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To cite this article: Zuzanna Schneider, Edyta Charzyńska, Dagna Kocur & Peter K. Jonason (03 Mar 2025): A Concise Measure of the Impostor Phenomenon: The Brief Impostor Phenomenon Scale (BIPS), Journal of Personality Assessment, DOI: [10.1080/00223891.2025.2468492](https://doi.org/10.1080/00223891.2025.2468492)

To link to this article: <https://doi.org/10.1080/00223891.2025.2468492>

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 Published online: 03 Mar 2025.

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A Concise Measure of the Impostor Phenomenon: The Brief Impostor Phenomenon Scale (BIPS)

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ABSTRACT

The aim of the study was to introduce a concise measure for assessing the impostor phenomenon. We reduced the Perceived Fraudulence Scale (PFS) in a sample of 1,001 Polish-speaking adults through the use of exploratory ($n=500$) and confirmatory ($n=501$) factor analysis to 12 items, composed of three subscales: self-deprecation, external ability attribution, and inauthenticity. This brief scale showed scalar measurement invariance between men and women, and between students and working professionals. Item Response Theory (IRT) analyses further supported individual items' properties. The measure also demonstrated good internal consistency and validity. Impostor phenomenon correlated negatively with self-esteem, emotional stability (i.e., low neuroticism), extraversion, conscientiousness, and intellect (i.e., openness to experience). In addition, women scored higher than men on overall impostor phenomenon which was driven only by the self-deprecation aspect. Students scored higher than working professionals on both the general score and all three subscales. The initial psychometric properties suggest that the Brief Impostor Phenomenon Scale (BIPS) is a valid and reliable short measure, supporting its further use in research. These results also add to the currently underdeveloped body of research on the impostor phenomenon in a non-English speaking cultural setting.

ARTICLE HISTORY

Received 10 May 2024
Revised 20 January 2025
Accepted 9 February 2025

Introduction


The impostor phenomenon (IP), otherwise known as the “imposter syndrome,” can be defined as a subjective experience of intellectual phoniness. It is accompanied by a sense that one is less intelligent and capable than others might think. IP usually occurs among ambitious individuals with objectively high achievements, yet who struggle with internalizing their success (Kolligian & Sternberg, 1991). Some of the most prominent characteristics of the IP include distorted attribution of success, self-perceived intellectual fraudulence, and self-critical denial of one's abilities (Clance, 1985; Kolligian & Sternberg, 1991). Even though various conceptualizations and terms describing the IP have emerged (e.g., “impostorism”; Leary et al., 2000; or “perceived fraudulence” proposed by Kolligian & Sternberg, 1991, to avoid clinical connotations associated with the term “syndrome”), there seems to be a general consensus that they all refer to the same underlying construct with varying outlooks on its dimensionality (see Bravata et al., 2020; Lee et al., 2024; Stone-Sabali et al., 2023) and only minor differences.¹

While the IP is not officially recognized as a clinical disorder (Bravata et al., 2020), it is associated with several mental health consequences such as anxiety and self-doubt, tendency to overwork (Kananifar et al., 2015; Vergauwe et al., 2015), and experiencing guilt and shame (Clance & O'Toole, 1987). People with high levels of impostor phenomenon also have low and unstable self-esteem (Schubert & Bowker, 2019), high neuroticism (Bernard et al., 2002), and often procrastinate, which may explain their lower scores in conscientiousness (Vergauwe et al., 2015). Although in academic settings the IP is associated with higher achievement orientation (King & Cooley, 1995) and a higher GPA, in professional environments “impostors” tend to get fewer promotions and have lower salaries (Blondeau, 2024). Despite having the necessary qualifications, they may be less inclined to seek such opportunities out of fear of being exposed as a “fraud” (Crawford et al., 2016). Altogether, people struggling with IP may have difficulties with flourishing at work to their full potential and face more considerable mental health issues (Bravata et al., 2020). Thus, considering the relevance of these psychological outcomes, expanding the research on

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¹Given that these numerous terminologies describe largely the same underlying construct, with the “impostor phenomenon” remaining more widely used than “perceived fraudulence” (Stone-Sabali et al., 2023) we continue to use the original term “impostor phenomenon” and propose the name Brief Impostor Phenomenon Scale (BIPS) to avoid multiplying various labels and therefore generating further noise in the literature (see Clance & Lawry, 2024). This also aligns with Kolligian and Sternberg (1991) notion to avoid the term “syndrome” commonly associated with clinical diagnosis.

 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/00223891.2025.2468492>.

the IP and making its assessment brief and accessible seems even more important.

Even though the IP was originally described as a phenomenon that predominantly affects women (Clance & Imes, 1978), it has since been identified among both men and women. Until recently, researchers have not reached a consensus on whether there are gender differences in the IP. While in some studies women scored higher in IP (e.g., Jöstl et al., 2012; Kumar & Jagacinski, 2006; McGregor et al., 2008), in others their IP level was no different than men's (Edwards et al., 1987; Leary et al., 2000; Rohrmann et al., 2016). Recent meta-analysis findings conclude that women indeed tend to demonstrate higher levels of the IP than men. However, these differences are greater in European countries and Northern America than in Asia (Price et al., 2024). Whereas some findings may suggest that these differences can be dependent on cultural (Price et al., 2024) or situational context (see Brauer & Proyer, 2023a; Hutchins & Rainbolt, 2017), little attention has been given to the particular facets of the IP that may underline these effects.

To date, most studies on the IP have been conducted in the United States and most of the research on the IP—that is over 77%—comes from WEIRD (i.e., Western, Educated, Industrialized, Rich, Democratic), English-speaking countries (Stone-Sabali et al., 2023). Despite the need for more studies to examine the construct in more diverse samples and cultures (Walker & Saklofske, 2023), cross-cultural research on the IP remains limited. Nonetheless, there are reasons to suspect that culture might affect levels of the IP. For instance, students from Hong Kong demonstrated higher levels of the IP than those from the United Kingdom (Cheung & Cheng, 2024). This highlights the importance for expanding IP research to different cultural backgrounds (see Lee et al., 2024) to further test its replicability in diverse settings.

