Behavior Problems Inventory-Short Form – Polish Adaptation and Validation

Aneta Lew-Koralewicz[1], Agnieszka Łaba-Hornecka[1], Anna Gagat-Matuła[2]

[1] University of Rzeszów, Institute of Pedagogy, Poland
[2] University of the National Education Commission, Faculty of Education and Psychology, Poland

HOW TO CITE:
Lew-Koralewicz, A., Łaba-Hornecka, A., & Gagat-Matuła, A. (2024). Behavior Problems Inventory-Short Form – Polish Adaptation and Validation. *International Journal of Special Education, 39*(2), 114-125.

CORRESPONDING AUTHOR:
Aneta Lew-Koralewicz;
alew@ur.edu.pl

DOI:
https://doi.org/10.52291/ijse.2024.39.26

ABSTRACT:

Behavior problems in people with autism spectrum disorder (ASD) represent a significant challenge requiring supportive interventions. The fact that there are no standardized research tools in Poland makes it impossible to assess this phenomenon in Poland, as well as to plan effective interventions. The study aimed to develop and adapt the Polish version of The Behavior Problems Inventory-Short Form (BPI-S).

To determine the psychometric properties of the tool, reliability and validity analyses were carried out with confirmatory factor analysis (CFA), Cronbach's α, and for 70 participants, the intraclass correlation coefficient (ICC).

Factor analysis confirmed the three-factor structure of the Polish version of the BPI-S. The internal consistency was acceptable. For frequency, the result was from questionable (SIB subscale) to good (Aggressive/Disruptive Behavior and Stereotyped Behavior subscale), while for severity it was good. The test–retest reliability of the BPI-S was very high (*ICC* = 0.93).

We found the BPI-S to be applicable in assessing challenging behaviors in this sample of Polish people with ASD. The Polish language version of the Behavior Problems Inventory-Short Form is a reliable tool for assessing problem behaviors in individuals with autism spectrum disorder.

Keywords: Autism Spectrum Disorder; Challenging Behavior; Behavior Problem Inventory, Adaptation

INTRODUCTION

The term 'problem behaviors' is used synonymously with 'challenging behavior', and refers to certain behaviors that a person engages in that can be harmful and negatively affect his/her daily functioning. These behaviors are often recognized as being culturally abnormal and occur at such an intensity, frequency, or duration that the safety of the person and/or others is placed in jeopardy. Challenging behaviors may be related to the social, academic, communicative, cognitive, vocational, or physical domains, may serve various functions, and should be examined systematically for these functions to be identified (DeAquair, 2013).

Autism spectrum disorders predispose individuals to the occurrence of challenging behaviors, as the great majority of the ASD population manifests some form of self-injurious behavior, stereotyped behavior, aggressive behavior, and destructive behavior (Jang et al., 2011; Leader et al., 2022; McTiernan et al., 2011; Murphy et al., 2009). Due to the pervasive nature of the disorder, individuals on the autism spectrum experience a range of difficulties in daily functioning, and as several studies have confirmed, behavior problems are more common in the autistic population than for other developmental disorders (Esteves et al., 2021; Fombonne et al., 2022; Hattier et al., 2011; Nicholls et al., 2020). Challenging behaviors can vary in topography, frequency, and severity, differentiated by several individual factors that can include the level of communication skills and cognitive competence (Kildahl et al., 2023; Murphy et al., 2005; Rosen et al., 2022), as well as the co-occurrence of other health problems such as pain, eating problems (Courtemanche et al., 2016; Edelson, 2021) sleep problems (Callahan et al., 2022) or underdiagnosed mental disorders in individuals with ASD (Peña-Salazar et al., 2022). It is often difficult to identify the underlying contributors to challenging behaviors. As a result, these behaviors frequently persist into adulthood (Edelson, 2022). Although some challenging behaviors decrease in severity with age (Laverty et al., 2023), some persist over time or tend to increase (Matson et al., 2010). Factors that increase the likelihood of difficult behavior in the future are hyperactivity and impulsivity (Laverty et al., 2023), as well as cognitive inflexibility (Hollocks et al., 2022). The persistence of challenging behaviors over time can significantly affect the functioning of a person with autism, as well as their social environment. Challenging behavior moderates the quality of the relationship between parents and children and significantly affects the well-being of parents (Lorang et al., 2022; Mello et al., 2022). Parents of children who manifest aggravated behavior problems experience higher levels of stress and symptoms of anxiety and depression (Khusaifan & El Keshky, 2022). The problems in daily functioning are sometimes so severe that some parents experience PTSD as a result of struggling with their children's challenging behaviors (McKechanie et al., 2017; Stewart et al., 2020).

The challenging behaviors of autistic people are a significant social problem, thus generating the need for specific, properly validated instruments for this population. The Behavior Problems Inventory-01 is a useful tool used in studies into the prevalence, frequency, and severity of challenging behavior in people with developmental disorders (Poppes et al., 2010). The tool has been most frequently used in the diagnosis of behavioral problems of people with intellectual disabilities, both children (Gashool et al., 2015; Rojahn et al., 2010) and adults (Csorba et al., 2011; Dinya et al., 2012; Owen et al., 2004). It has also been used in assessing challenging behaviors of individuals on the autism spectrum (Courtemanche et al., 2016; Lundqvist et al., 2009), Cri du Chat syndrome (Collins & Cornish, 2002), schizophrenia (Thorson et al., 2008) or children and adolescents with visual impairments (Lang & Sarimski, 2018). The tool has also found use in assessing the effectiveness of pharmacological treatment for behavioral problems (Snyder et al., 2002). The Behavior Problems Inventory-01 (BPI-01) and The Behavior Problems Inventory-Short Form (BPI-S) are informant-based behavior rating instruments that provide detailed assessments of the most common behaviors, namely specific types of SIB, stereotyped behavior, and aggressive/destructive behavior (Rojahn et al., 2012a). Self-injurious behavior is any behavior that causes harm to one's tissues, such as bruising, redness, and open wounds (Rojahn et al., 2008). People with ASD sometimes engage in this type of extreme behavior, including banging their heads, biting their hands, and excessive scratching or rubbing. In some cases, self-injury may be caused by over-stimulation (such as frustration), so self-harm acts as a release and thus lowers arousal. Sometimes, self-harm can be a type of repetitive, ritualistic behavior that provides some form of sensory stimulation or enjoyable arousal (Turkington & Anan, 2007). Aggressive or destructive behaviors are socially undesirable actions or deliberate overt attacks directed towards other individuals or objects. They occur repeatedly in the same way and are characteristic of certain individuals (Rojahn et al., 2012a). Aggressive behavior is often classified as a type of externalizing behavior. A distinction is usually

