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Assessing the Psychometric Properties of Clance Impostor Phenomenon Scale: A Pakistani Context

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ABSTRACT

The Impostor Phenomenon (IP) refers to a psychological sensation where undergraduates feel fraudulent or undeserving of their achievements, attributing success to external factors rather than their abilities. The most widely used scale to assess the feelings of the IP is the Clance Impostor Phenomenon Scale (CIPS). This study evaluated the psychometric properties of CIPS among Pakistani undergraduates from a general university in Sindh. The research involved two randomly selected samples: the first, comprising of 315 participants (201 males and 114 females), was used for item discrimination, internal consistency reliability, and Exploratory Factor Analysis (EFA). The second sample, consisting of 220 participants (138 males and 82 females), was utilized for Confirmatory Factor Analysis (CFA). Results indicated that CIPS items demonstrated good discrimination power and high internal consistency reliability, with a Cronbach alpha of α = .91. EFA revealed that the IP is a unidimensional construct. CFA confirmed that this one-factor solution fits the data adequately. The findings suggest that the IP, as measured by CIPS, is a unidimensional construct among Pakistani undergraduates. This research contributes valuable insights for evaluating the presence of impostor feelings in educational contexts within Pakistan.

Keywords: Impostor Phenomenon (IP), Clance Impostor Phenomenon Scale (CIPS), Psychometric Validation, Pakistani Undergraduates

INTRODUCTION

The "Impostor Phenomenon" (IP) is a psychological occurrence characterized by suspicion and fear of being exposed as a fraud despite one's achievements. In doing so, individuals question their ability, even if they are capable, and acclaim their success to external factors such as self-doubt, concerns about intelligence and ability (faking), failure to recognize praise and good performance (discounting), and categorization of successes to luck or chance (luck). The term was coined in the late 1970s based on clinical observations of female clients and initially seemed to apply only to highly successful individuals (Clance & Imes, 1978). However, Harvey (1981) argues that the inability to internalize success and see oneself as a fraud is not limited to highly successful people. According to Harvey and Katz (1985), this condition occurs in individuals facing performance tasks regardless of their status or gender. Moreover, the anticipation and confrontation of tasks associated with achievement are linked with adverse emotions and personal beliefs, including anxiety, depression, and reduced self-esteem, in individuals struggling with impostor feelings (Chrisman et al., 1995; Cozzarelli & Major, 1990).

Till today, many scales have been developed to explore the IP in various contexts. According to Mak et al. (2019), the 20-item "Clance Impostor Phenomenon Scale" (CIPS) is more noticeable due to its brevity, self-administration capability, and psychometrically reliable. Such features have contributed to its popularity as a preferred scale for the measurement of IP. This scale was initially used in 1985, and it has since been used in various researches to determine the perspectives of people concerning the IP. The scale has become a significant tool in the assessment

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determine the magnitude of the prevalence of the IP, the scores from individual items are added up and higher scores delineate more prevalence of the IP.

The Problem

Initially CIPS undertook validation studies and resulted in the development of a twenty-item scale. That initial validation now has been extended to further adaptation and validation in different languages. Many studies have attempted to explore scales psychometric properties in various languages and cultural contexts. This includes validation in Spanish (Sandoval-Lentisco et al., 2024), adaptation and validation in Turkish (Şahin & Gülşen, 2022), Croatian (Čarapina Zovko et al., 2021), also in Korean with 654 Korean individuals (Chae et al., 1995), then Brauer and Wolf (2016) validated in Germany with a sample consisting of 300 undergraduates. Later on it was also validated by Leonhardt et al. (2017) with a sample of 183 leadership position holders. These validation studies explored the CIPS's reliability, validity, and factorial structure, consistently affirming its reliability robustness and efficacy in gauging levels of IP but showing inconsistency in its factorial structure.

The original validation of this scale was identified as having three factors only. The three identified factors of this scale were labeled as Fake, Discount, and Luck Chrisman et al. (1995). Fake, was concerned with doubts about one's abilities and skills. The second factor, Discount, relates to the inability to acknowledge one's achievements or accept praise for them. The Luck factor entails a person crediting his/her achievements to chance as opposed to individual prowess. However, discussions on the conventional three-factor structure and alternative factor structures are increasing, with some researchers being in support of the three-factor solution (Brauer & Wolf, 2016), though other studies are also in support of alternative factorial models, such as the one-factor and two-factor (French et al., 2008; Simon & Choi, 2018).

Despite the popularity of CIPS since its introduction, variability in the factor structure of the CIPS has been observed in various studies; as a result, the agreement on the number of the factors is yet to be achieved. Furthermore, the absence of empirical data and eventually supporting literature on the consistency of the underlying dimensions of CIPS is missing (Mak et al., 2019). With factorial inconsistency, no research has substantiated the CIPS in student samples of Pakistan and moreover, there is no scale at present that is validated to measure the IP in the Pakistani student population.

Cultural norms may influence the perception of people of different races and cultural groups regarding the IP. One such study was carried out on minority students as per which the Asian American students had higher IP scores than Latino and African American students, with both the latter groups not showing any significant difference (Cokley et al., 2013). The second study by Bauer-Wolf (2017) using a minority group of undergraduate students revealed that Black students who were exposed to the IP reported higher anxiety and depression levels. These increased levels according to the respondents were attributed to perceived discrimination. On the other hand, the Asian students who underwent the IP also complained of depression and anxiety. These Asian students failed to blame such elevated levels on discrimination or racism. Interestingly, Latino origin students who were struggling with the IP did not report high levels of anxiety and depression. Bauer-Wolf (2017), were also of the strong belief that cultural backgrounds contribute to the interpretation and behavior of individuals in response to the impostor feelings.