Existing measures of the impostor phenomenon

Despite a growing interest in the impostor phenomenon in the past decade with numerous studies and lay literature published on the topic (Bravata et al., 2020; Feenstra et al., 2020), a “gold standard” in the IP measurement is yet to be established and the popularity of some scales should not be mistaken for higher quality (Mak et al., 2019). There are several measures of the IP available, however, none of them comes without some considerable shortcomings and, therefore, leave room for improvement. The most prominent limitations of the existing IP scales concern lack of proper evaluation of their psychometric properties (Lee et al., 2024) resulting in issues like instability in their internal consistency (e.g., the Harvey Impostor Phenomenon Scale; HIPS; Harvey, 1981; see Edwards et al., 1987, Hellman & Caselman, 2004) or their factor structure (e.g., the Clance Impostor Phenomenon Scale; CIPS; Clance, 1985; see Brauer & Proyer, 2023b, Brauer & Wolf, 2016; French et al., 2008, Jöstl et al., 2012, Yaffe, 2020; or the Perceived Fraudulence Scale; PFS; Kolligian & Sternberg, 1991). The measures also differ considerably in their conceptualizations of the IP's dimensionality—while some scales' unidimensional approach focuses solely on the fraudulent experience aspect, and thus may

overlook some of the IP's key facets such as struggling to internalize success (e.g., the Leary Impostorism Scale; LIS; Leary et al., 2000), others run the risk of distinguishing an excessive amount of dimensions and as a result might in fact measure the IP's correlates rather than the IP itself (e.g., the Impostor Phenomenon-Profile; IPP31; Ibrahim et al., 2022 or the Impostor Phenomenon Assessment; IPA; Walker & Saklofske, 2023). For instance, self-handicapping—defined as one of the core facets of the IP in the Impostor Phenomenon Assessment, is prominently described as its correlate (Fimiani et al., 2024; Want & Kleitman, 2006) or outcome (Jensen & Deemer, 2020; Pooja et al., 2024; Tewfik et al., 2025;). Similarly, need for sympathy, which is considered one of the IP facets in the IPP31 and is supposed to measure conflict-aversiveness and agreeableness, does not correlate with other IP measures (Ibrahim et al., 2022).

Notably, another shortcoming of some measures is their length, which makes their use uneconomical in the studies and suggests redundancy of some items (e.g., the PFS or the IPA). Efforts to develop a more economical IP measure resulted in the preparation the shortened CIPS—CIPS-10 (Wang et al., 2024). Although the 10-item scale improved on the original CIPS by modifying the wording of certain items and changing the response scale, it did not resolve the ambiguities regarding the undetermined dimensionality of the construct (Lee et al., 2024) since it discards the individual subscales. Correlated residuals of the items also resulted in their further subtraction to six items. However, the relationship between the shortened and modified version of the CIPS-10 and the original CIPS was also not evaluated. In addition, the original 20-item CIPS—the most used IP measure (Mak et al., 2019)—is also protected under copyrights, therefore its use comes with restrictions.

Current study

The CIPS and the PFS assess largely overlapping content, strongly correlate with one another ($r = .78$; Chrisman et al., 1995), share the same external correlates (e.g., self-esteem, depression, social anxiety; Chrisman et al., 1995), and are regarded as psychometrically equivalent in terms of their validity and high internal consistency, with CIPS's length being its main advantage over PFS (Brauer & Wolf, 2016). While both the CIPS and the PFS have inconsistent factor structure, none of the previous efforts to resolve the CIPS's structural issues resulted in a clear and consistent solution (see Stone-Sabali, 2024), therefore, we decided to revisit the Perceived Fraudulence Scale, reexamine its factor structure, and shorten it substantially. We expect that the structure will reflect the previously found dimensions—inauthenticity and self-deprecation, which capture the self-perceived fraudulence and self-critical doubts about one's abilities and self-imposed achievement pressure. However, given the length of the original scale and its ambiguous structure (further discussed in the *EFA* section of the article) we also acknowledge that other core characteristics of the IP might be reflected in the scale's factors. For instance, failure to internalize success and distorted achievement attribution aligns with Kolligian and Sternberg's

(1991) conceptualization of the IP but was not previously differentiated as a separate component.

We seek to examine the scale's measurement invariance (MI) not only between genders, but also between students and working professionals, which will allow for more meaningful comparisons between these groups and will address the need for more studies to assess IP measures' MI (see Lee et al., 2024). Further, we strive to adopt a complimentary approach of using both Classical Test Theory (CTT) and Item Response Theory (IRT), which—to the best of our knowledge—has not yet been applied in the impostor phenomenon research. The purpose of the factor analyses is to examine the scale's dimensionality, considering the structural ambiguities of the existing scales, while the purpose of the IRT is to provide more nuanced information on the individual items' properties.

We aim to validate the scale by replicating some of the IP's well-established relations with the Big Five personality traits (neuroticism, extraversion, and conscientiousness in particular) and self-esteem. In line with previous research (Cokley et al., 2018; Schubert & Bowker, 2019; Vergauwe et al., 2015), we expect the IP to correlate negatively with self-esteem, extraversion, conscientiousness, and emotional stability (i.e., low neuroticism). Our objective is thus to propose a concise, psychometrically sound, and gender and occupationally invariant IP measure that still assesses the nuanced facets of the IP and offers researchers unrestricted use.