made between aggressive behavior directed at objects (destruction of property) and aggressive behavior directed at other people. Examples of the topography of aggression directed at objects include throwing, intentionally breaking, and hitting objects. Subcategories of aggression towards other people involve physical aggression (e.g. hitting, kicking) and verbal aggression (e.g. shouting at someone, threatening someone) (Didden et al., 2012). Stereotyped movement disorder is characterized by the persistent presence of voluntary, repetitive, stereotyped, movements that arise during the early developmental stage and markedly interfere with normal activities or result in self-inflicted bodily injuries. Stereotyped movements that are non-injurious can include body rocking, head rocking, finger-flicking mannerisms, and hand flapping (*ICD-11 for Mortality and Morbidity Statistics Version*: 2022). Stereotyped behaviors or repetitive behaviors do not serve any social function for the person, instead, they function to produce some form of sensory stimulation for the individual (Miltenberger, 2008).

Perceptions of challenging behaviors may vary depending on the perceived model of disability. Considering the social context, it is important to emphasize that challenging behaviors can be considered as a result of interaction between environmental factors and autism spectrum disorder. The social environment is not always able to interpret the needs or adequately respond to them. Individuals with ASD are at risk for challenging behaviors that can result from an inability to satisfy their needs through effective communication (Hutchins & Prelock, 2014). Higher levels of stereotyped behavior, aggression, and self-injurious behavior are associated with lower IQ (McTiernan et al., 2011) which is connected with communication level. They often experience frustration with their basic needs, especially the sense of security, which is related to features of the physical environment as well as the social environment. ASD is associated with atypical sensory processing. Individuals with ASD may experience both hypersensitivity and hyposensitivity to a wide range of stimuli related to sights, sounds, smells, tastes, touch, balance, or body awareness. Sensory integration problems are associated with experiencing educational difficulties (Mallory & Keehn, 2021) and also the occurrence of challenging behaviors (Griffin et al., 2022). As the research indicates, sensation sensitivity and sensation avoidance are significantly correlated to challenging behaviors; and anxiety is a mediating variable that accounts for the relationships between sensory over-responsivity and challenging behaviors (Kirby et al., 2022).

The social environment can also present significant challenges for people on the autism spectrum. Most children with ASD exhibit severe social competence deficits, which is due to reduced social competence and difficulties with peer relationships. Individuals with autism spectrum disorders may experience symptoms of anxiety at a greater level than the general population. They exhibit significant anxiety symptoms, including physiological arousal, social anxiety, panic, and separation anxiety (Bellini, 2004). Impairments in emotion regulation and executive function may also contribute substantially to aggressive and oppositional behaviors in school-age youth (Maddox et al., 2018). In addition to emotional regulation and executive functioning, variables such as intolerance of uncertainty and anxiety are contributing factors to the occurrence of challenging behaviors in individuals with ASD (Álvarez-Couto, 2024).

Professionals working in the health and education sectors, as well as those in social assistance, are responsible for the well-being of those under their care. Documenting the development of adaptive behaviors and the reduction of clinically significant client behaviors is an important part of provider accountability in supporting individuals on the autism spectrum. To effectively organize assistance and support, reliable behavioral assessment is necessary, and the use of standardized tools serves this purpose. The motivation for this research was the need for standardized instruments to assess challenging behavior in Poland. This study was designed to translate the BPI-S into Polish and to examine the psychometric properties of the BPI-S.

METHOD

Participants

The study participants were children and adolescents from Poland with a comprehensive medical diagnosis of autism spectrum disorders subsequently confirmed by a psychological and pedagogical clinic. The selection for the research group used non-probability sampling. Before the survey, parents consented to their children's participation in the study through staff members. The participants included 151 individuals (111 male and 41 female). Their ages ranged from 3 to 18 years, with a mean age of 8.84 years (SD = 3.56). The cognitive development of 56 of the participants was normative, while 96 of them had intellectual disabilities. Table 1 shows the age distribution and levels of ID. As to the ethnicity, 100% were reported as being Caucasian, The majority of the respondents (N=115) used verbal communication, while 36 participants did not develop verbal communication.

Teachers and staff members after agreeing to participate in the study, completed the BPI-01 on behalf of their students or clients, respectively. The informants were 73 specialists who had worked with a person with ASD for over six months - the average time the respondents had known the participants was 2.21 years (*SD* = 1.87 years). The respondents spent an average of 3.68 hrs. (*SD* = 4.79) with the participants per day. The specialists participating in the study included teachers, special educators, speech therapists, autism therapists, and psychologists. The teacher could evaluate the behavior of 1 to 4 participants. One questionnaire was completed for each participant. A re-test was conducted at the facilities that agreed to participate. In some of them, retesting could not be done in a timely manner due to the constraints of the Covid-19 pandemic. In total, after the retesting procedure, data was obtained on problem behaviors exhibited by 70 individuals with ASD.

Table 1. **Demographic characteristics of participants**

	Total (N = 151)	
	N	%
Sex		
Female	40	26.49
Male	111	73.51
Age groups		
0 – 6	44	29.14
7 – 10	82	54.30
11 – 14	7	4.64
15 – 18	18	11.92
Verbal communication		
Yes	115	76.16
No	36	23.84
Level of MR		
No MR	56	37.09
Mild	33	21.85
Moderate	33	21.85
Severe	15	9.93
Profound	2	1.32
Unknown	12	7.95

Instrument

The Behavior Problems Inventory-Short Form (BPI-S) was developed as a shorter version of The Behavior Problems Inventory-01 (BPI-01), which is an informant-based, indirect behavioral assessment tool intended to measure challenging behaviors in people with intellectual disabilities (ID). BPI-01, which was developed over several years by Rojahn and colleagues (Rojahn et al., 1989; 2001; 2010; 2012b), has been successfully used in several studies and has shown acceptable to very good psychometric properties (Rojahn et al., 2012c). The tool has been translated into several languages (An et al., 2015; Baraldi et al., 2013; Dumont et al., 2014; Inoue et al., 2021; Jeong et al., 2013; Lundqvist, 2011; Mircea et al., 2010; Oubrahim & Combalbert, 2019). The tool consists of three subscales, including Self-injurious Behavior (14 items), Stereotyped Behavior (24 items), and Aggressive/Destructive Behavior (11 items).