New studies also highlight that socio-cultural issues play a crucial role in the occurrence and the experience of IP. Such aspects are gender and class, which formulate assumptions of competency and achievement, especially in the non-Western world (Meghji et al., 2025; Zafar et al., 2024). As an example, the challenges of moving through collective social norms to individualistic academic environments experienced by the first-generation college students in Pakistan are unique, thereby escalating impostorism (Abbas et al., 2024). Females are subjected to extra academic and social demands because of gendered expectations, which cause women to experience more IP than men (Ijaz et al., 2022; Qureshi et al., 2017). In addition, the internalization of failure and ability self-perception depend on socio-economic status and cultural stratification and help maintain the impostor feelings of Pakistani youth (Afzal et al., 2024; Zafar et al., 2024). These dynamics are consistent with the world evidence but require culturally responsive research methods that would allow addressing the IP experience in Pakistani context (Abbas et al., 2024). Due to these discussions of factor structure and growing evidence of cultural differences in IP experiences, there is need to examine these dimensions in the Pakistani context where it is possible that socio-cultural factors such as gender roles and class inequalities may have special influence on impostor feelings. Thus, considering such cultural peculiarities, this paper attempts to verify the CIPS in the context of the Pakistani undergraduate population to enhance the theoretic model beyond Western-centric models.

RESEARCH OBJECTIVES

The objectives of the study were to assess the psychometric properties of the CIPS among Pakistani undergraduates, aiming to offer evidence regarding the scale's item suitability, internal consistency reliability, identification of factor structure through exploratory factor analysis, and verification of factor structure through confirmatory factor analysis.

RESEARCH QUESTIONS

1. Are there any item(s) that need to be revised or removed for not providing acceptable discrimination between low and high levels of the Impostor Phenomenon?
2. Does the CIPS possess sufficient internal consistency reliability in the current sample of Pakistani undergraduates?
3. What are the underlying dimensions (s) of the CIPS in the current sample of Pakistani undergraduates?
4. Does dimension(s) identified through research question three provide(s) a good fit in the current sample of Pakistani undergraduates?

LITERATURE REVIEW

Adaptation and Validation in Turkish

A study conducted in Turkey adapted the CIPS questionnaire for Turkish speakers, involving 407 university students with a mean age of 21.12 ± 1.72 years. Confirmatory Factor Analysis (CFA) indicated that the single-factor model was suitable for the data from Turkish students. The analysis revealed a negative relationship between CIPS scores and self-esteem, while a positive relation was found with trait anxiety. High test-retest reliability was also demonstrated. In general, the Turkish adaptation of CIPS has strong psychometric characteristics, which is why it can be used to assess the IP levels in young adults. The small sample consisting mostly of females, however, is a limitation preventing its generalization. The next step of this research should be a more balanced sample based on gender and a clinical sample to better apply the results to a clinical population as well (Sahin & Gülşen, 2022).

Validation with Female Hebrew-Speaking Students

Yaffe (2020) psychometrically validated the Hebrew version of CIPS in 248 female students with the average age (in years) of the sample population 27.74 (SD = 7.32). The study collected data online, and the findings demonstrated that CIPS had acceptable psychometric characteristics (internal consistency and item-to-total correlation) meeting required standards. Exploratory Factor Analysis (EFA) indicated that there were four factors and accounted 54.81 percent of the total variance. This model was validated by Confirmatory Factor Analysis as the first model of four factors to be introduced in CIPS validation. Even having limitation in terms of broader applicability, these results indicate that the Hebrew version of CIPS is reliable in measuring impostor feelings in female Hebrew speaking students. The validation of this version should be done in future research by using external measures, to ensure that it is a multi-dimension measure and is consistent in measurement across genders.

Examination of Construct Validity Using a Multi-Method Approach

Bernard (2019) evaluated the construct validity of CIPS in black adults through a multi-method approach by involving 261 participants in factorial and discriminant validity, 157 participants in longitudinal consistency and eight participants in qualitative interviews to draw comparison between traditional theoretical conceptualizations of the IP. The first study did not indicate any empirical model structures which had been previously found to be applicable to this sample, thus leading to the development of a new factor structure with high discriminant validity to similar measures. This new structure was not constant over time in the second study, which created issues with the idea of CIPS being a constant measure of IP. Interviews partly confirmed traditional IP theory but brought out major effects that pertained to minority status regarding impostor cognitions. These results highlight both the strengths and the weaknesses of CIPS construct validity in black adults. These are also limited by sample characteristics which might limit the generalizability; respondents were of two different educational backgrounds (PWIs and HBCUs) and they could not be generalized to the wider population. Also, none of the studies was specifically in undergraduates, which may have excluded other groups of individuals who might have undergone the experiences of impostor feelings. The fact that the respondents are obliged to refer themselves to the African American/Black group also makes the interpretations rather complicated because of multiethnic identifications among the sample.

Validation of Psychometric Properties with Engineering Students

French et al. (2008) tested psychometric properties of CIPS with engineering students and the psychometric measures assessed internal consistency reliability and construct validity using CFA. Findings showed that internal consistency was acceptable, but CFA reported possible problems with the factor structure of the original theoretical model, which require additional research. The individualistic nature of this study to engineering students prevents its generalization to the rest of the population because other fields might not have the same admission requirements.

Validation Using Parallel Analysis

Živković (2020) examined the factorial validity of CIPS for both its twenty and sixteen-item versions, through the application of parallel analysis. Results demonstrated that the twenty-item version is appropriately modeled as a two-factor construct, while the sixteen-item version is best conceptualized as a one-factor version. The analysis helped determine the components and factors that were required to assess the IP.

Measurement Invariance and Validity in a University Population

In another study, Erekson et al. (2022) conducted multi-objective study on a university population, which comprised a total of 830 respondents for factorial validity assessment through cross-validation, as well as the examination of measurement invariance for CIPS factors across genders. It was determined that a one-factor model was well suited for CIPS and measurement invariance was attained through the removal of certain items that pertained to gender differences. The primary limitations of the study were non-probability sampling, which may not capture the overall university population, and insufficient consideration of diversity in the race and ethnicity beyond the male and female dichotomy.

Validation in Healthcare Simulation Educators

Moreover, Freeman et al. (2022) conducted an analysis involving the CIPS and Leary Impostorism Scale (LIS) among educators in an online healthcare simulation platform. It involved 148 participants (23% male, 77% female). CFA showed that a single-factor model fits best for both instruments and internal consistencies were high ($\alpha = .96$ for CIPS; $\alpha = .95$ for Leary). This research concludes that the IP is unidimensional among healthcare simulation educators.