Methods

Participants and procedure

One thousand and one adult participants (720 female, 263 male, 17 non-binary persons, and one person identifying as “other” gender) aged 18–86 years ($M=28.15$; $SD=9.38$) took part in the study. Most of the participants had higher education (56.4%), 44.1% had high-school education, 1.4% had middle-school education, 0.6% had primary education, and 0.5% had vocational education. The participants' occupations were listed as follows: working professionals (40.7%), university students (33.7%), school students (3.5%), working and studying simultaneously (18%), unemployed (2.9%), retired (0.8%), receiving a pension (0.4%). One person did not declare their occupational status (0.1%).

The study was conducted online using the LimeSurvey platform and a snowball sampling method. The invitations were posted on social media platforms. The data were collected in Poland between March and June of 2022 as part of a research project on the impostor phenomenon. The inclusion criteria were speaking Polish, minimum age limit of 18 years, and passing the attention check (i.e., selecting the correct response in the following item: “If you are reading this item, please select the response 2 = *disagree*”). As a compensation for taking part in the study, the participants could voluntarily enter a prize drawing after completing the survey by signing up in a separate form. Five of the participants were randomly awarded gift cards to a bookstore. The participants were presented with a description of the study, they were informed of their right to withdraw at any point of the

study, and that the study was voluntary and anonymous. The study was conducted in accordance with the Declaration of Helsinki and ethical approval of the Ethics Committee at the University of Silesia in Katowice was obtained (KEUS 215/01.2022/W). The authors of the Perceived Fraudulence Scale granted their permission for the translation and further use of the tool.

Measures

To measure the impostor phenomenon, we used the Perceived Fraudulence Scale (Kolligian & Sternberg, 1991). The scale was translated to Polish by three independent translators (a bilingual person, an English philologist, and a psychologist fluent in English), back translated by two English philologists, and the translations were evaluated by two psychologists fluent in English (see Fenn et al., 2020). The participants rated how much they agreed (1 = *strongly disagree*; 7 = *strongly agree*) with statements such as “I often feel I receive praise or grades that I don't deserve” and “In general, significant people in my life tend to believe that I am more academically or professionally competent than I really am.” The Cronbach's α and the McDonald's ω of the full 51-item version of the scale in the current study were .95.

We used the Polish version (Topolewska et al., 2019) of the 20-item Mini-IPIP scale (Donnellan et al., 2006) to assess the Big Five personality dimensions. The scores were summed for indices of five scales and their reliability in the current study was as follows: extraversion ($\alpha = .87$, $\omega = .87$), agreeableness ($\alpha = .71$, $\omega = .73$), conscientiousness ($\alpha = .80$, $\omega = .80$), emotional stability ($\alpha = .80$, $\omega = .82$), and intellect ($\alpha = .72$, $\omega = .73$). The participants respond by rating how well each of the statements such as “[I] get upset easily” or “[I] like order” described them (1 = *very inaccurate*; 5 = *very accurate*).

To measure self-esteem, we used the Polish version (Szpitalak & Polczyk, 2015) of the Self-Liking/Self-Competence Scale-Revised (SLCS-R; Tafarodi & Swann, 2001). The Polish version consists of 16 items, which can be summed to a total score of self-esteem ($\alpha = .91$, $\omega = .91$) as well as two subscales: self-liking ($\alpha = .91$, $\omega = .91$) and self-competence ($\alpha = .79$, $\omega = .80$). Reliability indices were calculated in the current study. Participants rate how much they agreed (from 1 = *strongly disagree* to 5 = *strongly agree*) with such statements as “I feel great about who I am” and “I am almost always able to accomplish what I try for.”

Statistical analysis

When developing the Perceived Fraudulence Scale Kolligian and Sternberg (1991) conducted a principal component analysis (PCA) and named two components of the perceived fraudulence: self-deprecation and inauthenticity. However, the structure of the scale varied throughout their studies. While some of the items in Study 1 loaded the inauthenticity component, in Study 2 they loaded the self-deprecation component (e.g., Item 12). Moreover, other items did not load either of the components in either of the studies (e.g., Item 3). Therefore, we decided on an exploratory approach to establish a more coherent factor structure.

Before conducting a factor analysis, we decided to reduce the initial 51-item pool (Table S1) by removing those items the content of which may not represent the measured construct best or might be challenging for the participants to comprehend (e.g., Items 26 or 39 containing the word “impostor” as a keyword which does not have a Polish equivalent). We asked five psychologists with knowledge on the construct to give their expert opinions on each of the items. They evaluated each of the items independently and rated how well they reflected the construct’s definition (1=*doesn’t reflect the definition at all*; 5=*reflects the definition completely*) and their intelligibility (1=*completely incomprehensible*; 5=*fully comprehensible*). The experts were also able to comment on each of the items and justify their ratings. Kendall’s *W* in accordance with definition criterium was .40 ($p < .001$) and .35 ($p < .001$) in the intelligibility criterium, suggesting a fair agreement between the judges (Landis & Koch, 1977). We evaluated the experts’ comments, the mean ratings, and standard deviations of the items. We were especially cautious of the items with low mean ratings (i.e., below 4) and comments suggesting an item has a content overlap with a different psychological construct (e.g., the Dark Triad). Based on these premises, we decided to remove 28 items from further analysis.