The BPI-S is a tool with a similar design to the BPI=01 and is designed to assess behavior occurring in the last two months in children, adolescents, and adults with intellectual disabilities as well as other neurodevelopmental disorders. It is composed of 30 items: Self-injurious Behavior (SIB - 8 items), Aggressive/Destructive Behavior (A/DB - 10 items), and Stereotyped Behavior (SB - 12 items). Items from all the subscales are rated on a frequency scale (from 0 - never to 4 - hourly), while items from Self-injurious Behavior and Aggressive/Destructive Behavior subscales are rated on a severity scale (from 1 - mild problem to 3 - severe problem) (Rojahn et al., 2012a; 2012c).

PROCEDURE

Translation

The BPI-S was translated into Polish by two professional, independent translators. Based on the translations, the first and second authors developed a Polish version of the questionnaire. The few discrepancies that emerged, which consisted principally of different choices of synonymous words or sentence structures, were discussed between the authors and J. Rojahn. The questionnaire was then consulted with a group of five therapists working with children with autism spectrum disorders during a group meeting. The agreed Polish version of the BPI-S was then back-translated into English by two independent translators who had no prior knowledge of the source document. There were no significant differences between the original version and the back-translated version in English, so the final version of the tool was adopted.

Design

The authors obtained approval for the study from the bioethics committee of the University of Rzeszow. The research was conducted in mainstream and special pre-

schools and schools in southeastern Poland. Permission to conduct the study was obtained from directors of educational institutions through personal or telephone contact. The participants in the study were children or adolescents with ASD whose parents gave their consent. The first author met with a group of specialists, who then conducted the study at a particular institution, gave instructions, and clarified any concerns. These were professionals who had known their clients for more than six months. A re-test was carried out after two weeks. In the second test, 70 participants were evaluated.

Statistical analysis

In order to test the structure of the Polish version of the BPI-S, confirmatory factor analysis was performed in the first step. Following Hu and Bentler (1999), the following indices were adopted as model fit measures: $\chi 2/df < 3$, CFI > 0.95, RMSEA < 0.08; SRMR < 0.08. Due to the skewness of the results, DWLS was used as the estimation method. Factor analysis was performed for frequency. In the absence of data for severity, where the frequency was 0, a value of 0 was assigned (Rojahn et al., 2001). Factor reliability was assessed using Cronbach's α and McDonald's ω as alternatives. The discriminant power of the test item was also calculated using item-scale correlation. In addition, for 70 individuals, the stability of the results over time was estimated using the ICC intraclass correlation coefficient. Differential validity was determined using intercorrelations between the factors. The analyses were performed in Jasp 0.17.2.1 and IBM SPSS Statistics 29.0 software.

RESULTS

Confirmatory factor analysis confirmed the 3-factor structure of the questionnaire – the analyzed model turned out to be sufficiently well matched to the data, $\chi 2/df = 1.23$; CFI = 0.969; RMSEA = 0.039 [95%CI: 0.026;0.050]; SRMR = 0.094. The values of the factor loadings are presented in Table 2.

All factor loadings were 0.3 and above, and all were statistically significant $p < 0.001$.

Table 3 presents the reliability analysis using Cronbach's α with item exclusion, as well as the analysis of the discriminating power of the test items, determined using the item-rest correlation. The discriminatory power of the items was 0.2 or more for frequency, and 0.34 or more for severity. The lowest discriminating power was found for SIB 8, both for frequency and severity.

Reliability was calculated using Cronbach's α and additionally McDonald's α for frequency and severity (Table 4). The analysis showed that A/DB and SB had a satisfactory level of reliability. Only for factor 1 - SIB was the reliability slightly below the threshold of 0.7, and exclud-

Table 2. **Descriptive statistics for test items with factor loading values**

Factor	Item	M	Me	SD	Sk.	Kurt.	Min.	Maks.	λ
SIB	1	0.52	0.00	1.04	1.89	2.34	0.00	4.00	0.56
	2	0.32	0.00	0.86	2.79	6.88	0.00	4.00	0.32
	3	0.82	0.00	1.25	113	-0.27	0.00	4.00	0.38
	4	0.49	0.00	1.11	2.16	3.41	0.00	4.00	0.47
	5	0.36	0.00	0.92	2.49	5.05	0.00	4.00	0.33
	6	0.19	0.00	0.62	3.87	16.05	0.00	4.00	0.45
	7	0.09	0.00	0.49	5.90	36.91	0.00	4.00	0.39
	8	0.31	0.00	0.87	2.94	7.83	0.00	4.00	0.44
A/DB	9	0.97	0.00	1.18	0.76	-0.94	0.00	4.00	0.62
	10	0.70	0.00	1.08	1.19	-0.14	0.00	3.00	0.72
	11	0.76	0.00	1.14	1.20	0.04	0.00	4.00	0.60
	12	0.32	0.00	0.80	2.64	6.42	0.00	4.00	0.61
	13	0.73	0.00	1.14	1.31	0.37	0.00	4.00	0.77
	14	0.60	0.00	1.11	1.60	1.04	0.00	4.00	0.82
	15	0.71	0.00	1.15	1.28	0.12	0.00	4.00	0.77
	16	0.80	0.00	1.23	1.20	-0.07	0.00	4.00	0.53
	17	0.93	0.00	1.22	0.89	-0.75	0.00	4.00	0.68
	18	0.49	0.00	0.97	1.79	1.72	0.00	3.00	0.58

