Evaluating the psychometric properties of the multidimensional externalising behaviour disorders inventory in Pakistani truant students

Muhammad Aqeel*
PhD in Clinical Psychology, Assistant Professor
Foundation University Islamabad
44000, Defence Ave, Islamabad, Pakistan
https://orcid.org/0000-0003-4522-3972

Tasnim Rehna
PhD in Psychology, Assistant Professor
National University of Modern Languages
44000, 4 Khayaban–e–Johar Str., Islamabad, Pakistan
https://orcid.org/0000-0002-7745-6554

Rabia Akhtar
Master's Student
Foundation University Islamabad
44000, Defence Ave., Islamabad, Pakistan

Jaffar Abbas
PhD
Shanghai Jiao Tong University
200240, 800 Dongchuan Rd., Shanghai, China
https://orcid.org/0000-0002-4716-1413

Abstract. The health of students is intricately connected to their academic performance, yet school truancy, a significant global public health issue, often remains overlooked in healthcare evaluations and health promotion efforts. This study aimed to examine the psychometric properties of the for Pakistani truant students. The externalising behaviour disorders inventory was designed to assess five distinct externalising behaviour disorders, including: (1) oppositional defiant disorder, (2) conduct disorder, (3) antisocial personality disorder, (4) individual deviance, and (5) group deviance. A total of 960 school students (truant, n = 361; punctual, n = 599) were enrolled from different government schools, internet cafes, and community parks in Faisalabad, Pakistan. Exploratory Factor Analysis was used to explore the underlying covert structure of the externalising behaviour disorders inventory scales for the true student sample. The findings of the Receiver Operating Characteristic curve analysis revealed that the scales for oppositional defiant disorder, conduct disorder, antisocial personality disorder, individual deviation, and group deviation demonstrated robust diagnostic efficacy. Moreover, the externalising behaviour disorders inventory exhibited acceptable levels of Multidimensional Externalising Behaviour Disorders Inventory reliability, construct validity, and criterion validity for the truant sample. The findings of this study highlight that the indigenously developed externalising behaviour disorders inventory scales are reliable and valid self-report diagnostic instruments for examining externalising behaviour disorders in school students

Keywords: school refusal behaviour; conduct disorder; oppositional defiant disorder; group deviance; individual deviance; antisocial personality disorder

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*Corresponding author

Introduction

Home and school environments play an important role in the academic, social, and emotional growth of school-going adolescents' students. However, chronic absenteeism, especially school truancy, is linked to a lot of deleterious consequences, such as mental health issues, poor academic performance, and delinquent behaviour. It is usually characterised as unexcused or illegal absences from school without the knowledge of higher school authorities or parents. Students who are involved in school truancy are at higher risk of both short- and long-term outcomes, including school dropout or refusal behaviour, poor employment prospects, and involvement in risky sexual and delinquent behaviours.

School truancy is a multifaceted and complex issue that requires the development of an appropriate and relevant assessment scale to address the social, academic, as well as mental health issues linked to externalising and internalising behavioural problems. A.D. Tissue *et al.* (2022) highlighted the dire need to comprehend and address behavioural problems to alleviate their influence in school students lives. They pointed out that Emotional and Behavioural Disorders Inventory (EBDI) aims to explore the etiological issues underlying persistent social, academic, emotional, and behavioural problems commonly noted in Pakistani school adolescents. According to H. Boettcher *et al.* (2020), externalising disorders, referred to as disruptive, aggressive, and criminal behaviours, are a noteworthy concern for mental health and education professionals internationally, and these factors are often linked to risky behaviours, which lead to academic failure, school refusal behaviour, and long-term social and mental health outcomes.

K. Champion (2022) emphasised that school truancy is closely associated with mental health challenges including oppositional defiant disorder (ODD), conduct disorder (CD), antisocial personality disorder (ASPD), and delinquent behaviour, which have co-morbidity with behaviour problems that enhance the risk of school dropout, sexual misconduct, juvenile delinquency, and criminal activities in adulthood. Critics both of the DSM-5 and International Classification of Diseases (ICD), such as M.D. Bonham *et al.* (2020), have emphasised the limits of their categorical methods to psychopathology, highlighting the dire need for dimensional approaches to better figure out the spectrum of emotional and behavioural disorders.

A recent study has highlighted the importance of dimensional approaches to examine externalising behaviour problems (EBP) and internalising behaviour problems (IBP) in school-aged students. C. Jiang *et al.* (2024) revealed that CD, ODD, and ASPD commonly manifest early onset in school truancy and are associated with severe criminal patterns as well as functional impairments, enhancing the probability of future delinquent and criminal activity. M. Aqeel & T. Rehna (2020) similarly observed the long-term outcomes of these

behaviour disorders on schoolchildren in Pakistan. Traditional diagnostic scales have encountered criticism for their lack of adaptability and inclusivity to diverse clinical and educational settings. S. Peters *et al.* (2020) and M.A. Rogers *et al.* (2024) recognised gaps in prevailing assessment approaches in capturing the indigenous diverse manifestation of externalising behaviours in Pakistani educational settings.

C.J. Hopwood *et al.* (2020) proposed dimensional approaches, which offer a more comprehensive comprehension of externalising behavioural problems by determining the severity, frequency, and duration of symptoms. This approach initially applied in personality disorder examination, which is now being used to examination of externalising behaviour disorders in school settings. The EBDI developed in present research based on this dimensional framework, assessing important psychopathological behaviour such as ODD, CD, ASPD, group deviance (GD) and individual deviance (ID) what was grounded on M.A. Rogers *et al.* (2024). By addressing these gaps, the present study was intended to offer an inclusive, comprehensive, and culturally sensitive assessment tool.

The EBDI's development is grounded in the recognition that externalising behaviour disorders commonly display overlapping symptomatology that undermines the reliability, validity, and precision of old categorical diagnostic methods. A dimensional method is as adopted by the EBDI and provides a more flexible and nuanced framework for measuring these behaviour disorders, which is improving diagnostic efficacy and helping to develop intervention strategies. The EBDI provides an original, dimensional approach to measuring EBP in truant adolescents' students, offering a more accurate and flexible instrument for educational and clinical use. It focuses on five important dimensions, including conduct, oppositional defiant, antisocial personality, and individual and group deviance. This study aimed to develop the psychometric properties of the EBDI, which is designed to measure its effectiveness in recognising externalising disorders in truant and punctual school-going students.