We randomly split the data in half to conduct an exploratory factor analysis (EFA) on one half ($n=500$) to establish a preliminary factor structure of the PFS and follow with a CFA on the other half ($n=501$) to validate it. The data were split using the “randbetween” function in MS Excel and then filtered in JASP statistical software version 0.18.3 (JASP Team, 2023), which was used for all further analyses except for the IRT. Before conducting the analysis, we ran the Kaiser-Meyer-Olkin (KMO) and the Bartlett’s test of sphericity. The KMO values between .08 and 1.0 and significant values of Bartlett’s test ($p < .05$) determined the adequacy of the analysis (Shrestha, 2021). We performed an EFA using oblimin rotation and maximum likelihood (ML) estimator. The number of factors was determined based on parallel analysis (Horn, 1965) and scree plot (Cattell, 1966). We chose four best loading items per factor with the recommended minimum factor loading of .40 (Stevens, 2009) and cross-validated the obtained structure with hierarchical CFA based on the notion that the scale was created to measure the general score of perceived fraudulence (Kolligian & Sternberg, 1991). The overall model was evaluated using the following goodness of fit measures indicating good fit: χ^2 divided by the degrees of freedom ($\chi^2/df \leq 3$); the root mean square error of approximation (RMSEA) $< .06$, the standardized root mean square residual (SRMR) $< .08$; the comparative fit index (CFI) and Tucker-Lewis Index (TLI) $\geq .95$ (Hu & Bentler, 1999; Schreiber et al., 2006). The following indices determined an acceptable fit: $\chi^2/df < 5$, CFI and TLI $\geq .90$, RMSEA and SRMR $\leq .08$ (Brown, 2015; Hooper et al., 2008).

After determining the scale’s factor structure, we performed a multi-group CFA (MGCFA) using a robust maximum likelihood estimator (MLR) to test the measurement invariance (MI) between genders, and between students and working professionals. We analyzed the configural (equivalent factor structure), metric (factor loadings fixed to be equal), and scalar (item intercepts fixed to be equal) MI by subsequently testing and comparing more constrained

models. MI was assessed by evaluating changes in model fit (Δ). We followed the recommended cutoff criteria to determine whether MI was established: ΔCFI and $\Delta TLI \leq .01$, $\Delta RMSEA \leq .015$, and $\Delta SMRM \leq .030$ for metric invariance or $\leq .015$ for scalar invariance (Chen, 2007).

As the next step, we performed an IRT analysis using Jamovi statistical software version 2.5.3.0 (The Jamovi Project, 2024) to gain complimentary information about the individual items’ properties. We used a partial credit model (PCM) for polytomous data with marginal maximum likelihood estimation (see Masters & Wright, 1997). We assessed the individual items’ fit following the recommended cutoff criteria of infit and outfit between 0.6 and 1.4 (Bond & Fox, 2015). Values below 0.6 suggest that the item may be redundant, while values above 1.4—that the item fails to define the same construct as the other items (Jafari et al., 2012). We examined the items’ thresholds to identify the patterns of endorsing particular response categories. We also tested the person reliability index, equivalent to Cronbach’s alpha (De Ayala, 2022), to determine whether the scale effectively differentiates people with varying levels of IP.

We then tested the internal consistency of the shortened scale using Cronbach’s alpha and McDonald’s omega. We also calculated the descriptive statistics and the correlations between the BIPS’s subscales. After that, we checked for differences between genders and between students and working professionals using *t*-tests. Lastly, we tested the scale’s validity by correlating its scores with the Big Five personality traits and self-esteem using Pearson’s *r*.

Results

Factor analyses

EFA

The KMO of .94 and significance of Bartlett’s test ($\chi^2 = 4751.47$, $df=210$, $p < .001$), supported the use of the EFA. The results of the EFA conducted on the first half of the sample ($n=500$) with 23 items indicated a four-factor solution (Table S2). The examination of the scree plot suggested either a four- or a three-factor solution (Figure S1). Factors 1 and 3 were named “self-deprecation” and “inauthenticity,” respectively, as the content of their items reflected the components retained by the scale’s authors. After examining the content of the items loading on Factor 2, we named it “external ability attribution.” Factor 4 was loaded by only two items: 33 and 28, both of which regarded turning down compliments. Considering the theoretical premises, the lowest eigenvalue of this factor, the scree plot, and Raubenheimer’s (2004) recommendation of no fewer than three items per factor, we decided on the three-factor solution.

CFA

We then performed a CFA on the second half of the sample ($n=501$) using a robust maximum likelihood (MLR) estimator. Firstly, we tested the model with three lower-order factors (four best loading items per factor, Table S2) and a higher-order factor—impostor phenomenon. The goodness of

fit measures suggested a suboptimal fit ($\chi^2/df=4.61$, CFI = .93, TLI = .90, RMSEA = .084; 90% CI [.073, .095], SRMR = .05). Therefore, we checked the modification indices (MI), which indicated high residual errors between Item 9 and a few of the other items: Item 6 (MI = 66.96), Item 17 (MI = 19.79), Item 16 (MI = 11.21). Item 48 showed high residual error with Item 2 (MI = 29.97) as well as cross-loadings with the “external ability attribution” factor (MI = 17.12) and the “self-deprecation” factor (MI = 16.16). Item 48 also had the lowest factor loading of .37. Based on these premises, we decided to remove Items 9 and 48. Following Raubenheimer’s (2004) suggestion to keep at least four items per factor, should the subscale be ever used on its own, we decided to replace the removed items with the items with the next best factor loading in the EFA. Thus, Item 9 was replaced with Item 36 and Item 48 was replaced with Item 19.

We again tested the three-factor hierarchical model (Figure 1 and Table 1). The goodness of fit measures indicated a good fit ($\chi^2/df=2.83$, CFI = .96, TLI = .95, RMSEA = .060, 90% CI [.049, .072], SRMR = .04). All item loadings were greater or equal to .50. The loadings of the lower-order factors on a higher-order factor were as follows: self-deprecation = .87, external ability attribution = .95, inauthenticity = .87. We compared the three-factor model with a one-factor model. The goodness of fit measures for a single-factor model indicated a poor fit ($\chi^2/df=4.91$; CFI = .91; TLI = .89; RMSEA = .088, 90% CI [.078, .099], SRMR = .05) and the comparison of the models supported the better fit of the three-factor model ($\Delta\chi^2 = 121.07$, $\Delta df=3$, $p < .001$, $\Delta BIC = 102.42$).