Factor	Item	M	Me	SD	Sk.	Kurt.	Min.	Maks.	λ
SB	19	1.71	2.00	1.60	0.13	-1.63	0.00	4.00	0.58
	20	1.19	0.00	1.48	0.67	-1.22	0.00	4.00	0.59
	21	1.84	2.00	1.58	-0.08	-1.64	0.00	4.00	0.66
	22	1.87	2.00	1.46	-0.13	-1.44	0.00	4.00	0.58
	23	1.85	2.00	1.52	-0.10	-1.57	0.00	4.00	0.62
	24	2.03	3.00	1.46	-0.36	-1.40	0.00	4.00	0.65
	25	1.93	2.00	1.59	-0.06	-1.62	0.00	4.00	0.48
	26	0.97	0.00	1.43	0.98	-0.74	0.00	4.00	0.55
	27	1.20	0.00	1.51	0.65	-1.33	0.00	4.00	0.56
	28	1.42	1.00	1.49	0.29	-1.61	0.00	4.00	0.63
	29	1.06	0.00	1.41	0.76	-1.17	0.00	4.00	0.62
	30	2.05	3.00	1.51	-0.35	-1.45	0.00	4.00	0.48

λ – *factor loading value*

ing any item did not increase the coefficient (Table 3). The reliability of both severity dimensions was satisfactory (>0.8). Pearson's correlation analysis for the factors confirmed the relationships between them, but the correlations were weak or moderate, which means that they are separate constructs. The correlation between frequency and severity within one factor was positive and high, indicating a strong relationship between frequency and severity.

Table 5 presents the reliability analysis carried out by means of double measurement. The analyses were performed on a sample of 70 people. For all the ana-

Table 3. **Analysis of the reliability and discriminatory power of the test items for the BPI-S**

Factor	Item	Frequency		Severity	
		Item-rest correlation	Cronbach's α after excluding items	Item-rest correlation	Cronbach's α after excluding items
SIB	1	0.54	0.61	0.71	0.74
	2	0.36	0.65	0.52	0.78
	3	0.34	0.67	0.53	0.78
	4	0.38	0.65	0.52	0.78
	5	0.36	0.65	0.51	0.78
	6	0.49	0.64	0.50	0.78
	7	0.39	0.66	0.55	0.78
	8	0.25	0.68	0.34	0.80
A/DB	9	0.66	0.88	0.71	0.87
	10	0.73	0.88	0.72	0.87
	11	0.66	0.88	0.64	0.88
	12	0.54	0.89	0.53	0.88
	13	0.70	0.88	0.64	0.88
	14	0.68	0.88	0.65	0.88
	15	0.63	0.88	0.63	0.88
	16	0.55	0.89	0.53	0.89
	17	0.59	0.89	0.60	0.88
	18	0.63	0.88	0.65	0.88

Factor	Item	Frequency		Severity	
		Item-rest correlation	Cronbach's α after excluding items	Item-rest correlation	Cronbach's α after excluding items
SB	19	0.58	0.85		
	20	0.49	0.85		
	21	0.61	0.84		
	22	0.54	0.85		
	23	0.61	0.84		
	24	0.52	0.85		
	25	0.44	0.86		
	26	0.51	0.85		
	27	0.54	0.85		
	28	0.60	0.84		
	29	0.55	0.85		
	30	0.44	0.85		

Item-rest correlation – item-scale correlation

Table 4. **Descriptive statistics with reliability coefficients and intercorrelations between BPI-S factors**

						Intercorrelations			
		M	SD	Cronbach's α	McDonald's ω	1	2	3	C-N
Frequency									
1.	SIB	3.06	4.11	0.682	0.692	-			0.89***
2.	A/DB	6.92	7.91	0.893	0.896	0.32***	-		0.90***
3.	SB	18.88	11.44	0.860	0.861	0.32***	0.28**	-	
Severity									
1.	SIB	2.13	3.38	0.800	0.814	-			
2.	A/DB	4.91	5.68	0.890	0.892	0.39**	-		

*C-N – frequency-severity correlation for the same scale **p<0.01;***p<0.001*

Table 5. **Descriptive statistics with ICC for BIP-S measurements (N = 70)**

		Measurement 1	Measurement 2	ICC	95% CI
		M (SD)	M (SD)		
1. SIB	Frequency	3.17 (3.69)	3.38 (3.70)	0.955	0.929 – 0.972
	Severity	2.09 (2.72)	2.09 (2.63)	0.952	0.924 – 0.970
2. A/DB	Frequency	5.91 (5.93)	6.26 (5.62)	0.918	0.871 – 0.948
	Severity	4.33 (4.33)	4.66 (4.27)	0.916	0.867 – 0.947
3. SB	Frequency	17.48 (8.95)	18.10 (9.05)	0.923	0.879 – 0.952
Overall score	Frequency	26.57 (13.91)	27.74 (14.45)	0.932	0.893 – 0.957
	Severity	6.41 (5.89)	6.74 (5.71)	0.930	0.890 – 0.956

lyzed factors, both for frequency and severity, the ICC intraclass correlation coefficient was high - over 0.9. This proves the high consistency of the results over time.

DISCUSSION

The Polish version of the BPI-S has good psychometric properties for assessing problem behaviors in children, adolescents, and young adults with autism spectrum disorder. Similarly, good psychometric properties have been demonstrated in other language versions of the BPI-S questionnaire (Inoue et al., 2021; Mascitelli et al., 2015; Oubrahim & Combalbert, 2019; Rojahn et al., 2012a).

A confirmatory factor analysis was performed for each of the subscale factors of the BPI-S. Factor loadings for the SIB scale ranged from 0.32 to 0.56. For the Aggressive/Destructive Behavior scale, estimated factor loadings ranged from 0.53 to 0.82. Estimated factor loadings for the Stereotyped Behavior scale ranged from 0.48 to 0.66. The SIB scale has the poorest factor loadings, which is also confirmed by other studies on the BPI-S (Mascitelli et al., 2015; Rojahn et al., 2012a) and BPI-01 (Barnard-Brak et al., 2013; Dumont et al., 2014; González et al., 2009; Rojahn et al., 2013; Willner et al., 2020). Generally, the results found that the internal consistency of the Polish BPI-S is consistent with previous studies of the BPI-S and BPI-01 and that the suggested factor model has an acceptable fit.