Materials and Methods

A mixed research design approach was applied to develop and validate the EBDI in both truant and punctual student samples. The research was conducted in two different studies, including a qualitative and quantitative approach. In the first study, a grounded theory approach was employed to develop themes by conducting ten mini-focus group discussions with 81 school-going truant students from Rawalpindi and Islamabad, Pakistan. Thematic analysis identified three themes related to its consequences and nine themes related to the causes of truancy in the truant sample, which is reported in a PhD dissertation. In the second study, items for the EBDI were constructed based on qualitative study

theses and validated through expert evaluation. The EBDI was developed using Exploratory Factor Analysis (EFA) to develop its construct validity, with further analyses also used to confirm the reliability and validity of the scales. The EFA was conducted to uncover the original factor structure of EBDI, which comprises five scales: ODD, CD, ASPD, ID, and GD. These scales assess externalising behaviour disorders in school students. The content validity of the EBDI scales was established with input from three experts in educational psychology. These experts, faculty members from various universities in Pakistan, provided names and validated the content of the five scales: CD, ODD, ID, ASPD, and GD. This ensured that each scale accurately measured EBP in truant students.

This study constructed an item pool for the EBDI, which was developed and validated for content validity. Initially, one hundred ninety items of EBDI were developed in Urdu and, after that, translated into English for an international audience by subject experts. A pilot study involved three subject experts who examined the items for relevance to truant behaviour and its associated psychopathology; further, these items were refined, modified, and reduced to ninety-five. These items were categorised into five scales through EFA analysis, including ODD, CD, ASPD, ID, and GD – each measuring different aspects of externalising behaviour in truant school-going students. The inventory was further modified based on feedback from professionals, and this preliminary study with prospective students was ensuring clarity and internal reliability.

In the main study, a purposive sampling technique and a cross-sectional design were employed to carry out this study. A total of 960 participants (truant students, n = 361 and punctual students, n = 599; N = 960) were recruited from various government schools, internet cafes, and community parks in Faisalabad, Pakistan, from August 1, 2021, to March 30, 2022. 361 school-going students with a previous history of truant behaviour (44.6% females, 55.4% males) were aged between 12 and 18 (M = 15.17, SD = 1.96) years. The three heterogeneous samples of truant students were included in the present study. For instance, the inclusion criteria of truant students were followed: those students who remained absent without information from higher school authorities, parents, and teachers from their schools for more than twenty-one days last year. They were assumed to be truant students. These truant students were found in different places in the school and outside schools, including internet cafes, and community parks. Parents' or guardians' written informed consent was taken from school-going truant students that under age of 18 years who were identified in schools. However, parental informed consent form was not possible from school-truant students under the age of 18 who were identified in internet cafes and community parks due to confidential issues and school students' skipping be-

haviour. For the purpose of the comparison and to establish criterion validity, 659 regular school students (44.9% females, 55.1% males) without a previous history of truant behaviour, aged ranged between 12 and 18 years were selected (Mean = 15.21, Standard deviation = 1.80). These students were incorporated from various government schools and parks in Faisalabad, Pakistan. Demographic information and the externalising behaviour disorders inventory were used to gather information about the EBP from both punctual and truant school going students.

The school refusal assessment scale (SRBS) scale was developed to examine the tendency and prevalence of school refusal behaviour in school students (Kearney, 2022). It consists of eighteen items that ask participants to rate their agreement on a seven-point Likert scale from 0 (strongly disagree) to 6 (strongly agree). The scale includes four subsets including avoidance of school-related situations that trigger negative emotions, pursuit of tangible rewards, avoidance of unpleasant social or evaluative interactions, and seeking parental attention. Greater scores on these subsets indicate a greater tendency toward school refusal behaviour. In contrast lower scores on these subsets revealed a lower tendency for school refusal behaviour. It has revealed good validity and reliability in school students.

The multidimensional externalising behaviour disorders inventory (EBDI) is developed in the present study. It was developed to measure EBP for truant students in the present study. It was designed to measure truant behaviour and its negative consequences related to psychopathology. It is a self-reported 95-item multidimensional externalising behaviour disorder inventory that examines EBP and psychopathology in school students. All the scale's items are statements related to the truant students that the truant students rate their level of agreement with a five-point Likert scale (1 – "strongly disagree", 2 – "disagree", 3 – "neutral", 4 – "agree", and 5 – "strongly agree"). This inventory was primarily designed to measure five different externalising behaviour disorders, including (1) ODD scale, (2) CD scale, (3) ASPD scale, (4) ID scale, and (5) GD scale. Each scale was independently designed to measure EBP in truant students.

The Multidimensional Externalising Behaviour Disorders Inventory (EBDI) and the School Refusal behaviour Scale were carefully translated and culturally adapted for the Pakistani context using forward and backward translation and pilot testing to ensure their relevance. The School Refusal Behaviour Scale was chosen to assess convergent and divergent validity. Ethical considerations, including informed consent and confidentiality, were comprehensively addressed, with participants and guardians fully informed of their rights, and data anonymised and securely stored. The statistical methods, including factor analysis, Cronbach's alpha, and regression modelling, were appropriately selected

and justified in the Data Analysis section to ensure robust evaluation of the EBDI's psychometric properties.

This research was sanctioned by the Institutional Research Ethical Board of the Department of Applied Psychology, and National University of Modern Languages, Islamabad, Pakistan (NUML/IRB/PSY/01-A/2020). A total of 960 participants (truant students, n = 361 and punctual students, n = 599) were recruited from various government schools, internet cafes, and community parks in Faisalabad, Pakistan. The procedure was conducted in accordance with American Psychological Association (2017). Both written and verbal informed consent were taken to conduct this research by the higher school authorities, teachers, and parents of both punctual and truant students. After receiving consent from all of them, two psychological instruments were applied to examine the EBP and school refusal behaviour of students. The Pearson correlation coefficient, EFA, ROC, and independent sample t-test analyses were applied to devise the psychometric properties of the indigenously EBDI in students.

This study developed the psychometric properties of the EBDI by different statistical analyses including: Pearson correlation coefficient, EFA, and Receiver Operating Characteristic curve (ROC), independent sample t-test analyses in punctual and truant students (Field, 2013). The IBM SPSS-21 Statistics software package was applied to analyse and establish the psychometric properties of the EBDI. Initially**,** missing values and outliers were dealt with through the imputation method technique in the present study. Further, EFA was carried out to examine the original covert factor structure or develop factorial validity of the EBDI in truant students. Furthermore, the internal consistency of the scale was examined through Cronbach's alpha re-

liability analysis technique (Steiger & Ward, 1987). EFA was applied to examine the covert original factor structure of EBDI, which included five independent EBP such as (1) ODD; (2) CD; (3) ASPD; (4) ID; and (5) GD scale for truant students. Further, EFA analysis was separately performed on each externalising behaviour disorder of the EBDI to establish the factorial validity in a sample of the truant students. A principal component analysis (PCA) method was utilised to extract appropriate items from the EBDI. Moreover, the descriptive statistics were also analysed to check the ceiling and floor effects of the EBDI scales. Additionally, the Kaiser–Meyer–Olkin (KMO) values of all the EBDI scales were obtained to study the sampling appropriateness of the present study sample.