Measurement invariance

Table 2 presents the results of MGCFAs between genders (720 female, 263 male), and between students ($n=337$) and

working professionals ($n=407$). In the configural model the goodness of fit indices suggested acceptable fit across all groups. Comparison of subsequent model fit indices supported that scalar MI was established across all groups as all the fit changes were within the acceptable range.

Item response theory

No residual correlations exceeded the value of .30, therefore supporting the assumption of local independence (Table S3). The item statistics are presented in Table 3. The infit and outfit statistics of all items range between 0.77 and 1.20, supporting a good fit of all items. Given that the average item’s difficulty is 0 (Furr, 2021), the items in general were not very difficult for respondents to endorse, with difficulties varying from -0.86 to 0.11 . Typically, difficulty values close to -2.0 indicate that the item is very easy, while values close to 2.0 characterize very difficult items (Hambleton et al., 1991). The Wright Map (Figure 2) presents the respondents’ distribution of IP and the items’ difficulty. As depicted, there is a balanced distribution of IP among the respondents. The Thurstone thresholds (Table S4) represent the level of IP at which the respondents have 50% probability of selecting a higher response category over the lower, adjacent one (e.g., Threshold 1 represents the cutoff between responses “strongly disagree” and “disagree”). The threshold analysis (Table S4) suggests that the responses are correctly ordered and that people with higher IP were more likely to choose the higher responses. This tendency is visually depicted through Item Characteristic Curves (ICC) in Figure S2. The probability of choosing each particular response category (from 1 = *strongly disagree* to 7 = *strongly agree*) depending on the respondents’ IP levels is depicted through Item Response Category Characteristic Curves (CCC) in Figure S3. The

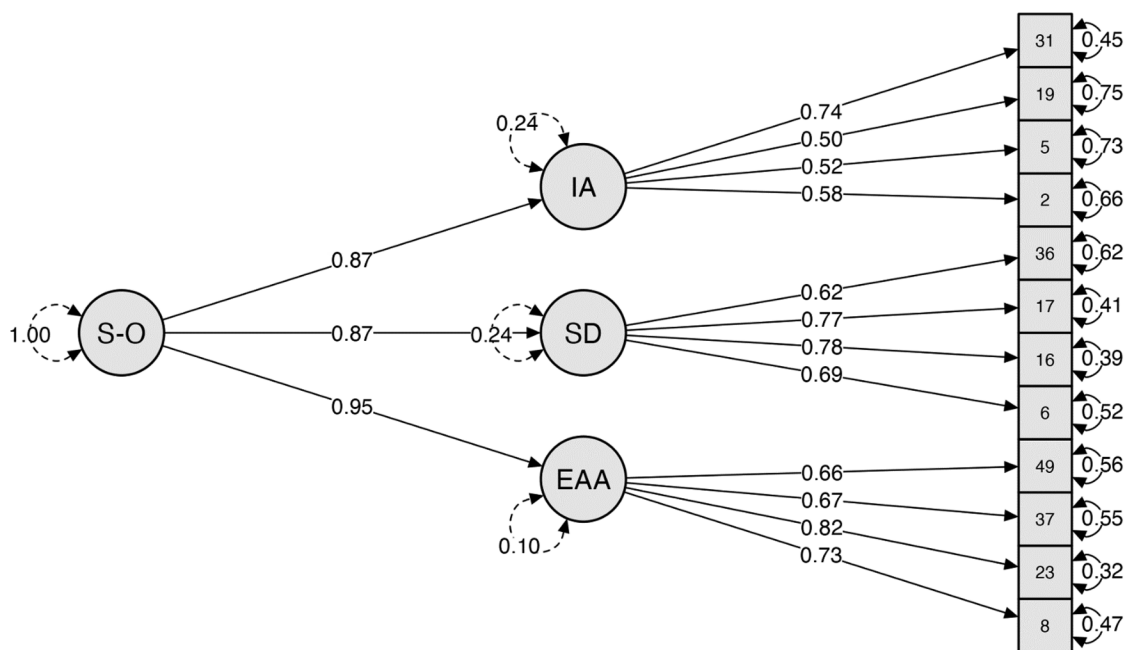


Figure 1. Confirmatory factor analysis (CFA) model of the Brief Impostor Phenomenon Scale (BIPS).

Note. S-O=second-order factor: impostor phenomenon, IA=inauthenticity, SD=self-deprecation, EAA=external ability attribution. Factor loadings are standardized. $N = 501$.

Table 1. Confirmatory factor analysis (CFA) and factor loadings of the Brief Impostor Phenomenon Scale (BIPS).

Construct	Item's original no.	Item's modified no.	Item's content	Factor loading (λ)
Self-deprecation	6	3	Even in situations for which I am well-prepared (e.g., studied very hard and long for an examination or worked tirelessly on a project), I still have doubts about my ability to perform well.	.69
	16	5	I have visions of failure that often accompany new situations requiring a demonstration of my abilities.	.78
	17	6	I am often surprised when I perform well on a project or a test.	.77
	36	10	I often get "down on myself" when I perform, what I consider, less than perfectly on a task or a problem.	.62
External ability attribution	8	4	At times, I feel that I am in my present position or academic program through some kind of mistake or accident.	.73
	23	8	I often feel I receive praise or grades that I don't deserve.	.82
	37	11	My achievements have been due more to external factors, such as luck or effort, rather than to my own inherent abilities.	.67
	49*	12*	I feel I deserve whatever honors, recognition, or praise I receive with regard to my academic or professional pursuits.*	.66
Inauthenticity	2	1	In some situations I feel like a "great pretender": that is, I'm not as genuine as others think I am.	.58
	5	2	I often feel I am concealing secrets about my abilities from others.	.52
	19	7	In general, significant people in my life tend to believe that I am more academically or professionally competent than I really am.	.50
	31	9	Even though I feel that I have a lot of potential, I sometimes feel like an intellectual "fraud" or "phony."	.74

Note. *items with reversed coding. Factor loadings are standardized. Polish version of the items is available upon request from the corresponding author. $N=501$.