To identify internal consistency, Cronbach's alphas were calculated for frequency and severity. According to guidelines set out by George & Marley (2016) the results for frequency on the SIB scale were questionable (α = 0.682) while the Aggressive/Destructive behavior and Stereotype behavior subscales had good results (ADB - α = 0.893, SB α = 0.860). SIB items demonstrated the lowest prevalence rates, examples are hair pulling (4.1%), inserting objects (10.53%), head hitting (12.78%), and pica (15.79%), which could have resulted in the low alpha of the SIB subscale. Other language versions, both the original English version (Bowring et al., 2018; Mascitelli et al., 2015; Rojahn et al., 2012a) as well as the Japanese version (Inoue et al., 2021), yielded similar results, where the SIB had weaker internal consistency relative to the other scales. The results indicate a good internal consistency of the tool for the severity factor - both for SIB behaviors (α = 0.8) and for A/D behaviors (α = 0.890).

In this research, we also verified the test–retest reliability of the Polish version of the BPI-S. The Polish version, as well as the Japanese version (Inoue et al., 2021), both have very high agreement between measurements across time for both frequency and severity. In compliance with recommendations by Koo & Li (2016), results above 0.9 indicate a very high consistency of measurements.

A limitation of this study was the relatively small study group, which was related to the timing of the Covid-19 pandemic. The size of the research sample and the low prevalence of certain behaviors hindered some analyses (CFA). Another limitation was that the data were collected by specialists and teachers, who assessed the challenging behaviors of their students in their educational settings, while behavior displayed in their homes was not reflected in the assessments.

It can be concluded from the result that the Polish version of the BPI-S is a reliable measurement tool for use in clinical practice. It can be used as a framework for assessing behavior problems among people with autism spectrum disorders as well as among people with intellectual disabilities. It is an important tool that can be used in research studies on challenging behavior. The BPI-S is a useful tool for early identification and assessment of behavior problems. It can also be successfully used in clinical practice to monitor changes in behavioral problems, both their severity and frequency. It allows for the development of individual profiles of challenging behaviors and is also useful in evaluating the results of interventions designed to modify these types of behaviors. The BPI-S can be used in education, particularly concerning understanding challenging behaviors and their environmental context. Taking into account the increasing number of students with ASD present in classrooms, understanding challenging behaviors is essential to designing better classroom environments and developing more effective adaptations and interventions to prevent problem behaviors and promote optimal student success. The tool can also be useful in researching challenging behaviors in the Polish population of people with ASD and intellectual disabilities, for designing supportive interventions, and for making social and health policy decisions.

ACKNOWLEDGEMENTS

The authors wish to thank the teachers and staff members who participated for their assistance with data collection. Special thanks go to Johannes Rojahn for his assistance during the development of the Polish version of the tool.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING

None.

REFERENCES

Álvarez-Couto, M. (2024). Challenging Behaviors in Adults with Intellectual Disabilities and ASD: Related Variables. In *The Palgrave Encyclopedia of Disability*, (pp. 1–12). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-40858-8_63-1

An, X., Rojahn, J., Curby, T. W., & Ding, Y. (2015). Psychometric properties of the Chinese Behavior Problems Inventory-01 in children and adolescents with or at risk for intellectual disabilities. *Research in Developmental Disabilities, 36*, 256–263. https://doi.org/10.1016/j.ridd.2014.10.006

Baraldi, G. da S., Rojahn, J., Seabra, A. G., Carreiro, L. R. R., & Teixeira, M. C. T. V. (2013). Translation, adaptation, and preliminary validation of the Brazilian version of the Behavior Problems Inventory (BPI-01). *Trends in Psychiatry and Psychotherapy, 35*(3), 198–211. https://doi.org/10.1590/S2237-60892013000300007

Barnard-Brak, L., Rojahn, J., & Wei, T. (2013). Psychometric Analysis of the Behavior Problems Inventory Using an Item-Response Theory Framework: A Sample of Individuals with Intellectual Disabilities. *Journal of Psychopathology and Behavioral Assessment, 35*(4), 564–577. https://doi.org/10.1007/s10862-013-9356-3

Bellini, S. (2004). Social Skill Deficits and Anxiety in High-Functioning Adolescents With Autism Spectrum Disorders. *Focus on Autism and Other Developmental Disabilities, 19*(2), 78–86. https://doi.org/10.1177/10883576040190020201

Bowring, D. L., Totsika, V., Hastings, R. P., & Toogood, S. (2018). Toward data-based clinical decision making for adults with challenging behavior using the Behavior Problems Inventory-Short Form (BPI-S). *Tizard Learning Disability Review, 23*(2), 103–110. https://doi.org/10.1108/TLDR-06-2017-0025

Callahan, M., Matson, J., Tevis, C., & Brown, M. (2022). Aggression in Toddlers with Autism Spectrum Disorder as Predicted by Sleep Problems. *Journal of Developmental and Physical Disabilities, 34*(4), 645–654. https://doi.org/10.1007/s10882-021-09818-5

Collins, M. S. R., & Cornish, K. (2002). A survey of the prevalence of stereotypy, self-injury and aggression in children and young adults with Cri du Chat syndrome. *Journal of Intellectual Disability Research, 46*(2), 133–140. https://doi.org/10.1046/j.1365-2788.2002.00361.x

Courtemanche, A. B., Black, W. R., & Reese, R. M. (2016). The Relationship Between Pain, Self-Injury, and Other Problem Behaviors in Young Children With Autism and Other Developmental Disabilities. *American Journal on Intellectual and Developmental Disabilities, 121*(3), 194–203. https://doi.org/10.1352/1944-7558-121.3.194

Csorba, J., Radvanyi, K., Regenyi, E., & Dinya, E. (2011). A study of behaviour profiles among intellectually disabled people in residential care in Hungary. *Research in Developmental Disabilities, 32*(5), 1757–1763. https://doi.org/10.1016/j.ridd.2011.03.003

DeAquair, R. (2013). Challenging Behavior. In *Encyclopedia of Autism Spectrum Disorders, (pp. 568–569)*. Springer. https://doi.org/10.1007/978-1-4419-1698-3_1022