Additionally, the Pearson correlation coefficient technique was carried out to evaluate the association the school's EBP with school refusal behaviour in both truant and punctual students. In addition, divergent and convergent validity were developed by the Pearson correlation coefficient method. Moreover, Advance ROC analysis technique was performed to determine a cutoff score that examines the diagnostic utility of the EBDI in identifying school EBP in both punctual and truant students. Finally, an independent sample t-test was used to establish known group validity and concurrent validity on school refusal behaviour and EBP in both punctual and truant school students.

Results and Discussion

The Table 1 provides the results of the EFA of EBDI, including item descriptions of each scale and their corresponding factor loadings. The descriptions and statistical values for each figure are detailed in Table 1, following the item descriptions.

Table 1. Factor loadings of the EBDI scales, including the ODD scale, CD scale, ASPD scale, GD scale, and ID scale, for truant students

| | | Externalising disorder factors loading | | | | | | | | | | |
| | | ODD | | CD | | ASPD | | | GD | ID | | |
	M(SD)	1	2	1	2	1	2	3	1	1	2	3
1	1.79(1.36)			0.63				0.73				0.53
2	1.68(1.31)			0.63					0.53			
3	1.80(1.26)			0.56				0.78				0.55
4	1.89(1.41)			0.65				0.72				0.59
5	1.65(1.22)			0.64					0.57			
6	1.86(1.41)			0.68					0.65			
7	1.86(1.26)	0.50		0.31								
8	1.50(1.09)	0.54		0.41								
9	1.54(1.18)	0.62		0.39								
10	1.65(1.24)	0.55										
11	1.76(1.33)	0.57										
12	1.62(1.20)	0.60				0.39				0.34		
13	1.90(1.37)	0.56		0.49								
14	1.68(1.25)	0.61		0.51								
15	1.56(1.15)	0.71		0.52								
16	1.72(1.30)	0.69		0.51								

		Externalising disorder factors loading								
		ODD		CD		ASPD		GD		ID	
17	2.19(1.56)	0.61		0.53							
18	1.57(1.12)	0.61			0.39						
19	1.80(1.38)	0.60		0.49							
20	1.81(1.35)			0.38							
21	2.26(1.53)	0.63		0.46							
22	1.78(1.32)	0.56		0.57							
23	1.98(1.48)		0.48			0.49				0.39	
24	1.88(1.35)					0.53					0.47
25	1.70(1.19)										
26	1.64(1.17)										
27	2.04(1.50)										
28	3.31(1.59)										
29	2.01(1.40)			0.48		0.44				0.38	
30	1.78(1.31)			0.47							
31	1.58(1.18)			0.56		0.51				0.53	
32	1.84(1.30)				0.38		0.30				
33	2.01(2.63)				0.39						
34	2.17(1.52)			0.66			0.44				0.39
35	1.90(1.41)			0.63				0.59			
36	2.34(1.58)			0.66		0.64				0.67	
37	1.58(1.20)			0.63		0.62				0.59	
38	1.72(1.30)			0.59							
39	2.07(1.47)			0.60							
40	1.65(1.24)			0.60		0.68		0.66		0.61	
41	1.90(1.38)				0.42			0.42			
42	1.54(1.08)			0.58		0.74				0.70	
43	2.05(1.45)					0.67				0.81	
44	2.17(1.46)					0.61				0.66	
45	2.39(1.55)			0.50		0.49				0.40	
46	2.38(1.53)					0.64				0.63	
47	2.18(1.55)					0.41				0.53	
48	2.07(2.59)			0.39							
49	1.62(1.20)					0.64				0.43	
50	1.46(1.01)			0.45							
51	1.46(1.03)					0.54					
52	1.63(1.17)				0.43						
53	1.66(1.19)						0.42				0.31
54	1.81(1.31)							0.33		0.32	
55	1.78(1.35)					0.65				0.57	
56	1.74(1.23)			0.69				0.74			
57	1.64(1.24)			0.74				0.77			
58	1.81(1.37)							0.74			
59	1.56(1.13)			0.64				0.68			
60	1.75(1.21)			0.70				0.76			
61	2.05(1.49)		0.63	0.63		0.60				0.50	
62	2.52(1.58)		0.66	0.52							
63	1.82(1.32)		0.67	0.55		0.62				0.56	
64	2.00(1.40)			0.54							
65	2.27(1.45)		0.60								
66	1.97(1.42)		0.42		0.48						
67	1.87(1.39)		0.63								
68	2.21(1.42)		0.65								
69	1.98(1.43)										
70	1.88(1.37)										

Table 1. Continued

		Externalising disorder factors loading										
		ODD		CD		ASPD			GD	ID		
71	2.40(1.57)		0.66	0.53								
72	1.76(1.25)		0.45	0.36		0.43					0.38	
73	1.96(1.41)											
74	2.34(1.48)		0.60			0.67				0.46		
75	1.84(1.34)								0.64			
76	1.97(1.50)					0.69				0.47		
77	1.80(1.25)		0.42	0.49								
78	1.43(.98)								0.68			
79	2.38(1.50)					0.71				0.51		
80	2.23(1.41)				0.39	0.54					0.55	
81	2.32(1.43)				0.49		0.65					0.34
82	2.38(1.49)					0.70				0.39		
83	2.36(1.52)				0.43				0.63			
84	3.15(1.65)				0.51				0.54			
85	3.15(1.56)								0.63			
86	2.52(1.50)								0.54			
87	2.54(1.62)				0.36				0.46			
88	2.69(1.63)				0.50							
89	2.54(1.47)					0.55					0.39	
90	2.15(1.47)				0.60							
91	2.35(1.55)						0.41				0.66	
92	3.53(1.76)						0.45				0.60	
93	2.79(1.51)						0.53				0.51	
94	2.42(1.69)						0.83				0.38	
95	2.56(1.56)						0.44				0.63	
ODD	Eigen Values	8.35	2.28									
	% of Variance	30.96	8.44									
	Cumulative Variance	30.96	39.40									
CD	Eigen Values			15.86	2.94							
	% of Variance			28.33	5.25							
	Cumulative Variance			28.33	33.58							
ASPD	Eigen Values					12.01	2.4	1.71				
	% of Variance					30.79	6.16	4.40				
	Cumulative Variance					30.79	36.96	41.36				
GD	Eigen Values								7.33			
	% of Variance								34.91			
	Cumulative Variance								34.91			
ID	Eigen Values									12.01	2.40	1.71
	% of Variance									30.79	6.16	4.40
	Cumulative Variance									30.79	36.96	41.36