Item Analysis of CIPS in Third-Year Medical Students

Also, Levant et al. (2020) worked with a cohort of medical students in the transition phase and evaluated impostor feelings using a 60-item CIPS questionnaire along with some burnout questions. Of 215 students surveyed, 112 completed the CIPS on which the average score suggested moderate-to-frequent impostor feelings (63.0 ± 14.6). Differences were noted between self-reported burnout levels, gender and burnout. Limitations include generalizability of the findings as the institution was singular, and the data was collected during specific training with clinical rotations having a high potential for variability and participant selection bias.

Validation of CIPS in the United States

Chrisman et al., (1995) compared CIPS with the Perceived Fraudulence Scale (Kolligian & Sternberg, 1991), demonstrating high internal consistency for both scales along with similar correlations with constructs like depression and self-esteem to establish discriminant validity for CIPS.

Psychometric Properties of the Spanish Version of CIPS

Sandoval-Lentisco (2024) conducted psychometric adaptation and validation of CIPS in Spanish-speaking populations, demonstrating high internal consistency (ωTotal = .90) alongside moderate correlations with depression ($r = .633$) and negative correlations with self-esteem ($r = -.754$). The study employed CFA to assess three proposed structures from the literature; findings suggested that a two-factor structure was most appropriate for this adaptation.

Validation in STEM Doctoral Students

Simon and Choi (2018) investigated CIPS's underlying factor solution due to inconsistencies in previous models advocating three-factor structures while later proposing single- or two-factor solutions through CFA evaluations indicating that a single-factor model was most parsimonious despite limitations related to sample size diversity across disciplines.

Validation in Pakistan/Impostor Phenomenon Research in Pakistan

A few researchers have studied the IP in Pakistan, but no study has done the factorial structure validation of the CIPS in Pakistan. However, only a few assessed the reliability through Cronbach alpha. Further, the majority of research is done with samples of medical and dental college students in Punjab.

MATERIALS AND METHODS

Population of the Study

The population of this study was both male and female undergraduates enrolled in the academic year 2024 in a public sector general university of Sindh.

Participants (EFA Sample)

The details of the participants on the EFA sample are given on the table below.

Table 1: EFA Sample

Program	No. of respondents	Gender		Self-Reported Age	First Language Spoken
		Male	Female		
BBA	70(22.2%)			15-20 (183, 58.1%)	Sindhi (242, 76.8%)
BS(Commerce)	5(14.21%)				
B.Ed. (Hons)	58(18.4%)				
B.Ed. (2.5)	3(1.0%)				
B.Ed. (1.5)	28(8.9%)			21-25 (104, 34.6%)	
BS (English)	76(24.1%)				Urdu (58, 18.4%)
BS (IT)	58(18.41%)				
BS (Computer Science)	43(13.7%)	201(63.8%)	114(36.2%)		
				26-30 (10, 3.2%)	Siraiki (5, 1.6%)
					Marwari (1, .3%)
Total	315 (100%)				
				31-35(11, 3.5%)	Balochi (9, 2.9%)
				36-40 (2, 0.6%)	

According to the data given in Table 1, the initial EFA sample was comprised of 325 undergraduates from a public sector general university in Sindh. These students completed an online version of the CIPS via Google Forms. However, 10 cases were omitted from the analysis because having incomplete information. Consequently, the final strength of the sample came out to be 315 undergraduates, among whom 201 (63.8%) were male and 114 (36.2%) were female. These undergraduates were enrolled in various programs offered by the university during the academic year 2024. These programs included BS (English) 76(24.1%), B.Ed. (H), 58(18.4%), B.Ed. (2.5) 3(1.0%), and B.Ed.

(1.5) 28(8.9%), BBA, 70 (22.2%), BS (IT) 58(18.41%), BS (CS) 43(13.7%), BS (Commerce), 5(14.21%). Data was collected from January 15th to January 28th, 2024. Among the respondents, most were aged 15-20 years, totaling 183 individuals, which accounts for 58.1% of the respondents, while 109 respondents or 34.6%, and were aged 21-25 years, with smaller proportions comprising the older age categories. Considering ethnicity, most respondents was Sindhi-speaking, which is 76.8% of the sample, with 18.4% of the sample being Urdu-speaking and smaller proportions accounted for the other ethnicities.

Participants (CFA Sample)

A detail of the second sample, which was randomly designated as a CFA sample, is provided in the table below.

Table 2: CFA Sample

Program	No. of respondents	Gender		Self-Reported Age	First Language Spoken
		Male	Female		
BBA	60 (27.3%)	138(62.7%)	82(37.3%)	15-20 (115, 52.3%)	Sindhi (160, 72.72%)
BS(Commerce)	5(14.21%)			21-25 (82, 37.3%)	
B.Ed. (Hons)	49(22.3%)				
B.Ed. (2.5)	2(0.9%)				Urdu (40, 18.18%)
B.Ed. (1.5)	28(12.7%)				
BS (English)	40(18.2%)			26-30 (10, 4.5%)	
BS (IT)	19(8.6%)				
BS (Computer Science)	22 (10.0%)			31-35(11, 5%)	Siraiki (8, 3.63%)
					Marwari (2, 0.9%)
Total	220 (100%)			36-40 (2, 0.9%)	
					Balochi (10, 4.44%)

According to the information in Table 2, the original sample for the CFA consisted of 225 undergraduate students at a public sector general university in Sindh, Pakistan. These students filled out the CIPS online Google form. Finally, the sample analysis included 220 undergraduates, as 5 cases were dropped on account of incomplete information. Of the sample, 138 (62.7%) were males and 82 (37.3%) were females. The students were registered in one of the university's offered programs for the 2024 academic year as follows: BS (English) 40 (18.2%), B.Ed. (H) 49 (22.3%), B.Ed. (2.5) 2 (0.9%), B.Ed. (1.5) 28 (12.7%), BBA 60 (27.3%), BS (IT) 19 (8.6%), BS (CS) 43 (13.7%), and BS (Commerce) 5 (14.21%). The data were collected from January 15 to January 28, 2024. Regarding the ages of the students, 115 (52.3%) were aged 15-20 years and 82 (37.3%) were 21-25 years, with fewer percentages in older categories. In terms of ethnicity, the majority were Sindhi-speaking (160, 72.7%), followed by Urdu-speaking (40, 18.18%), and minor percentages of the remaining ethnicities.

Procedures

Following the development of a Google Form which included the demographic section and the CIPS items, a request for formal approval from the authorities of the General University was initiated. After receiving formal approval from the Registrar of General University, the researchers sent out invitations to undergraduates through WhatsApp, asking them to take part in this research. A cover letter was provided which underlined the voluntary nature of participation and guaranteed the confidentiality of their responses.