Didden, R., Sturmey, P., Sigafoos, J., Lang, R., O'Reilly, M. F., & Lancioni, G. E. (2012). Nature, Prevalence, and Characteristics of Challenging Behavior. In J. L. Matson (Ed.), *Functional Assessment for Challenging Behavior (1st ed.), (pp. 33–34)*. Springer. https://doi.org/10.1007/978-1-4614-3037-7_3

Dinya, E., Csorba, J., Suli, A., & Grosz, Z. (2012). Behaviour profile of Hungarian adolescent outpatients with a dual diagnosis. *Research in Developmental Disabilities, 33*(5), 1574–1580. https://doi.org/10.1016/j.ridd.2012.03.001

Dumont, E., Kroes, D., Korzilius, H., Didden, R., & Rojahn, J. (2014). Psychometric properties of a Dutch version of the Behavior Problems Inventory-01 (BPI-01). *Research in Developmental Disabilities, 35*(3), 603–610. https://doi.org/10.1016/j.ridd.2014.01.003

Edelson, S. M. (2021). Comparison of Autistic Individuals Who Engage in Self-Injurious Behavior, Aggression, and Both Behaviors. *Pediatric Reports, 13*(4), 558–565. https://doi.org/10.3390/pediatric13040066

Edelson, S. M. (2022). Understanding Challenging Behaviors in Autism Spectrum Disorder: A Multi-Component, Interdisciplinary Model. *Journal of Personalized Medicine, 12*(7), 1127. https://doi.org/10.3390/jpm12071127

Esteves, J., Perry, A., Spiegel, R., & Weiss, J. A. (2021). Occurrence and Predictors of Challenging Behavior in Youth with Intellectual Disability with or without Autism. *Journal of Mental Health Research in Intellectual Disabilities, 14*(2), 189–201. https://doi.org/10.1080/19315864.2021.1874577

Fombonne, E., Croen, L. A., Bulkley, J. E., Varga, A. M., Daida, Y. G., Hatch, B. A., Dickerson, J. F., & Lynch, F. L. (2022). Emotional and Behavioral Problems in Youth with Autism: High Prevalence and Impact on Functioning. *Journal of Developmental & Behavioral Pediatrics, 43*(3), 140–148. https://doi.org/10.1097/DBP.0000000000001028

Gashool, M., Qasem, S., Karami, B., Alizadeh, H., Arkan, A., & Fooladgar, M. (2015). Psychometric Properties and Factor Structure of the Behavior Problems Inventory in Iranian Elementary Students with Intellectual Disability. *Practice in Clinical Psychology, 3*(4), 251–258.

George, D., & Mallery, P. (2016). *IBM SPSS Statistics 23 Step by Step (Fourteenth)*. Routledge.

González, M. L., Dixon, D. R., Rojahn, J., Esbensen, A. J., Matson, J. L., Terlonge, C., & Smith, K. R. (2009). The Behavior Problems Inventory: Reliability and Factor Validity in Institutionalized Adults with Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities, 22*(3), 223–235. https://doi.org/10.1111/j.1468-3148.2008.00429.x

Griffin, Z. A. M., Boulton, K. A., Thapa, R., DeMayo, M. M., Ambarchi, Z., Thomas, E., Pokorski, I., Hickie, I. B., & Guastella, A. J. (2022). Atypical sensory processing features in children with autism, and their relationships with maladaptive behaviors and caregiver strain. *Autism Research, 15*(6), 1120–1129. https://doi.org/10.1002/aur.2700

Hattier, M. A., Matson, J. L., Belva, B. C., & Horovitz, M. (2011). The occurrence of challenging behaviours in children with autism spectrum disorders and atypical development. *Developmental Neurorehabilitation, 14*(4), 221–229. https://doi.org/10.3109/17518423.2011.573836

Hollocks, M. J., Charman, T., Baird, G., Lord, C., Pickles, A., & Simonoff, E. (2022). Exploring the impact of adolescent cognitive inflexibility on emotional and behavioural problems experienced by autistic adults. *Autism, 26*(5), 1229–1241. https://doi.org/10.1177/13623613211046160

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hutchins, T. L., & Prelock, P. A. (2014). Using Communication to Reduce Challenging Behaviors in Individuals with Autism Spectrum Disorders and Intellectual Disability. *Child and Adolescent Psychiatric Clinics of North America, 23*(1), 41–55. https://doi.org/10.1016/j.chc.2013.07.003

ICD-11 for Mortality and Morbidity Statistics Version. (2022). https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/437815624

Inoue, M., Inada, N., Gomi, Y., Aita, C., & Shiga, T. (2021). Reliability and validity of the Japanese version of the Behavior Problem Inventory-Short Form. *Brain and Development, 43*(6), 673–679. https://doi.org/10.1016/j.braindev.2021.01.007

Jang, J., Dixon, D. R., Tarbox, J., & Granpeesheh, D. (2011). Symptom severity and challenging behavior in children with ASD. *Research in Autism Spectrum Disorders, 5*(3), 1028–1032. https://doi.org/10.1016/j.rasd.2010.11.008

Jeong, B., Yoo, E., Jung, M., Kang, D., Park, S., & Park, S. H. (2013). Validity and Reliability of the Korean Version of the Behaviour Problems Inventory. *Journal of Applied Research in Intellectual Disabilities, 26*(6), 578–590. https://doi.org/10.1111/jar.12054

Khusaifan, S. J., & El Keshky, M. E. S. (2022). Emotional and behavioral problems in children with autism spectrum disorder and psychological distress in their parents in Saudi Arabia: The moderating effect of marital relationship satisfaction. *Journal of Pediatric Nursing, 65*, e99–e106. https://doi.org/10.1016/j.pedn.2022.03.015

Kildahl, A. N., Ludvigsen, L. B., Hove, O., & Helverschou, S. B. (2023). Exploring the relationship between challenging behaviour and mental health disorder in autistic individuals with intellectual disabilities. *Research in Autism Spectrum Disorders, 104*, 102147. https://doi.org/10.1016/j.rasd.2023.102147

Kirby, A. V., Bilder, D. A., Wiggins, L. D., Hughes, M. M., Davis, J., Hall-Lande, J. A., Lee, L., McMahon, W. M., & Bakian, A. V. (2022). Sensory features in autism: Findings from a large population-based surveillance system. *Autism Research, 15*(4), 751–760. https://doi.org/10.1002/aur.2670