Source: compiled by the authors

The EFA of the ODD scale (Fig. 1) identified two main factors: IBP, represented by items 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 22; EBP, represented by items 23, 61, 62, 63, 65, 66, 67, 68, 71, 72, 74, and 77. The scale demonstrated high internal consistency with a Cronbach's alpha of 0.91. The KMO value was 0.91, and Bartlett's test of sphericity was significant $\chi^2(351) = 4{,}740.48$, $p < 0.000$), indicating the sample was appropriate for factor analysis. Both eigenvalues and the scree plot supported a two-factor model as shown 1, validating the structure of the ODD scale.

The EFA of the CD scale (Fig. 2) revealed two primary factors: internalising and externalising behaviour problems (IEBP), including items 1, 2, 3, 4, 5, 6, 7, 8, 9,

13, 14, 15, 16, 17, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 48, 50, 56, 57, 59, 60, 61, 62, 63, 64, 66, 71, 72, and 77; and internal and social deviance (ISD), including items 18, 32, 33, 41, 52, 66, 77, 80, 81, 84, 87, 88, and 90. The scale showed excellent internal consistency, with a Cronbach's alpha of 0.96.

The KMO value was 0.91, and Bartlett's test of sphericity was significant $\chi^2(1540) = 10,220.60$, p < 0.000), supporting the two-factor solution and validating the factorial structure of the CD scale. Both eigenvalues and the scree plot supported a two-factor model as shown 2, validating the structure of the CD scale.
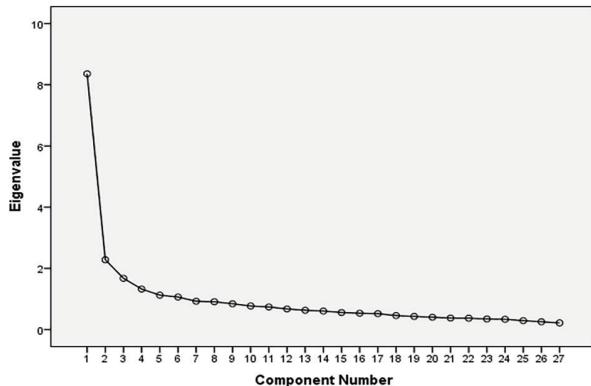
Figure 1. Scree plot and eigenvalue recommend two–factor solution of the ODD scale in truant students
Source: compiled by the authors
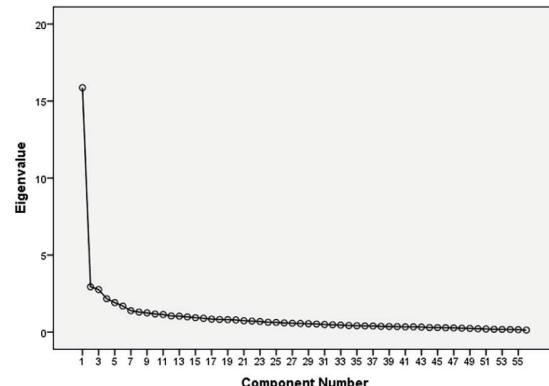
Figure 2. Scree plot and eigenvalue recommend a two–factor solution of the CD scale in truant students
Source: compiled by the authors

The EFA of the ASPD (Fig. 3) scale identified three factors: violation of school norms (VSN), with items 12, 23, 24, 29, 31, 36, 37, 40, 42, 43, 44, 45, 46, 47, 49, 51, 55, 61, 63, 72, 74, 76, 79, 80, 82, and 89; violation of social norms (VOSN), with items 1, 3, 4, 32, 34, 53, 54, 81, 91, 92, 93, 94, and 95; and violation of personal and social norms (VPSN), with items 1, 3, 4, 34, and 54. The ASP scale demonstrated strong internal consistency, with a Cronbach's alpha of 0.93. The KMO value was 0.93, and Bartlett's test of sphericity was significant $\chi^2(741) = 5,891.92$, p < 0.000). A three-factor solution was confirmed by eigenvalues and the scree plot, establishing the factorial validity of the ASP scale. Both eigenvalues and the scree plot supported a three-factor model as shown 3, validating the structure of the ASP scale.

The EFA of the ID scale (Fig. 4) identified three main factors: internal and external excuses/blames in individual deviation (IEID), consisting of items 12, 29, 31, 36, 37, 40, 42, 43, 44, 45, 46, 47, 49, 54, 55, 61, 63, 74, 76, 79, and 82; personal base conflict with others (PCO), consisting of items 23, 72, 80, 89, 91, 92, 93, 94, and 95; and personal and social deviation preferences(PSDP), consisting of items 1, 3, 4, 24, 34, and 53, 81. The ID scale demonstrated high internal consistency with a Cronbach's alpha of 0.92. The KMO value was 0.92, and Bartlett's test of sphericity was significant $\chi^2(741) = 5,891.92$, p < 0.000). The analysis confirmed a two-factor solution, validating the factorial structure of the ID scale. Both eigenvalues and the scree plot supported a three-factor model as shown 4, validating the structure of the ID scale.


Figure 3. Scree plot and eigenvalue recommend a three–factor solution of the ASPD scale in truant students
Source: compiled by the authors
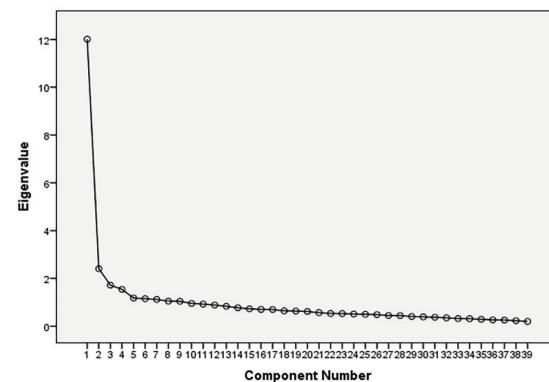
Figure 4. Scree plot and eigenvalue recommend a three–factor solution of the ID disorder scale in truant students
Source: compiled by the authors

The EFA was performed to examine the covert original factor structure of the GD scale (2, 5, 6, 35, 40, 41, 56, 57, 58, 59, 60, 75, 78, 83, 84, 85, 86, and 87) for truant school students (Fig. 5). The GD scale demonstrated strong internal consistency, with a Cronbach's alpha of 0.91. The KMO value was 0.90, and Bartlett's test of sphericity was significant $\chi^2(210) = 3{,}403.14$, $p < 0.000$), confirming the factorial validity of the GD scale. Both eigenvalues and the scree plot supported a one-factor model as shown 5, validating the structure of the GD scale.