Those who agreed were individually sent a link of the Google Form introducing the research objectives. They were subsequently briefed on the IP and the "Clance Impostor Phenomenon Scale," followed by instructions for anonymously completing the questionnaire, conditional upon their informed consent authentication. Demographic details including age, gender, primary language, and residence were collected from all participants before they proceeded to complete the CIPS. No incentives were offered for participation. Because the Google Form contained written instructions and also verbal instructions were given, therefore, counterbalancing was neither required nor done. The data was collected before and after instructional time. To participate, students needed to be enrolled as full-time undergraduates at any of the eight undergraduate programs offered by the university. No gender orientation or age-related requirements were imposed on undergraduates to become the respondents, and the questionnaire was completed in approximately half an hour. Further, Participation was optional, and aside from gathering fundamental demographic details, the survey did not acquire any identifiable information beyond that.

Measures

The present research utilized IBM SPSS Statistics 24, AMOS, Microsoft Excel, and SPSS syntax (parallel. Sps) developed by British Columbia University for its analysis. Data normality was assessed using the z scores. Mean and standard deviation were calculated. Further, the corrected item-total correlation was also calculated for each item. To assess the psychometric properties of the CIPS, a method having two steps was adopted. The first step determined how twenty items of CIPS club together to form single or multiple constructs and this was done through EFA. Subsequently, the identified structure was validated through the CFA method. While EFA aids in discerning the instrument's dimensionality, it solely provides theoretical evidence of its dimensionality. Hence it was necessary to verify the identified dimensionality of the scale by utilizing a different sample to cross-validate the scale's construct validity (Fabrigar & Wegener, 2012). Therefore, the original sample of 535 undergraduates was split into two samples of 315 and 220, respectively, employing the SPSS random selection procedure. These two samples were randomly assigned as EFA and CFA samples. The first sample comprising of 315 undergraduates served as an EFA sample and the second including 220 undergraduates was designated as a CFA sample. Additionally, the item analysis and internal consistency reliability analysis were also done.

Ethical Statement

The participants encountered no negative effects, their identities were kept confidential, and their consent was obtained through a written agreement. The respondents were given the contact details of the researcher because they had the choice to leave this research at any stage of the data collection.

RESULTS

Research Question Analysis

Analysis of Research Question No: 01: Are there any item(s) that need to be revised or removed for not providing acceptable discrimination between low and high levels of the Impostor Phenomenon?

Table 3: Descriptive statistics and Corrected Item-Total Correlations (CITC) for CIPS items within the EFA sample (n=315)

Items	Mean	SD	CITC	Skew	Kurtosis
1. "I have often succeeded in a test or on task even though I was afraid that I would not do well before I undertook the task".	2.68	1.437	.567	2.00	-4.30
2. "I can give the impression that I'm more	3.24	1.325	.550	-.759	-3.71

competent than I really am. ”					
3. “I avoid evaluations if possible and have a dread of others evaluating me. ”	2.59	1.437	.550	2.00	-4.12
4. “When people praise me for something I accomplish, I’m afraid I won’t be able to live up to their expectations to me in the future. ”	2.94	1.402	.528	.795	-.865
5. “I sometimes think I obtained my present position or gained my present success because I happened to be in the right place at the right time or knew the right people.”	2.43	1.429	.508	1.47	-3.62
6. “I’m afraid people important to me may find out that I’m not as capable as they think I am.”	2.99	1.335	.598	-.0072	-3.47
7. “I tend to remember the incidents in which I have not done my best more than those times I have done my best.”	3.30	1.297	.532	.737	-3.58
8. “I rarely do a project or task as well as I’d like to do it”.	3.56	1.306	.527	-2.00	-3.24
9. “Sometimes I feel or believe that my success in my life or in my job has been the result of some kind of error.”	2.72	1.451	.545	1.78	-4.41
10. “It’s hard for me to accept compliments or praise about my intelligence or accomplishments.”	3.17	1.336	.601	-.737	-3.64
11. “At times, I feel my success has been due to some kind of luck.”	3.23	1.296	.533	-.700	-3.46
12. “I’m disappointed at times in my present accomplishments and think I should have accomplished much more.”	3.06	1.249	.502	-.116	-2.86
13. “Sometimes I’m afraid others will discover how much knowledge or ability I really lack. ”	2.59	1.468	.590	2.00	-4.27
14. “I’m often afraid that I may fail at a new assignment or undertaking even though I generally do well at what I attempt. ”	3.13	1.353	.517	-.306	-3.80
15. “When I’ve succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.”	3.26	1.294	.537	-1.489	-3.26
16. “If I receive a great deal of praise and recognition for something I’ve accomplished, I tend to discount the importance of what I’ve done.”	3.20	1.420	.603	-1.37	-4.10

17. "I often compare my ability to those around me and think they may be more intelligent than I am."	3.24	1.396	.576	1.32	-4.10
18. "I often worry about not succeeding with a project or examination, even though others around me have considerable confidence that I will do well."	3.03	1.278	.505	.93	-3.45
19. "If I'm going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact."	3.10	1.352	.589	-.007	-3.80
20. "I feel bad and discouraged if I'm not "the best" or at least "very special" in situations that involve achievement."	3.23	1.361	.618	-.671	4.047

Note. Item's response scale ranges between 1 and 5. CITC= corrected item-total-correlations; CIPS= "Clance Impostor Phenomenon Scale".

Table 3 presents descriptive statistics regarding CIPS. Each item underwent an item analysis to assess its total correlation and discriminatory power. The evaluation of item discrimination commonly relies on measures such as the discrimination index (D) and item-total correlation. Item discrimination assesses the strength of the relationship between a specific item within a test and the other items, effectively gauging its association with the true score (DeVellis, 2006). Put differently, it reflects the extent of correlation between an individual item and all other items, hence termed as item-total correlation. This relationship is investigated using coefficients such as phi for "tetrachoric, biserial and point-biserial correlation for binary scored items (e.g., true/false) and Pearson product-moment correlation coefficient for polytomous scored items (e.g., open-ended tests) (Kline, 2000)". Positive item discrimination values represent an improvement in the ability to discriminate between people at low and high trait levels (Macdonald & Paunonen, 2002). Researchers typically propose a minimum item-total correlation of .30 as a threshold for acceptable discrimination (Kline, 2000; Nunnally & Bernstein, 1994). According to the results, 20 items met 0.3 criteria of item-total correlation. The results also displayed good to very good discrimination (Oosterhof, 1990), with indices ranging from .50 to .61 (mean = 0.55). These discrimination indices for the CIPS indicate the potential for items to differentiate between individuals experiencing low and high levels of IP. Eventually, no item warranted revision or removal from the scale, and all the items were retained.