Koo, T. K., & Li, M. Y. (2016). A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. *Journal of Chiropractic Medicine, 15*(2), 155–163. https://doi.org/10.1016/j.jcm.2016.02.012

Lang, M., & Sarimski, K. (2018). The Behavior Problems Inventory–Short Form: Utility for Children and Adolescents with Visual Impairments. *Journal of Visual Impairment & Blindness, 112*(6), 765–770. https://doi.org/10.1177/0145482X1811200611

Laverty, C., Agar, G., Sinclair-Burton, L., Oliver, C., Moss, J., Nelson, L., & Richards, C. (2023). The 10-year trajectory of aggressive behaviours in autistic individuals. *Journal of Intellectual Disability Research, 67*(4), 295–309. https://doi.org/10.1111/jir.13004

Leader, G., Dooley, E., Whelan, S., Gilroy, S. P., Chen, J. L., Farren Barton, A., Coyne, R., & Mannion, A. (2022). Attention-Deficit/Hyperactivity Disorder Symptoms, Gastrointestinal Symptoms, Sleep Problems, Challenging Behavior, Adaptive Behavior, and Quality of Life in Children and Adolescents with Autism Spectrum Disorder. *Developmental Neurorehabilitation, 25*(4), 217–228. https://doi.org/10.1080/17518423.2021.1964005

Lorang, E., Hong, J., Song, J., DaWalt, L. S., & Mailick, M. (2022). Verbal Ability, Behavior Problems, and Mother–Child Relationship Quality in Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders, 52*(6), 2463–2478. https://doi.org/10.1007/s10803-021-05133-2

Lundqvist, L.-O. (2011). Psychometric properties and factor structure of the Behavior Problems Inventory (BPI-01) in a Swedish community population of adults with intellectual disability. *Research in Developmental Disabilities, 32*(6), 2295–2303. https://doi.org/10.1016/j.ridd.2011.07.037

Lundqvist, L.-O., Andersson, G., & Viding, J. (2009). Effects of vibroacoustic music on challenging behaviors in individuals with autism and developmental disabilities. *Research in Autism Spectrum Disorders, 3*(2), 390–400. https://doi.org/10.1016/j.rasd.2008.08.005

Maddox, B. B., Cleary, P., Kuschner, E. S., Miller, J. S., Armour, A. C., Guy, L., Kenworthy, L., Schultz, R. T., & Yerys, B. E. (2018). Lagging skills contribute to challenging behaviors in children with autism spectrum disorder without intellectual disability. *Autism, 22*(8), 898–906. https://doi.org/10.1177/1362361317712651

Mallory, C., & Keehn, B. (2021). Implications of Sensory Processing and Attentional Differences Associated With Autism in Academic Settings: An Integrative Review. *Frontiers in Psychiatry, 12*, 695825. https://doi.org/10.3389/fpsyt.2021.695825

Mascitelli, A. N., Rojahn, J., Nicolaides, V. C., Moore, L., Hastings, R. P., & Christian-Jones, C. (2015). The Behaviour Problems Inventory-Short Form: Reliability and Factorial Validity in Adults with Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities, 28*(6), 561–571. https://doi.org/10.1111/jar.12152

Matson, J. L., Mahan, S., Hess, J. A., Fodstad, J. C., & Neal, D. (2010). Progression of challenging behaviors in children and adolescents with Autism Spectrum Disorders as measured by the Autism Spectrum Disorders-Problem Behaviors for Children (ASD-PBC). *Research in Autism Spectrum Disorders, 4*(3), 400–404. https://doi.org/10.1016/j.rasd.2009.10.010

McKechanie, A., Moffat, V., Johnstone, E., & Fletcher-Watson, S. (2017). Links between Autism Spectrum Disorder Diagnostic Status and Family Quality of Life. *Children, 4*(4), 23. https://doi.org/10.3390/children4040023

McTiernan, A., Leader, G., Healy, O., & Mannion, A. (2011). Analysis of risk factors and early predictors of challenging behavior for children with autism spectrum disorder. *Research in Autism Spectrum Disorders, 5*(3), 1215-1222. https://doi.org/10.1016/j.rasd.2011.01.009

Mello, C., Rivard, M., Morin, D., Patel, S., & Morin, M. (2022). Symptom Severity, Internalized and Externalized Behavioral and Emotional Problems: Links with Parenting Stress in Mothers of Children Recently Diagnosed with Autism. *Journal of Autism and Developmental Disorders, 52*(6), 2400–2413. https://doi.org/10.1007/s10803-021-05131-4

Miltenberger, R. G. (2008). *Behaviour Modification: Principles and Procedures (4th ed.)*. Wadsworth.

Mircea, C. E., Rojahn, J., & Esbensen, A. J. (2010). Psychometric Evaluation of Romanian Translations of the Behavior Problems Inventory-01 and the Nisonger Child Behavior Rating Form. *Journal of Mental Health Research in Intellectual Disabilities, 3*(1), 51–65. https://doi.org/10.1080/19315860903520515

Murphy, G. H., Beadle-Brown, J., Wing, L., Gould, J., Shah, A., & Holmes, N. (2005). Chronicity of Challenging Behaviours in People with Severe Intellectual Disabilities and/or Autism: A Total Population Sample. *Journal of Autism and Developmental Disorders, 35*(4), 405–418. https://doi.org/10.1007/s10803-005-5030-2

Murphy, O., Healy, O., & Leader, G. (2009). Risk factors for challenging behaviors among 157 children with autism spectrum disorder in Ireland. *Research in Autism Spectrum Disorders, 3*(2), 474–482. https://doi.org/10.1016/j.rasd.2008.09.008

Nicholls, G., Hastings, R. P., & Grindle, C. (2020). Prevalence and correlates of challenging behaviour in children and young people in a special school setting. *European Journal of Special Needs Education, 35*(1), 40–54. https://doi.org/10.1080/08856257.2019.1607659

Oubrahim, L., & Combalbert, N. (2019). Behaviour problems in people with intellectual disabilities: validation of the French version of the Behaviour Problems Inventory – Short Form. *Journal of Intellectual Disability Research, 63*(5), 466–476. https://doi.org/10.1111/jir.12612