In Table 2, the results of the correlation are presented, such as the item descriptions for internal consistency and correlation coefficient values, concurrent validity, and convergent validity. This table provides a summary of the association between school refusal behaviour and the EBDI scales, supporting the psychometric properties of the scales of school refusal behaviour and EBDI in truant and undergraduate students.


Figure 5. Scree plot and eigenvalue recommend a one–factor solution of the GD disorder scale in truant students
Source: compiled by the authors

Table 2. Mean standard deviation, correlation matrix, and alpha reliability coefficient of ODD scale, CD scale, APD scale, ID scale, and GD scales in students

Variables	T(α)	P(α)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.ODD	0.91	0.89	-	0.92**	0.83**	0.90**	0.89**	0.57**	0.83**	0.84**	0.58**	0.51**	0.82**	0.83**	0.38**	0.54**	0.73**	0.13**	0.17**	0.08*	0.05	0.09*
2.IBP	0.89	0.88	0.91**	-	0.57**	0.81**	0.82**	0.47**	0.72**	0.72**	0.51**	0.53**	0.72**	0.72**	0.30**	0.51**	0.63**	0.14**	0.19**	0.08*	0.05	0.10*
3.EBP	0.83	0.75	0.84**	0.56**	-	0.78**	0.75**	0.57**	0.77**	0.78**	0.53**	0.52**	0.76**	0.77**	0.39**	0.43**	0.68**	0.08	0.10**	0.05	0.03	0.05
4.CD	0.95	0.93	0.93**	0.80**	0.85**	-	0.97**	0.70**	0.93**	0.90**	0.73**	0.61**	0.93**	0.90**	0.45**	0.71**	0.88**	0.13**	0.15**	0.10*	0.04	0.10**
5.IEBP	0.94	0.92	0.92**	0.81**	0.82**	0.96**	-	0.52**	0.91**	0.91**	0.66**	0.61**	0.91**	0.91**	0.33**	0.74**	0.86**	0.14**	0.17**	0.10**	0.03	0.11**
6.ISD	0.77	0.63	0.58**	0.45**	0.60**	0.71**	0.51**	-	0.63**	0.53**	0.67**	0.64**	0.62**	0.53**	0.64**	0.35**	0.60**	0.05	0.03	0.03	0.05	0.03
7.ASPD	0.93	0.89	0.84**	0.65**	0.87**	0.94**	0.91**	0.65**	-	0.96**	0.80**	0.81**	0.99**	0.96**	0.55**	0.69**	0.84**	0.13**	0.14**	0.11**	0.04	0.12**
8.VSN	0.92	0.90	0.82**	0.62**	0.86**	0.90**	0.90**	0.54**	0.95**	-	0.60**	0.66**	0.95**	0.99**	0.35**	0.60**	0.82**	0.14**	0.15**	0.11**	0.05	0.11**
9.VOSN	0.73	0.60	0.65**	0.53*	0.63**	0.77**	0.68**	0.72**	0.80**	0.60**	-	45*	0.80**	0.63**	0.83**	0.67**	0.64**	0.08*	0.08*	0.06	0.01	0.09*
10.VPSN	0.67	0.76	0.61**	0.51*	0.60**	0.67**	0.61**	0.71**	0.80**	0.62**	0.65**	-	0.76	0.63**	0.81**	0.62**	0.69**	0.14*	0.15*	0.01	0.05	0.16*
11.ID	0.92	0.88	0.84**	0.65**	0.86**	0.94**	0.92**	0.64**	0.99**	0.95**	0.80**	0.70**	-	0.96**	0.53**	0.72**	0.84**	0.13**	0.14**	0.10**	0.04	0.11**
12.IEID	0.93	0.89	0.82**	0.63**	0.86**	0.90**	0.91**	0.53**	0.96**	0.99**	0.62**	0.65**	0.96**	-	0.35**	0.66**	0.83**	0.13**	0.15**	0.11**	0.05	0.10**
13.PCO	0.68	0.60	0.44**	0.34**	0.46**	0.53**	0.39**	0.75**	0.58**	0.37**	0.86**	0.65**	0.57**	0.37**	-	0.16**	0.34**	0.05	0.02	0.05	0.02	0.07
14.PSDP	0.78	0.68	0.61**	0.54**	0.55**	0.71**	0.76**	0.32**	0.70**	0.61**	0.69**	0.61**	0.73**	0.66**	0.23**	-	0.69**	0.07	0.12**	0.04	-0.01	0.08*
15.GD	0.91	0.87	0.79**	0.62**	0.79**	0.90**	0.89**	0.60**	0.90**	0.88**	0.69**	0.60**	0.90**	0.89**	0.43**	0.70**	-	0.10**	0.13**	0.08*	0.02	0.09*
16.SRBS	0.81	0.78	-0.06	-0.07	-0.04	-0.03	-0.02	-0.05	-0.05	-0.02	-0.10	-0.11	-0.05	-0.02	-0.13*	-0.01	-0.01	-	0.79**	0.74**	0.76**	0.77**
17.EASES	0.78	0.74	-0.05	-0.05	-0.03	-0.02	-0.02	-0.01	-0.02	0.01	-0.08	-0.07	-0.03	-0.01	-0.07	-0.04	0.01	0.79**	-	0.50**	0.48**	0.49**
18.ASPNA	0.79	0.72	-0.05	-0.07	-0.08	-0.01	-0.01	-0.02	-0.01	0.01	-0.05	-0.02	-0.01	0.01	-0.07	0.01	0.03	0.80**	0.66**	-	0.40**	0.39**
19.TR	0.80	0.71	-0.07	-0.06	-0.01	-0.01	-0.01	-0.01	-0.03	-0.02	-0.03	-0.01	-0.03	-0.02	-0.07	0.03	0.01	0.74**	0.40**	0.48**	-	0.45**
20.AS	0.77	0.70	-0.05	-0.03	-0.07	-0.06	-0.04	-0.09	-0.08	-0.05	-0.14*	0.14*	-0.08	-0.04	-0.16*	-0.03	-0.05	0.77**	0.52**	0.47**	0.35**	-