Analysis of Research Question No: 02: Does the CIPS possess adequate internal consistency reliability in the current sample of Pakistani undergraduates?

Table 4: Reliability Statistics

Cronbach Alpha	N of Items
.911	20

According to the data presented in Table 4, an adequate internal-consistency reliability coefficient was observed in the current study with a total score for all twenty items of CIPS stood at .91, which is consistent with previous findings of this scale (Chrisman et al., 1995). So, CIPS possess adequate internal consistency reliability in the current sample of Pakistani undergraduates.

Analysis of Research Question No: 03: What are the underlying dimensions of the CIPS in the current sample of Pakistani undergraduates?

An EFA for dimensionality identification was conducted starting with unrestricted factor extraction and followed by a priori restricted one, two, three and four factors extraction.

Unrestricted Factor Extraction. In the first step of EFA, an unrestricted factor extraction was conducted based on Eigen values greater than 1 rule.

Table 5: The Total Variance Explained and Communalities

Factors	Initial Eigenvalues			Communalities
	Total	% of Variance	Cumulative %	(h^2)
1	11.628	58.14	58.14	.446
2	1.111	5.55	63.69	.415
3	1.107	5.50	69.19	.457
4	1.019	5.09	74.28	.534
5	0.642	3.21	77.49	.379
6	0.502	2.51	80.00	.529
7	0.473	2.36	82.36	.448
8	0.450	2.25	84.61	.503
9	0.418	2.09	86.70	.474
10	0.375	1.87	88.57	.504
11	0.325	1.62	90.19	.606
12	0.310	1.55	91.74	.348
13	0.273	1.36	93.10	.647
14	0.265	1.32	94.42	.324
15	0.273	1.36	95.78	.361
16	0.251	1.25	97.03	.477
17	0.193	0.96	97.99	.358
18	0.153	0.76	98.75	.592
19	0.132	0.66	99.41	.391
20	0.117	0.59	100.000	.440

Table 6: Unrestricted Factor Loading Matrix with Maximum Likelihood Estimation and Varimax rotation. Loadings less than 0.3 suppressed for clarity

Items	**Factors**			
	1	**2**	**3**	**4**
Q4	.684			
Q6	.616	.351		
Q9	.550	.401		

Q2	.510		.341	
Q20	.455	.369		
Q16	.447		.366	.359
Q19	.387	.340		
Q17	.367			
Q13		.752		
Q3		.590		
Q1	.302	.556		
Q5		.505		
Q11			.724	
Q8			.647	
Q7			.585	
Q10	.431		.490	
Q15		.342	.354	.318
Q18				.706
Q12				.442
Q14		.331		.354

Note. Extraction Method: MLE

According to the data given in Table 6, an unrestricted maximum likelihood factor analysis with varimax rotation was done. This resulted in the identification of four potential factors, each with eigenvalues surpassing 1.0, collectively explaining 58.14%, 5.55%, 5.50%, and 5.09% of the variance, respectively. The communalities of the initial solution were observed and all were larger than 0.3 so, the decision was made to retain all the item. The analysis further revealed numerous instances of cross-loadings, wherein certain items were loaded onto multiple factors simultaneously. For example, item 1, 6, 9, 19 and 20 exhibited loadings on both factors 1 and 2, while items 2, 10 and 16 showed loadings on both factors 1 and 3, and items 15 and 16 loaded on factors 1, 3 and 4. Some items showed cross-loading differences greater than 0.2 and some less than 0.2. Based on the prevalence of numerous cross-loadings and a probable one-factor solution as suggested by Scree Plot analysis in contrast to a four-factor solution resulting from the eigenvalue rule the decision was made to manually select two, three and four factors for extraction. However, in all three scenarios, the factor solutions displayed numerous cross-loadings and it remained evident that the items loaded onto multiple factors. But the magnitude of loading was more on the first factor so only one factor emerged. Despite attempts to address these issues through iterative removal of items, the problems persisted in each analysis.

Table 7: One factor-specified factor-loading matrix

Items	**Factor Loadings**	**Communalities**
Q20	.652	.355
Q16	.635	.343
Q10	.632	.327
Q6	.628	.321

Q19	.619	.380
Q13	.611	.394
Q17	.607	.313
Q1	.596	.304
Q2	.585	.334
Q9	.578	.399
Q3	.572	.320
Q4	.567	.372
Q11	.566	.373
Q7	.560	.392
Q15	.557	.310
Q8	.551	.403
Q14	.541	.368
Q5	.529	.375
Q18	.524	.383
Q12	.522	.425

Note. Extraction Method: Maximum Likelihood

Parallel Analysis EigenValues

Finally, parallel analyses were accomplished on a randomly generated data set consisting of 20 variables through a sample size of 315. A Monte Carlo PCA with replication between 100 and 1000 was used to perform the Parallel. The results show that the first-factor eigenvalue in the current research (11.628) exceeds the corresponding eigenvalues derived from PCA (maximum = 1.55; 100 to 1000 repetitions). This suggests that all CIPS items use one underlying dimension. The cumulative percentage of variance explained by this one-factor solution for the 20 CIPS items was 58.14%, which exceeded the 50% threshold (Hair et al., 2014). The clarity of the interpretation of the item properties and factor loadings suggest that the CIPS measures a single construct of the IP as theorized by Simon and Choi (2018).