Owen, D. M., Hastings, R. P., Noone, S. J., Chinn, J., Harman, K., Roberts, J., & Taylor, K. (2004). Life events as correlates of problem behavior and mental health in a residential population of adults with developmental disabilities. *Research in Developmental Disabilities, 25*(4), 309–320. https://doi.org/10.1016/j.ridd.2004.01.003

Peña-Salazar, C., Arrufat, F., Santos López, J.-M., Fontanet, A., Roura-Poch, P., Gil-Girbau, M., Carbonell-Ducastella, C., & Serrano-Blanco, A. (2022). Intellectual Disability, Autism Spectrum Disorders, Psychiatric Comorbidities and Their Relationship with Challenging Behavior. *Journal of Mental Health Research in Intellectual Disabilities, 15*(2), 77–94. https://doi.org/10.1080/19315864.2022.2029641

Poppes, P., van der Putten, A. J. J., & Vlaskamp, C. (2010). Frequency and severity of challenging behaviour in people with profound intellectual and multiple disabilities. *Research in Developmental Disabilities, 31*(6), 1269–1275. https://doi.org/10.1016/j.ridd.2010.07.017

Rojahn, J., Schroeder, S. R., Mayo-Ortega, L., Oyama-Ganiko, R., LeBlanc, J., Marquis, J., & Berke, E. (2013). Validity and reliability of the Behavior Problems Inventory, the Aberrant Behavior Checklist, and the Repetitive Behavior Scale – Revised among infants and toddlers at risk for intellectual or developmental disabilities: A multi-method assessment approach. *Research in Developmental Disabilities, 34*(5), 1804–1814. https://doi.org/10.1016/j.ridd.2013.02.024

Rojahn, J., Rowe, E. W., Sharber, A. C., Hastings, R., Matson, J. L., Didden, R., Kroes, D. B. H., & Dumont, E. L. M. (2012a). The Behavior Problems Inventory-Short Form for individuals with intellectual disabilities: Part II: reliability and validity. *Journal of Intellectual Disability Research, 56*(5), 546–565. https://doi.org/10.1111/j.1365-2788.2011.01506.x

Rojahn, J., Zaja, R. H., Turygin, N., Moore, L., & van Ingen, D. J. (2012b). Functions of maladaptive behavior in intellectual and developmental disabilities: Behavior categories and topographies. *Research in Developmental Disabilities, 33*(6), 2020–2027. https://doi.org/10.1016/j.ridd.2012.05.025

Rojahn, J., Rowe, E. W., Sharber, A. C., Hastings, R., Matson, J. L., Didden, R., Kroes, D. B. H., & Dumont, E. L. M. (2012c). The Behavior Problems Inventory-Short Form for individuals with intellectual disabilities: Part I: development and provisional clinical reference data. *Journal of Intellectual Disability Research, 56*(5), 527–545. https://doi.org/10.1111/j.1365-2788.2011.01507.x

Rojahn, J., Wilkins, J., Matson, J. L., & Boisjoli, J. (2010). A Comparison of Adults with Intellectual Disabilities with and without ASD on Parallel Measures of Challenging Behaviour: The Behavior Problems Inventory-01 (BPI-01) and Autism Spectrum Disorders-Behavior Problems for Intellectually Disabled Adults (ASD-B. *Journal of Applied Research in Intellectual Disabilities, 23*(2), 179–185. https://doi.org/10.1111/j.1468-3148.2009.00519.x

Rojahn, J., Schroeder, S. R., & Hoch, T. A. (2008). *Self-injurious behavior in intellectual disabilities*. Elsevier.

Rojahn, J., Matson, J. L., Lott, D., Esbensen, A. J., & Smalls, Y. (2001). The Behavior Problems Inventory: an instrument for the assessment of self-injury, stereotyped behavior, and aggression/destruction in individuals with developmental disabilities. *Journal of Autism and Developmental Disorders, 31*(6), 577–588. https://doi.org/10.1023/a:1013299028321

Rojahn, J., Polster, L. M., Mulick, J. A., & Wisniewski, J. J. (1989). Reliability of the Behavior Problems Inventory. *Journal of the Multihandicapped Person, 2*(4), 283–293. https://doi.org/10.1007/BF01098170

Rosen, N. E., Schiltz, H. K., & Lord, C. (2022). *Teacher- and Parent-Reported Trajectories of Challenging Behavior Among Individuals with Autism*. MedRxiv. https://doi.org/10.1101/2022.09.09.22279781

Snyder, R., Turgay, A., Aman, M., Binder, C., Fisman, S., & Carroll, A. (2002). Effects of Risperidone on Conduct and Disruptive Behavior Disorders in Children With Subaverage IQs. *Journal of the American Academy of Child & Adolescent Psychiatry, 41*(9), 1026–1036. https://doi.org/10.1097/00004583-200209000-00002

Stewart, M., Schnabel, A., Hallford, D. J., McGillivray, J. A., Forbes, D., Foster, M., Shandley, K., Gardam, M., & Austin, D. W. (2020). Challenging child behaviours positively predict symptoms of posttraumatic stress disorder in parents of children with Autism Spectrum Disorder and Rare Diseases. *Research in Autism Spectrum Disorders, 69*, 101467. https://doi.org/10.1016/j.rasd.2019.101467

Thorson, R. T., Matson, J. L., Rojahn, J., & Dixon, D. R. (2008). Behaviour problems in institutionalised people with intellectual disability and schizophrenia spectrum disorders. *Journal of Intellectual & Developmental Disability, 33*(4), 316–322. https://doi.org/10.1080/13668250802441649

Turkington, C., & Anan, R. (2007). *The encyclopedia of autism spectrum disorder*. Facts On File, Inc.

Willner, P., Rose, J., Stenfert Kroese, B., Murphy, G. H., Langdon, P. E., Clifford, C., Hutchings, H., Watkins, A., Hiles, S., & Cooper, V. (2020). Effect of the COVID-19 pandemic on the mental health of carers of people with intellectual disabilities. *Journal of Applied Research in Intellectual Disabilities, 33*(6), 1523–1533. https://doi.org/10.1111/jar.12811