Table 2. Goodness of fit indices and model comparisons for measurement invariance models.

Model	χ^2	df	CFI	TLI	RMSEA (90% CI)	SRMR	Model comparison	ΔCFI	ΔTLI	$\Delta RMSEA$	$\Delta SRMR$
Men vs. women											
Men	96.60	51	.957	.944	.058 (.040, .076)	.041					
Women	173.81	51	.963	.953	.058 (.049, .067)	.032					
(A) Configural	270.42	102	.962	.951	.058 (.050, .066)	.035					
(B) Metric	280.40	113	.962	.956	.055 (.047, .063)	.041	B vs. A	0	.005	-.003	.006
(C) Scalar	312.11	121	.957	.953	.057 (.049, .064)	.043	C vs. B	-.005	-.003	.002	.002
Students vs. working professionals											
Students	91.32	51	.966	.956	.048 (.032, .064)	.037					
Working professionals	134.29	51	.962	.951	.063 (.050, .077)	.036					
(A) Configural	225.61	102	.964	.953	.057 (.047, .067)	.037					
(B) Metric	232.94	113	.965	.959	.053 (.044, .063)	.044	B vs. A	.001	.006	-.004	.007
(C) Scalar	251.90	121	.962	.958	.054 (.045, .063)	.044	C vs. B	-.003	-.001	.001	0

Note. df =degrees of freedom, CFI=Comparative Fit Index, TLI=Tucker-Lewis Index, RMSEA=Root Mean Square Error of Approximation, SRMR=Standardized Root Square Mean Residual, Δ change between a less restricted and a more restricted model.

Table 3. Item response theory item statistics.

Item number	Item's original number	Measure	$S.E.$	Infit	Outfit
1	2	0.11	0.02	1.13	1.16
2	5	0.08	0.02	1.09	1.20
3	6	-0.86	0.02	1.20	1.16
4	8	0.10	0.02	1.19	1.17
5	16	-0.59	0.02	1.02	1.04
6	17	-0.28	0.02	0.83	0.84
7	19	-0.32	0.02	1.10	1.20
8	23	-0.03	0.02	0.77	0.77
9	31	-0.21	0.02	0.98	1.00
10	36	-0.60	0.02	1.14	1.14
11	37	-0.05	0.02	0.91	0.98
12	49	-0.21	0.02	0.93	0.99

Note. $S.E.$ = standard error, Infit=information-weighted mean-square, Outfit=outlier-sensitive fit statistic.

distinct peaks in each response category's line support the non-redundancy of the response categories (see Nguyen et al., 2014). Person reliability of .88 supports the notion that BIPS effectively differentiates people with varying levels of IP.

Group comparisons

Women scored higher than men on general IP and self-deprecation. However, men and women did not differ either on external ability attribution or inauthenticity. Welch's t -test results revealed that students scored higher on general

IP than working professionals. They also had higher levels of self-deprecation, external ability attribution, and inauthenticity. Results of these comparisons are presented in Table 4.

The validity of the BIPS

Descriptive statistics, internal consistency, and correlations, which were used to assess the convergent and discriminant validity of the BIPS, are presented in Table 4. The IP correlated negatively with extraversion, conscientiousness, intellect (or openness to experience), and emotional stability (i.e., low neuroticism) with the latter being the strongest out of the Big Five traits. Neither the total BIPS score, nor its subscales correlated with agreeableness, except for inauthenticity which showed a trivial correlation with the trait. The BIPS and all its subscales negatively correlated with self-esteem.

Discussion

The aim of our study was to prepare a shortened version of the Perceived Fraudulence Scale (Kolligian & Sternberg, 1991), and thus introduce a concise and psychometrically sound measure of the impostor phenomenon which addresses the limitations of other available measures. We reexamined the scale's factor structure and found that it varied from the originally proposed two components, which could be

expected given the structural ambiguities in the original PFS studies and is not uncommon when preparing short scales (Smith et al., 2000). While “self-deprecation” and “inauthenticity” were reflected in two of the factors in our study, a third additional factor named “external ability attribution” emerged. Whereas this new factor was not originally recognized in the development of the scale, it is in accordance with Kolligian and Sternberg’s (1991) definition of impostor phenomenon (or in their terminology “perceived fraudulence”) characterized by failure to internalize success. This

factor structure mimics the CIPS’s pattern of “discount,” “fake,” and “luck” respectively. Given that external attribution is considered one of the core IP characteristics that is prominent across all its conceptualizations (Walker & Saklofske, 2023) the inclusion of this factor seems therefore well-supported by theory. Notably, even though “impostors” attribute their achievements to external factors such as luck or chance, IP itself is not related to the actual performance (Brauer & Proyer, 2022).

Our findings also add to the ongoing, yet unresolved debate on IP’s dimensionality (see Lee et al., 2024; Stone-Sabali, 2024). While some studies suggest a unidimensional approach to the IP (Jöstl et al., 2012; Simon & Choi, 2018; see also Tewfik et al., 2025), others support its multidimensionality (e.g., Brauer & Wolf, 2016; Domínguez-Soto et al., 2023; French et al., 2008; Neufeld et al., 2024; Yaffe, 2020). In the current study, the hierarchical model with three lower-order factors showed a good model fit and outperformed the single-factor model. Such model also has several advantages. In line with Kolligian and Sternberg’s (1991) research, it allows to measure a general IP score but does not overlook the more nuanced facets of the IP and diminish its dimensionality. As such, the model offers a more detailed insight into some of the most frequently studied areas of IP research, including for instance gender differences, which we discuss later. The hierarchical structure is also supported by previously presented higher-order models of the IP (Brauer & Proyer, 2023b; Wang et al., 2024). The MGCFA’s results supported the establishment of scalar measurement invariance between genders as well as between students’ and working professionals’ groups. To date, only few studies tested IP’s tools’ MI between genders (Erekson et al., 2024; Ibrahim et al., 2021), but to the best of our knowledge, none have assessed it across groups differing in other