Note: the upper section of the correlational matrix represents the punctual student sample, while the lower section represents the truant student sample. P denotes Cronbach's alpha coefficient for the punctual sample, and α (P) – Cronbach's alpha coefficient for the truant sample; EASES – Escape from Aversive Social and/or Evaluative Situations; AS – Attention Seeking; ASPNA – Avoidance of Stimuli Provoking Negative Affectivity; TR – Tangible Rewards. Significance levels are indicated as $p < 0.05$, $p < 0.01$, and $p < 0.001$
Source: compiled by the authors

In Table 2, the internal consistency of EBDI scales, which include CD, ODD, ID, ASPD, and GD were examined using Cronbach's alpha in both truant and punctual student samples. The results indicated satisfactory internal consistency across all study scales, providing strong psychometric support for the EBDI in measuring EBP in these populations. In Table 2, the results reveal inter-correlations between the EBDI scales and the school refusal behaviour scale in both punctual and truant student. The findings revealed statistically significant positive associations between the school refusal scale and the EBDI scales, including their respective subscales. These results support the convergent validity of the newly developed EBDI scales, indicating they effectively measure related constructs of externalising behaviour disorders in both student groups.
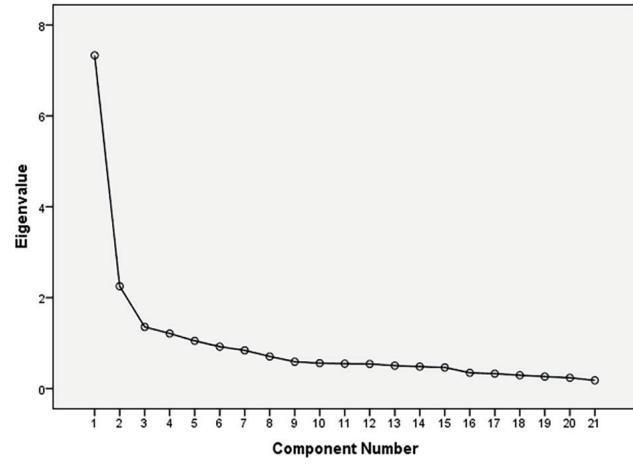
In Table 2, the concurrent validity of the EBDI was evaluated by examining the correlations between the newly developed scales and the previously validated School Refusal Behaviour Scale. The results showed statistically significant positive correlations across all scales in both truant and punctual students, confirming that the EBDI scales can reliably predict relevant outcomes. These findings provide robust evidence for the concurrent validity of the EBDI in assessing EBP among school-going students. In Table 3, the results of the independent sample t-test to explain mean wise differences on CD, ODD, ASPD, ID and GD scales in punctual and truant students.

Table 3. Mean wise differences on CD, ODD, ASPD, ID and GD scales in punctual and truant students

Variables	Truant students (n = 361)		Punctual students (n = 599)		t (958)	p	95% CL	
	M	SD	M	SD			LL	UL
1.ODD	48.39	18.88	45.67	16.93	2.27	0.02	0.36	5.06
2.IBP	26.81	12.17	25.40	11.35	1.78	0.07	−0.13	2.96
3.EBP	21.58	9.22	20.27	7.66	2.33	0.02	0.20	2.40
4.CD	109.74	37.05	103.62	32.58	2.63	0.00	1.56	10.68
5.IEBP	73.36	30.80	69.26	27.02	2.12	0.03	0.31	7.88
6.ISD	36.38	10.25	34.35	8.92	3.16	0.00	0.76	3.27
7.ASPD	85.06	29.66	79.46	25.50	3.05	0.00	1.99	9.20
8.VSN	44.27	19.64	42.91	16.84	1.12	0.26	−1.02	3.74
9.VOSN	31.92	8.91	28.13	7.67	6.85	0.00	2.70	4.86
10.VPSN	8.86	4.97	8.41	4.28	1.47	0.14	−0.15	1.06
11.ID	71.40	25.21	66.39	21.81	3.20	0.00	1.93	8.08
12.IEID	34.71	16.02	33.84	14.12	0.87	0.38	−1.09	2.84
13.PCO	21.69	7.54	18.42	6.89	6.74	0.00	2.31	4.21
14.PSDP	15.00	5.29	14.12	4.92	2.54	0.01	0.19	1.54
15.GD	32.90	14.68	30.78	12.30	2.37	0.01	0.36	3.88
16.SRBS	48.72	16.71	52.78	16.91	−3.61	0.000	−6.25	−1.85
17.EASES	10.46	4.60	11.96	5.01	−4.64	0.000	−2.13	−0.86
18.ASPNA	9.97	4.41	11.72	5.46	−5.16	0.000	−2.41	−1.08
19.TR	15.31	6.15	15.12	5.58	0.49	0.62	−0.56	0.94
20.AS	12.97	6.32	13.95	5.92	−2.44	0.01	−1.78	−0.19

Note: significance levels are indicated as p < 0.05, p < 0.01, and p < 0.001
Source: compiled by the authors

In Table 3, an independent sample t-test revealed significant mean differences in ASPD in truant adolescents students (M = 74.81, SD = 26.23) as well as punctual adolescents students (M = 71.05, SD = 22.34), t (918) = 2.36, p = 0.02, indicating that truant students more frequently exhibit antisocial behaviour. Similarly, significant differences were found in individual deviant behaviour in truant adolescents students (M = 78.54, SD = 27.89) and punctual adolescents students (M = 74.82, SD = 23.69), t (910) = 2.20, p = 0.02, with truant students showing higher deviance. Conversely, punctual students displayed higher school refusal behaviour (M = 52.78, SD = 16.91) compared to truant students (M = 48.72, SD = 16.71), t (912) = -3.20, p < 0.001. These findings support both group known validity and concurrent validity in assessing antisocial behaviour, individual deviance, and school refusal behaviour among truant and punctual students. In Table 4, the results of the receive operational curves to explain diagnostic performance of ODD scale, CD scale, ASPD scale, ID scale, and GD scale for recognition of oppositional defiant, conduct disorder, antisocial personality, individual and group deviant behaviours in punctual and truant students.