Table 8: Parallel Analysis EigenValues

Component Number	**Actual eigenvalue from PCA**	**Random order from parallel analysis**	**Decision**
1	11.628	1.549521	Accept
2	1.111	1.432482	Reject
3	1.107	1.358983	Reject
4	1.019	1.302528	Reject
5	0.642	1.249956	Reject
6	0.502	1.203254	Reject
7	0.473	1.155606	Reject
8	0.450	1.110295	Reject
9	0.418	1.073476	Reject
10	0.375	1.033611	Reject
11	0.325	.994996	Reject
12	0.310	.955308	Reject
13	0.273	.917193	Reject
14	0.265	.883112	Reject

15	0.273	.846890	Reject
16	0.251	.809678	Reject
17	0.193	.771421	Reject
18	0.153	.733163	Reject
19	0.132	.687630	Reject
20	0.117	.648407	Reject

Analysis of Research Question No: 4: Does dimension(s) identified through research question three provide(s) a good fit in the current sample of Pakistani undergraduates?

A Confirmatory Factor Analysis (CFA) was then undertaken to assess the adequacy of the current one-factor solution. Table 9 presents the model-fit statistics for the unaltered one-factor model (no modifications applied), aiming to preserve the genuine data structure by abstaining from introducing correlated errors (MacCallum et al., 1992). The one-factor model seems better, given that it meets the fit criterion: RMSEA = 0.07 (not >. 08), SRMR = 0.074 (below. 08), CFI = 0.93 (exceeding. 90), and TLI = 0.92 (>. 90). The standardized regression weights for the IP ranged from. 52 and. 70, indicating substantial loadings of all variables on the targeted latent variable and with each being statistically significant at. 01 levels. These results satisfy the criteria established by Hair et al. (2009) advocating for "standardized factor loadings" of at least 0.5, preferably 0.7, thereby explaining a minimum of 25% or ideally 49% of the variance for each Indicator. These findings affirm the scale's consistency and factorial validity with the data.

Table 9: Goodness-of-fit indices for the one-factor model of the CIPS (n=220)

Test Indices	Test Standard	Df	Result	Model Fit Verification
CMIN/df	"Less than 2 is considered a good fit, whereas a value of less than 5 refers to an acceptable fit (Ertaş et al., 2022)".		1.77	Good Fit
TLI	"Tucker–Lewis Index (TLI) is generally between 0 and 1 but sometimes more significant than 1. A high TLI value indicates a good fit (Gürbüz & Şahin, 2014)".		.92	Good Fit
CFI	"A comparative fit index (CFI) value greater than 0.95 is considered a good fit, and a value greater than 0.90 is considered acceptable (Gürbüz & Şahin, 2014)".		.93	Acceptable Fit
RMSE	"0.08 or less indicates an acceptable, and a value of 0.05 or less indicates a perfect fit (Karagöz, 2021)".	170	.07	Acceptable Fit
SRMR	"A value of .05 and below is a good fit and from .05 to .09 is considered an adequate fit (MacCallum et al., 1992)".		.074	Adequate Fit

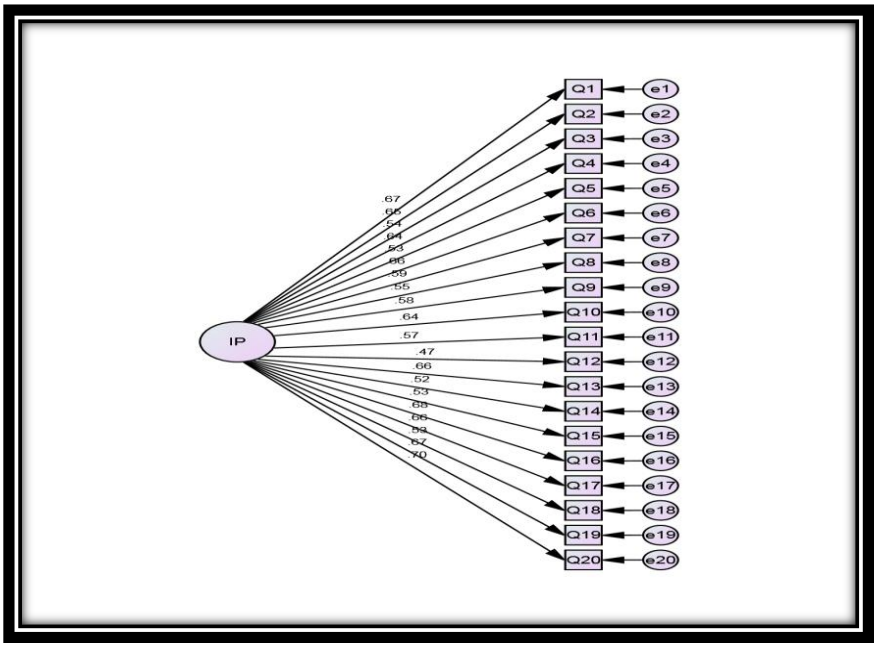

Figure 1: First Order One Factor CFA Model

DISCUSSIONS

The study's findings suggested satisfactory psychometric properties of the CIPS, encompassing its overall internal consistency reliability, adherence of item to total correlations and discrimination power to standard criteria (Chrisman et al., 1995; Kline, 2000; Nunnally & Bernstein, 1994; Oosterhof, 1990). The EFA revealed a consistent single-factor solution for the 20 items, elucidating 58.14% of the variance within the model and the CFA results for the theoretically preferred model were also favourable. Prior research has proposed one-factor solution (Erekson et al., 2022; Özdemir, 2015; Şahin & Gülşen, 2022; Simon & Choi,2018), two-factor solution (French et al., 2008), three-factor solution (Brauer & Wolf, 2016; Chrisman et al., 1995), and four-factor solutions (Yaffe, 2020), delineating various subscales. Recently, Mak et al. (2019) observed that the CIPS lacks subscale characteristics, thus obscuring the optimal factor structures. The findings of this study indicated that the CIPS was not sensitive enough to distinguish among different factors of the construct and through rigorous exploratory factor analysis, the present findings suggest that the measure is unidimensional, consistent with the findings of Jöstl et al. (2015) and Simon and Choi (2018), who also concluded that a one-factor solution best elucidates the factor structure of the CIPS. Also, the CFA results for the theoretically preferred one factor model also proved to be favorable and exhibited beneficial factor loadings. This was deemed acceptable that this 20 items one-factor model is well suited for undergraduates.