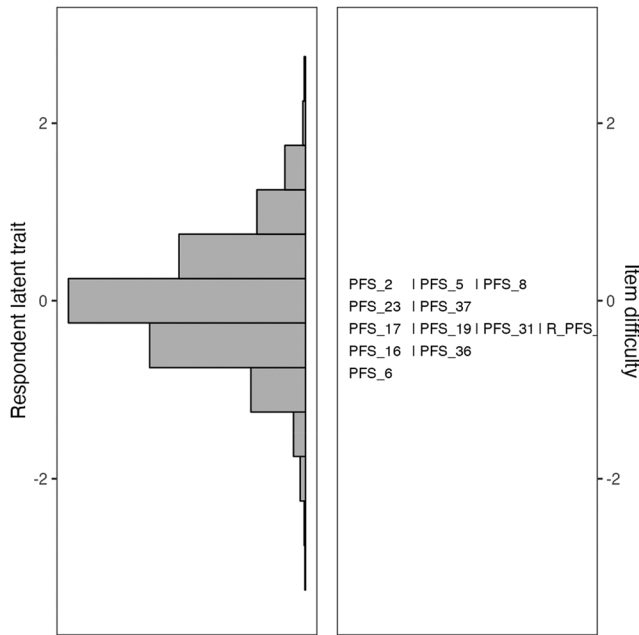


Figure 2. Item response theory wright map. Note. PFS=Perceived Fraudulence Scale. N = 1001.

Table 4. Descriptive statistics, reliability, group comparisons, and correlations between the Brief Impostor Phenomenon Scale (BIPS), its subscales, the Big Five traits, and self-esteem.

Variable	Brief Impostor Phenomenon Scale			
	Total ($\alpha = .88, \omega = .89$)	Self-deprecation ($\alpha = .80, \omega = .81$)	External ability attribution ($\alpha = .81, \omega = .82$)	Inauthenticity ($\alpha = .68, \omega = .70$)
Big Five traits				
Extraversion	-.34***	-.33***	-.31***	-.22***
Agreeableness	-.01	.04	.01	-.06*
Conscientiousness	-.21***	-.14***	-.18***	-.23***
Intellect	-.30***	-.29***	-.33***	-.14***
Emotional stability	-.56***	-.59***	-.47***	-.39***
Self-esteem	-.73***	-.69***	-.66***	-.52***
BIPS subscales				
Self-deprecation	.86***	1	.65***	.56***
External ability attribution	.89***		1	.61***
Inauthenticity	.83***			1
Overall M (SD)	53.35 (13.87)	20.23 (5.38)	16.37 (5.85)	16.65 (4.90)
Men vs. women				
Men M (SD)	51.38 (13.44)	18.86 (5.54)	15.97 (5.65)	16.45 (4.60)
Women M (SD)	53.71 (14.01)	20.61 (5.27)	16.43 (5.92)	16.66 (5.02)
t-tests	-2.33*	-4.29***	-1.09	-0.61
Cohen’s d	-0.17	-0.31	-0.08	-0.04
Students vs. working professionals				
Students M (SD)	55.52 (12.69)	21.21 (4.70)	17.14 (5.57)	17.17 (4.69)
Working professionals M (SD)	51.36 (14.65)	19.34 (5.78)	15.75 (6.01)	16.28 (5.07)
t-tests	-4.15***	-4.87***	-3.28**	-2.49*
Cohen’s d	-0.30	-0.36	-0.24	-0.18

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, N=1,001, M=mean, SD=standard deviation, α = Cronbach’s alpha, ω = McDonald’s omega. Correlations were measured using Pearson’s r coefficient. men = 263, women = 720, students = 337, working professionals = 407.

key characteristics. This allowed us to make meaningful comparisons between these groups, which seemed especially crucial considering that students were believed to be the most prone to experiencing the IP (Clance, 1985) and can be promising for future studies considering that the research on the IP often relies on student samples (see Gullifor et al., 2024).

While the factor analyses provided scale-level information, IRT analysis added item-level information which allowed for deeper understanding of the individual items' properties. All items demonstrated good fit, suggesting that none of them is either redundant or measures a different construct than the others, and therefore uniquely contribute to the scale. Although all items were within the typical item difficulty range between -2.0 and 2.0 (Hambleton et al., 1991), the items in general were not very difficult for participants to endorse, which may be due to high prevalence rates of the IP (see Bravata et al., 2020). The Item Response Category Characteristic Curve (CCC) graphs depict how well each item captures varying levels of impostor phenomenon through different response categories. They also illustrate general adequacy of the chosen response scale, as the response categories were not redundant. High person reliability, threshold analysis, and the ICC analysis support the notion that the BIPS accurately distinguishes people with different levels of the IP as those with high IP tend to endorse higher responses. To the best of our knowledge, the BIPS is the first IP measure examined through the lens of Item Response Theory. Future studies may adopt this approach for the purpose of comparing the BIPS items' properties with other IP scales.

The shortened 12-item version of the scale had good internal consistency for both general score and three subscales with the Cronbach's alpha ranging from .88 to .68 and McDonald's omega—from .89 to .70. Thus, our findings challenge Chrisman et al. (1995) notion that when reduced to the CIPS's length, PFS's internal consistency lowers to $\alpha = .57$. Furthermore, assuming that the average time required to complete the assessment is around 30s per item (Smith et al., 2000), the BIPS maintained the PFS's desirable reliability and reduced potential item redundancy, while saving nearly 20min of measurement.