Table 4. Diagnostic performance of ODD scale, CD scale, ASPD scale, ID scale, and GD scale for recognition of oppositional defiant, conduct disorder, antisocial personality, individual and group deviant behaviours in punctual and truant students using receive operational curves

Variables	AUC	SE	p	95% CL		Cut-off point	Sensitivity	Specificity
ODD	0.60	0.01	0.00	0.56	0.62	0.41	0.55	0.50
CD	0.62	0.01	0.01	0.60	0.68	0.59	0.97	0.99
ASPD	0.65	0.02	0.07	0.57	0.62	0.58	0.69	0.67
ID	0.60	0.01	0.00	0.61	0.63	0.61	0.67	0.66
GD	0.62	0.04	0.00	0.60	0.68	0.40	0.24	0.18

Notes: AUC – area under the curve; students' status: 1 – punctual students (n = 599); 2 – truant students (n = 361); p < 0.05, p < 0.01, p < 0.001
Source: compiled by the authors

In Table 4, the specificity (FPR) and sensitivity (TPR) indices used in ROC curve analysis revealed that the all scales of EBDI effectively differentiate in punctual and truant students. The AUC, covering 60% of the area, indicates fair clinical efficacy, with high specificity and sensitivity validating these scales as accurate diagnostic tools. Criterion validity was confirmed through ROC analysis, providing strong psychometric evidence. Additionally, predictive validity results showed that these newly developed scales are more effective than the school refusal behaviour scale in distinguishing between the two student groups (Figs. 6-11).
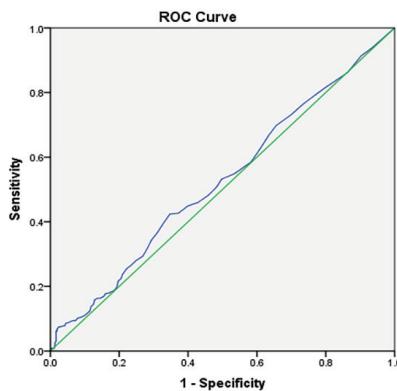
Figure 6. Sensitivity and specificity of the ODD for truant and punctual students
**Source:** compiled by the authors
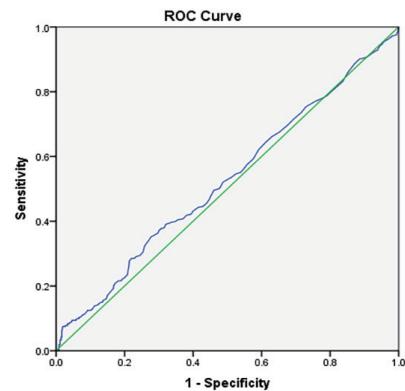
Figure 7. Sensitivity and specificity of the CD for truant and punctual students
Source: compiled by the authors
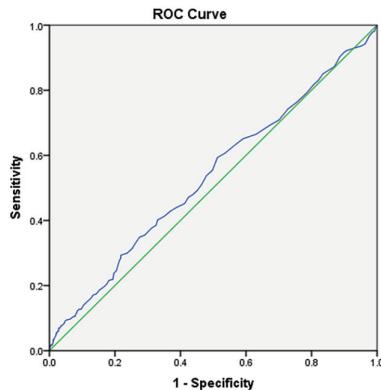
Figure 8. Sensitivity and specificity of the ASPD for truant and punctual students
Source: compiled by the authors
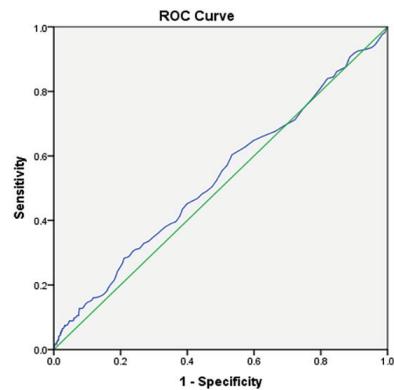
Figure 9. Sensitivity and specificity of the ID for truant and punctual students
Source: compiled by the authors
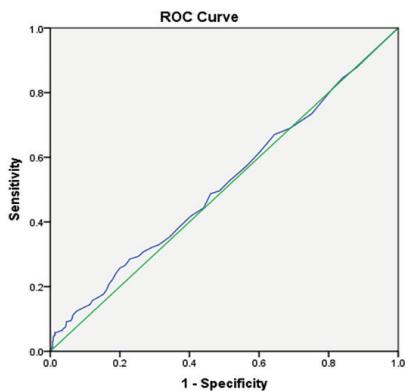
Figure 10. Sensitivity and specificity of the GD for truant and punctual students
**Source:** compiled by the authors
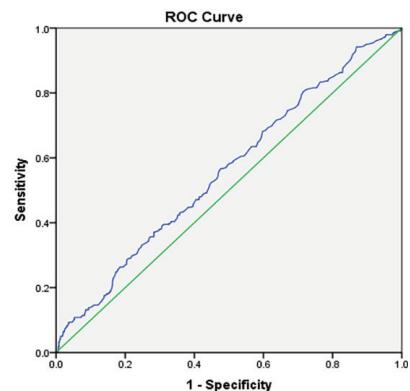
Figure 11. Sensitivity and specificity of EBDI for truant and punctual students
Source: compiled by the authors

This study's results revealed the robust psychometric properties of the EBDI in examining EBP in school-going truant and punctual students. All newly developed scales have shown satisfactory internal consistency and are supported by Cronbach's alpha analysis and display significant concurrent and convergent validity with the School Refusal Behaviour Scale in both samples. This study's results confirmed the validity and reliability of the EBDI as a clinical instrument for assessing EBP in Pakistani school-going adolescents. School truancy is a chronic and persistent problem worldwide that is consistently affecting students' social and academic lives (Kearney, 2022; da Fonseca *et al.*, 2024). Previous studies have consistently associated truancy with many adverse outcomes, such as EBP and IBP, substance abuse, and juvenile delinquency (Fornander & Kearney, 2020). The present study aimed to develop and validate EBDI for Pakistani school-going students. This study also examines its clinical efficacy in distinguishing EBP between punctual and truant school-going students. This study further sought to explore the convergent, discriminate, known group, and predictive validity of the EBDI.

This study's findings supported the robust psychometric properties of the EBDI for school-going truant students, especially the ODD, CD, ASPD, ID, and GD scales. EFA demonstrated distinct factor structures for each scale of the EBDI that are supported by prior studies that highlight the multidimensional nature of EBP in school and clinical contexts (Makowski *et al.*, 2020; Tahira & Jami, 2021). The CD scale similarly explored a two-factor structure in the truant school-going sample, encompassing EBP and IBP and internal and social deviance. These results also support the study of G. Attwood & P. Croll (2021), who highlighted the complex interaction between external and internal influences on the CD sample. On the other hand, the ASPD scale identified three factor structures: (1) violation of school norms, (2) violation of social norms, and (3) violence of personal and social norms in the total sample. These findings are also consistent with M. Crede *et al.* (2023), who emphasised the complex nature of ASPD in an adolescent sample.