While this study supports the unidimensional structure of the CIPS among Pakistani undergraduates, it is important to contextualize these findings within the wider context of cross-cultural variability and realize inherent limitations that could affect the scale's cultural sensibility and stability. While the CIPS is universally utilized and a significant source of data, it is also noted that many limitations, particularly pertaining to cultural adaptability and factorial validity in Pakistani context. The factorial structure of the CIPS has also been shown to vary across cultural contexts and be subject to concerns about how constructs that perpetuate IP is demonstrated in different populations. This variability demonstrates the limitations of the scale to fully capture culturally appropriate dimensions of impostorism without adaptation. On top of that, cultural norms, values, and language may influence responses to items by influencing the interpretation of items and inconsistencies among responses. To address these challenges, future studies should take a wider focus on culturally sensitive adaptation practices such as qualitative discussion of local perceptions of impostor feelings and iterative scale refinement. The use of cultural relevant items and the identification of the logical structure of factors will improve the psychometric robustness and relevance of the scale. Such efforts are required if reliable, accurate and robust instruments which are as per the local contexts and useful for extracting valid and feasible knowledge for understanding and evaluation of impostor phenomena especially for the Pakistani undergraduates are our priority.

CONCLUSION

This study was designed to verify the psychometric properties of CIPS, as previously conceived, since the CIPS had an inconsistent factor structure. According to the results of this study, the 20-item one-factor model is a better fit for Pakistani students. Although the CIPS can be readily applied to clinical and research purposes because of its ease of administration, brevity, and perceived utility for medical and research purposes compared with other IP instruments, its unclear factor structure suggests caution when choosing its totals for decisions. The CIPS is far superior to other IP measurement instruments that can be used to measure IP, having the convenience of carrying out administration, flexibility and perceptional utility in the field, but also is easier to use, easier to administer, and perceived usefulness for clinical and research applications. Together with these advantages of the CIPS, the availability of a common one-factor structure within Pakistani undergraduates suggests that professionals and researchers can rely on total scores using this instrument. In addition, the CIPS could be a useful tool to identify the perceived state of the undergraduate attitude toward personal incompetence. This study indicates the IP as measured by CIPS is unidimensional construct. On top of that, the 20-item CIPS has strong psychometric properties for assessing IP among Pakistani undergraduates. These results will thus increase the confidence of scientific community in the CIPSs as a measurement instrument for IP.

LIMITATIONS AND FUTURE WORK RECOMMENDATIONS

This research could be extended by gathering additional samples from diverse student populations as this study was dependent on a sample of undergraduates which were from only one university from public sector. Moreover, this general public sector university was situated in rural Sindh limiting the generalization and the applicability of the CIPS to broader populations. It is an important limitation keeping in view the other categories of undergraduates (Medical and Engineering) undergoing stringent admission criteria resulting in high likelihood of introducing a confounding factor of actual competence within the IP. Because of the general education is a less liked choice and students prefer to enroll in general universities if they fail to secure admissions in Medical or Engineering universities. Additional forms of psychometric properties can also be validated along with extended verification of factor structure. It may include measurement invariance testing because it remains unclear how reliable scores are over time (e.g., test-retest reliability) or whether scores can predict student persistence (predictive validity) as it is important to ensure these across various groups for valid comparisons on the CIPS. Convergent/Discriminant validity may also be assessed in future studies as it was not assessed in this study. Such evidence is necessary as it will enhance the understanding regarding the utility of the scores derived from CIPS within the context of Pakistani undergraduates. CIPS can also be employed to assess the prevalence of IP in undergraduates. Such analyses of the total scores could be useful in terms of student recruitment, performance, and retention. It may be so because IP may lead these students to doubt their readiness for the future. Such studies are necessary to uncover the extent of affected students by the IP. These will also identify factors contributing to these perceptions ultimately helping in the exploration of strategies to mitigate them. It will ensure that all individuals have equitable opportunities for both personal and professional advancement.

REFERENCES

Abbas, N., Farzand, M. S., Riaz, M. S., & Ahmad, E. (2024). Echoes of Doubt: Unveiling Imposter Phenomenon Among First Generation Pakistani Students. *Foundation University Journal of Business & Economics*, *9*(2), 147-159.

Afzal, S., Zamir, S., & Ali, M. A. (2024). Intricacies of Imposter Phenomenon, Mental Well-Being, Self-Compassion and Academic Integrity Interactions Among Students: Parallel Mediation Analysis. *Annals of Human and Social Sciences*, *5*(2), 427–440. https://doi.org/10.35484/ahss.2024(5-II)40

Bauer-Wolf J. (2017, April 6). *Feeling like impostors*. Inside Higher Ed. Retrieved from https://www.insidehighered.com/news/2017/04/06/study-shows-impostor-syndromes-effect-minority-students-mental-health

Bernard, D. L. (2019). *Impostor phenomenon: A multi-method examination of construct validity among Black college students* (Doctoral dissertation, The University of North Carolina at Chapel Hill). ProQuest Dissertations and Theses Global.

Brauer, K., & Wolf, A. (2016). Validation of the German-language Clance impostor phenomenon scale (GCIPS). *Personality and Individual Differences, 102*, 153–158

Čarapina Zovko, I., Milić, J., Vucemilovic, F. B., Jemrić, N., Sulić, P., Turudić, M., ... & Biloglav, Z. (2021). Translation of the Clance Impostor Phenomenon Scale into the Croatian Language. *Southeastern European Medical Journal: SEEMEDJ*, *5*(1), 145-156.

Chae, J. H., Piedmont, R. L., Estadt, B. K., & Wicks, R. J. (1995). Personological evaluation of Clance's Imposter Phenomenon Scale in a Korean sample. *Journal of personality assessment*, *65*(3), 468-485.

Chrisman, S. M., Pieper, W., Clance, P. R., Holland, C., & Glickauf-Hughes, C. (1995). Validation of the Clance imposter phenomenon scale. *Journal of personality assessment*, *65*(3), 456-467.

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.

Cokley, K., McClain, S., Enciso, A., & Martinez, M. (2013). An examination of the impact of minority status stress and impostor feelings on the mental health of diverse ethnic minority college students. *Journal of Multicultural Counseling and Development, 41(2)*, 82–95. https://doi.org/10.1002/j.2161-1912.2013.00029.x

Cozzarelli, C., & Major, B. (1990). Explaining women's depression: The role of the impostor phenomenon. *Psychology of Women Quarterly, 14(3)*, 327-341.