Our findings shed new light on the debate on gender differences in the IP. In line with the previous research (Jöstl et al., 2012; Kumar & Jagacinski, 2006; McGregor et al., 2008; Price et al., 2024), we found that women scored higher on the general IP than men. However, the investigation of the subscales' scores revealed that men and women differed only on the self-deprecation subscale, suggesting that the difference in the total score may be caused solely by this effect. This finding is contrary to Clance and Imes's (1978) notion that women tend to attribute their achievements to external factors such as luck, chance, or effort, whereas men perceive their success as a result of their inherent traits and abilities. In one of Erkut's (1983) studies, when assessing the underlying factors of their exam grades, men tended to attribute their achievement to abilities more than women, while women placed more significance on their effort. However, men and women did not differ in attributing luck as a factor

in their grades. In a similar manner, our findings may suggest that in line with Neff's (2003) conclusion, women are indeed more self-critical than men and tend to discount their abilities more, but they do not necessarily identify luck as a cause of their achievements any more than men do. This possible explanation is somewhat supported by Brauer and Proyer's (2022) findings that "impostors" in general attribute the cause of their performance to external factors even when controlled for gender.

While IP has been observed in various occupations, according to Clance (1985), students, as a group, can be especially at risk of experiencing impostor feelings, because of how frequently they are exposed to evaluations. This notion was later supported by the results of Brauer and Proyer's (2017, 2023b) studies, in which students demonstrated greater levels of IP than working professionals. The results of our study are consistent with this research. Students scored higher on both general IP and all three subscales. These findings are especially troubling considering the already rapid decrease in students' mental health (Emmerton et al., 2024) and argue in favor of demand for therapeutic interventions directed strictly at the IP voiced by Bravata et al. (2020).

As hypothesized, both general IP and the subscales were related to the Big Five personality traits and self-esteem. In line with Vergauwe et al. (2015) research, IP was negatively associated with extraversion, conscientiousness, and emotional stability (i.e., low neuroticism), with the latter unsurprisingly being the strongest. We found no association between IP and agreeableness, except for the inauthenticity subscale, which showed a very weak association with the trait. Because the previous findings are inconclusive on this matter (see Bernard et al., 2002; Chae et al., 1995; Vergauwe et al., 2015), we did not make any predictions in this regard. As expected, IP correlated negatively and strongly with self-esteem, which replicates the preexisting findings (e.g., Chrisman et al., 1995; Cokley et al., 2018; Cozzarelli & Major, 1990; Schubert & Bowker, 2019). Thus, our findings support the convergent and discriminant validity of the BIPS.

Interestingly, our findings revealed a moderate negative correlation between the IP and intellect (i.e., openness to experience), which has not been found prior. In our view, the previously mentioned strong correlation between the IP and self-esteem may somewhat explain the relationship between the IP and intellect. One might speculate that people high in IP are not less open to experience per se, but rather think of themselves as less creative due to their low self-esteem. This possible explanation is supported by Dudău (2013) findings in which the IP level did not differentiate people's divergent (i.e., creative) thinking task performance, but "impostors" did however rate themselves as less creative than the "non-impostors" in self-report.

Considering that the vast majority of studies on the IP comes from WEIRD, English-speaking countries (Stone-Sabali et al., 2023), our study also adds to the currently underdeveloped body of IP research from different cultural settings. Although Poland is regarded as a WEIRD country in some studies (e.g., Sorokowski et al., 2024), others still consider it a non-WEIRD one (Beyebach et al., 2021) as it has only

relatively recently undergone the process of “westernization” (Gattino et al., 2023). With an individualism index (IDV) of 47 Poland is considered neither a collectivistic nor an individualistic country (The Culture Factor Group, 2024). Thus, given that our sample consisted of Polish-speaking adults, the results of our study also provide some evidence for IP’s replicability in a cultural setting different to most of the existing studies.

Limitations and conclusions

Our study has several limitations that should be acknowledged. First, our study was cross-sectional, thus does not test for the construct’s stability overtime. Future research, preferably with longitudinal design, should test the BIPS and investigate its test-retest reliability and potential changes of the IP in time. Such design may also indicate the causality of the IP’s relationships with its correlates, which is yet to be determined. Second, although the study was conducted on a large sample, it was not equally distributed in gender as most of the participants were female (72%). Additionally, given that the rule of thumb sample size for each group in a multi-group CFA is 100 (Kyriazos, 2018), 18 persons (17 non-binary persons and one person identifying as “other” gender) had to be excluded from the gender measurement invariance analysis and the gender comparisons. Third, we recommend that future studies aim to replicate our findings to further validate the BIPS across different samples, more balanced in gender, and test the BIPS’s incremental validity by comparing its predictive value with other IP measures. This will extend our initial findings on the BIPS’s psychometric properties and also provide further evidence on such findings as the nuances regarding gender differences, which will help to clarify whether they are sample-specific, culture-specific, or consistently replicable. Lastly, while the BIPS showed good psychometric properties, it was tested solely on a Polish-speaking sample. Although this supports IP’s replicability in a cultural context in which the research on the IP is lacking, we recommend that future studies aim to further replicate our findings in different cultural settings.

Despite these limitations, the BIPS addresses the shortcomings of the existing scales by demonstrating good validity, reliability, and scalar measurement invariance both across genders and between students and working professionals, while still allowing for a brief and efficient assessment of the IP. Through substantial shortening of the scale, we were able to retain a clear and coherent factor structure, and thus improve on the original PFS, while keeping its desirable psychometric properties. Therefore, our findings support the use of the BIPS and offer researchers a concise measure of the IP with unrestricted use.

Acknowledgment

The authors would like to thank Dr. John Kolligian and Prof. Robert Sternberg for their permission to use the PFS. We also wish to thank Agnieszka Serdyńska, Justyna Kuskowska-Schneider, Karina Kunz-Kurnicka, and Justyna Trojanowicz for their help with the scale translation process.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This research was not supported by any external funding.

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Data availability statement

The data, materials, and outputs are available upon reasonable request from the corresponding author.

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