The ID identified three key factor structures, such as internal and external excuses/blames, personal and social deviance preferences, and personal basis conflict with other. Finally, the GD scale established a uni-factor structure that demonstrated good internal consistency. Interesting, it did not differentiate between truant and punctual current samples. This is slightly opposite to the results of M.J. Fornander & C.A. Kearney (2020), who recommended that GD emerges from multifaceted social dynamics that might not be fully figured out by a single-factor model. The diagnostic efficacy of the EBDI was also confirmed using Receiver Operating Characteristic (ROC) analysis that showed high specificity and sensitivity across the ODD, CD, ASPD, and ID

scales in truant and punctual school samples. These results are aligned with the study by C.A. Kearney (2022), who highlighted the importance of using strong, multidimensional instruments for diagnosing internalising and externalising behaviour disorders in clinical and educational contexts. The high specificity and sensitivity of the EBDI instruments reveal their efficacy in accurately diagnosing school-going students who display EBP from punctual school-going students, which further validates the instrument's clinical relevance.

Interestingly, GD revealed comparatively low specificity and sensitivity, which was suggesting that GD was a very complex concept that may not be as effective in unique between punctual and truant students. This study's results are slightly supported by the D. Makowski *et al.* (2020) study, who observed that group-based deviant behaviours are regularly triggered by broader environmental and social factors that may not be fully figured out by individual and personal level assessments. Furthermore, the convergent and discriminate validity of the EBDI was further confirmed using Pearson correlational analysis that demonstrated positive associations between the School Refusal Behaviour Scale and all EBDI scales for truant students. These results are aligned with the study of M.J. Fornander & C.A. Kearney (2020), who found the same association between externalising behaviour disorders and school refusal behaviour in clinical sample. This study's findings also confirmed the EBDI's usefulness as a comprehensive inventory for examining externalising behaviour disorders in truant and punctual students.

This present study further investigated group differences in punctual and truant adolescents' students, demonstrating truant students were more likely to be inclined to ODD, CD, ASPD, ID, and GD as compared to punctual students. Overall, the present research contributes to the prevailing literature by providing a developed and validated EBDI's tools for measuring externalising behaviour disorders in both punctual and truant students. The findings support and extend prior studies, confirming the multidimensional nature of externalising behaviour issues and highlighting the importance of utilising comprehensive examination instruments.

Conclusions

The main goal of this research was to establish and validate the EBDI, which is designed to examine different externalising behaviour disorders such as ODD, CD, ASPD, ID, and GD in Pakistani truant students. The EBDI scales were developed with a focus on construct, content, and criterion validity, enabling their use in diagnosing and identifying externalising behaviour disorders in punctual and truant students. EFA was carried out to establish construct validity, while Pearson correlations were employed to develop convergent validity with the school refusal behaviour scale for both truant and punctual students. Reliability was confirmed by

Cronbach's alpha, as well as clinical efficacy, which was examined using ROC analysis. These results recommend that the EBDI scales are valid and reliable diagnostic tools for diagnosing and addressing externalising behaviours in truant students. This novel inventory holds potential for usage in personnel selection, educational, forensic, and clinical settings, especially in truant student assessment and intervention strategy planning. However, many limitations influenced the conclusions of the study. A major drawback was the separate claim of EFA for each EBDI scale that led to diverse dimensions across the truant and punctual samples. Whereas the scales were designed using DSM-5 criteria and insights from mini-focus group discussions with a diverse total sample, CFA did not apply to further validate and confirm the construct validity of the scales. Future studies should address these gaps by employing CFA on larger and more diverse total and punctual student samples to approve the robustness, generalisability, or applicability of the EBDI in broader clinical and educational settings.

Acknowledgements

Conflict of Interest

None.

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Оцінка психометричних властивостей багатовимірної інвентаризації зовнішніх розладів поведінки серед пакистанських учнів

Мухаммад Акіл
Доктор філософії у галузі клінічної психології, доцент
Університет Фундації в Ісламабаді
44000, просп. Оборони, м. Ісламабад, Пакистан
https://orcid.org/0000-0003-4522-3972

Таснім Рехна
Доктор філософії у галузі психології, доцент
Національний університет сучасних мов
44000, вул. Хаябан-е-Джохар, 4, м. Ісламабад, Пакистан
https://orcid.org/0000-0002-7745-6554

Рабія Ахтар
Магістрант
Університет Фундації в Ісламабаді
44000, просп. Оборони, м. Ісламабад, Пакистан

Джафар Аббас
Доктор філософії
Університет Цзяо Тун у Шанхаї
200240, дорога Донгчуан, 800, м. Шанхай, Китай
https://orcid.org/0000-0002-4716-1413

Анотація. Здоров'я учнів тісно пов'язане з їхньою академічною успішністю, однак пропуски шкільних занять, які є суттєвою глобальною проблемою охорони здоров'я, можуть залишатися поза увагою в оцінюванні стану здоров'я та в заходах для його підтримки. Метою цього дослідження було вивчення психометричних властивостей інвентаризації зовнішніх розладів поведінки для пакистанських учнів, які пропускають заняття. Інвентаризація зовнішніх розладів поведінки була розроблена для оцінки п'яти різних розладів зовнішньої поведінки: (1) опозиційно вибичний розлад, (2) розлад поведінки, (3) антисоціальний розлад особистості, (4) індивідуальне відхилення, (5) групове відхилення. У дослідженні взяли участь 960 учнів (учні, що пропускають заняття, n = 361; пунктуальні, n = 599), які були відібрані з різних державних шкіл, інтернет-кафе та громадських парків міста Фейсалабад, Пакистан. Задля вивчення прихованої структури шкал інвентаризації зовнішніх розладів поведінки для вибірки учнів, які пропускають заняття, був застосований факторний аналіз. Результати аналізу кривої робочої характеристики реципієнта показали, що шкали для опозиційно вибичного розладу, розладу поведінки, антисоціального розладу особистості, індивідуального відхилення та групового відхилення продемонстрували високу діагностичну ефективність. Крім того, інвентаризація зовнішніх розладів поведінки виявила прийнятні рівні надійності, конструктивної валідності та критеріальної валідності для вибірки учнів, які пропускають заняття. Результати дослідження підтвердили, що індигенозно розроблені шкали інвентаризації зовнішніх розладів поведінки є надійними та валідними інструментами самозвіту для діагностики зовнішніх розладів поведінки серед школярів

Ключові слова: відмова від школи; розлад поведінки; опозиційно вибичний розлад; групова девіація; індивідуальна девіація; антисоціальний розлад особистості