DeVellis, R.F. (2006). Classical test theory. *Medical Care, 44*(11), 50-59. https://doi.org/10.1097/01.mlr.0000245426.10853.30

Erekson, D. M., Larsen, R. A., Clayton, C. K., Hamm, I., Hoskin, J. M., Morrison, S., ... & Beecher, M. E. (2022). Is the Measure Good Enough? Measurement Invariance and Validity of the Clance Imposter Phenomenon Scale in a University Population. *Psychological Reports*, 00332941221139991.

Ertaş, H., Filiz, E., Kahveci, Ş., & Ünal, S. N. (2022). Turkish Validity and Reliability Study of Challenge-Hindrance Demands Scale for the Nursing Profession. *International Journal of Clinical Practice*, *2022*(1), 3912003.

Fabrigar, L. R., & Wegener, D. T. (2012). *Exploratory factor analysis*. New York, NY: Oxford

Freeman, K. J., Houghton, S., Carr, S. E., & Nestel, D. (2022). Measuring impostor phenomenon in healthcare simulation educators: a validation of the clance impostor phenomenon scale and leary impostorism scale. *BMC medical education*, *22*(1), 1-6.

French, B. F., Ullrich-French, S. C., & Follman, D. (2008). The psychometric properties of the Clance Impostor Scale. Personality and Individual Differences, 44(5), 1270–1278.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis (7th ed.)*. Prentice-Hall

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). Multivariate data analysis: Pearson new international edition. *Essex: Pearson Education Limited, 1(2)*.

Harvey, J. (1981). The Impostor Phenomenon: Overcoming the Fear that Haunts Your Success. *Psychotherapy: Theory, Research & Practice, 18(2)*, 211-219.

Harvey, J. C. & Katz, C. (1985). *If I'm so successful, why do I feel like a fake?: The impostor phenomenon (1st ed.)*. New York: St. Martin's Press.

Ijaz, F., Bokhari, U., Khan, S. K., Shoaib, U., Tariq, S., Haris, R. Z., & Aftab, R. K. (2022). Association of imposter phenomenon and burnout with mode of education among medical students of Pakistan: Imposter phenomenon and burnout with mode of education. *Journal of Aziz Fatimah Medical & Dental College*, *4*(1).

Jöstl, G., Bergsmann, E., Lüftenegger, M., Schober, B., & Spiel, C. (2015). When will they blow my cover?. *Zeitschrift für Psychologie*.

Kline, P. (2000). *The handbook of psychological testing* (2nd ed.). Routledge

Kolligian, J., & Sternberg, R. J. (1991). Perceived fraudulence in young adults: Is there an impostor phenomenon? *Journal of Personality Assessment, 56(2)*, 308-326.

Leonhardt, M., Bechtoldt, M. N., & Rohrmann, S. (2017). All impostors aren't alike—Differentiating the impostor phenomenon. Frontiers in Psychology, 8, 1505.

Levant, B., Villwock, J. A., & Manzardo, A. M. (2020). Impostorism in American medical students during early clinical training: Gender differences and inter-correlating factors. *International Journal of Medical Education, 11,* 90–96.

MacCallum, R. C., Roznowski, M., & Necowitz, L. B. (1992). Model modifications in covariance structure analysis: the problem of capitalization on chance. *Psychological bulletin*, *111*(3), 490.

Macdonald, P., & Paunonen, S.V. (2002). A Monte Carlo comparison of item and person statistics based on item response theory versus classical test theory. *Educational and Psychological Measurement, 62*(6), 921-943. https://doi.org/10.1177/0013164402238082

Mak, K. K., Kleitman, S., & Abbott, M. J. (2019). Impostor phenomenon measurement scales: a systematic review. *Frontiers in psychology,* 10, 671.

Meghji, K. A., Shaikh, U. M., Hiba, U., & Asif, H. (2025). Prevalence of imposter phenomenon in students and its correlation with burnout syndrome: torn between perfection and exhaustion. *Khyber Medical University Journal*, *17*(1), 19-25.

Nunnally, J.C., & Bernstein, I.H. (1994). *Pschometric theory* (3rd ed.). McGraw Hill.

Oosterhof, A. (1990). *Classroom Applications of Educational Measurements.* Merrill, Columbus, OH.org/10.1016/j.bushor.2019.05.001

Özdemir, G. (2015). *Başarılarımın sahibi ben değilim: Sosyal kimlik, sosyal baskınlık ve sistemi meşrulaştırma kuramları perspektifinden sahtekâr fenomeni (My achievements are not mine: Imposter phenomenon in light of the social identity, social dominance and system justification theories)*. [Unpublished Master Thesis]. Uludağ University paid.2017.04.029

Qureshi, M. A., Taj, J., Latif, M. Z., Zia, S., Rafique, M., & Chaudhry, M. A. (2017). Imposter syndrome among Pakistani medical students. *Annals of King Edward Medical University, 23(2)*.

Şahin, E. E., & Gülşen, F. U. (2022). Clance Impostor Phenomenon Scale (CIPS): Adaptation and Validation in Turkish University Students. *Psycho-Educational Research Reviews*, *11*(1), 270-282

Sandoval-Lentisco, A., Tortajada, M., Palmero, L. B., Campoy, G., Fuentes, L. J., & Martínez-Pérez, V. (2024). Propiedades psicométricas de la adaptación española de la Clance Impostor Phenomenon Scale (S-CIPS). *Anales de Psicología/Annals of Psychology*, *40*(1), 38-43.

Simon, M., & Choi, Y. J. (2018). Using factor analysis to validate the Clance Impostor Phenomenon Scale in sample of science, technology, engineering and mathematics doctoral students. *Personality and Individual Differences, 121,* 173–175

Yaffe, Y. (2020). Validation of the Clance Impostor Phenomenon Scale with female Hebrew-speaking students. *Journal of Experimental Psychopathology*, *11*(4), 2043808720974341

Zafar, U., Ali, Z., Akhter, F., Huda, N. U., Ali, A., & Zulfiqar, A. (2024). Imposter phenomenon: its association with personality traits and self-esteem among students-an observational study. *Gomal Journal of Medical Sciences*, *22*(4 (S)), 401-407.

Živković, P. (2020). Using parallel analysis to validate the Clance Imposter Phenomenon Scale. *International Journal of Education Humanities and Social Science*, *3*(4), 408-414.