

Validation and Confirmatory Analysis of Impulsive Behaviors Scale in Children (UPPS-P-C)

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Abstract

Background: The present study was an effort for the validation and confirmatory factor analysis of the impulsive behaviors scale among a group of Iranian children.

Methods: The present study was a descriptive correlational study. The statistical population of the study included all children aged 8 to 12 years old in Tehran. 315 people were selected using available sampling methods. The scale's face validity was confirmed after its translation with the acquisition of experts' and subjects' perspectives. SPSS and AMOS were used for statistical analyses.

Results: The results of the confirmatory factor analysis, based on AMOS software, showed that the five-factor structure had a good fit with data of the Iranian sample. Internal consistency coefficients for the lack of perseverance, positive urgency, negative urgency, lack of premeditation and sensation seeking subscales were 0.69, 0.79, 0.66, 0.79 and 0.72, respectively.

Conclusion: The results of the present research generally revealed that the children's impulsive behaviors scale was a valid and reliable instrument capable of measuring impulsive behaviors and could be employed to evaluate impulsive behaviors in research and therapy centers.

Key Words: Children, Impulsivity, Reliability, Validity.

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1- INTRODUCTION

Impulsivity is defined as individuals' willingness to prefer direct and urgent rewards to delayed ones, failure in planning, and disorder in self-control (1). Other definitions of this construct highlight urgency, high sensation-seeking, a lack of premeditation and perseverance (2). Indeed, impulsivity is a personality trait that influences various human behaviors and is associated with self- and other-hurting behaviors, such as binge eating, violence and excessive social media use (3,4). At the same time, impulsivity is a key personality trait to a set of psychological problems, e.g. attention deficit/hyperactivity, bipolar, antisocial personality, and substance use disorders (5). In children and adolescents, functional problems tied to impulsive behaviors such as emotional disorders and difficulty in managing social relations can be observed in conduct disorder, attention-deficit/hyperactivity disorder, and many psychological disorders (6, 7). In addition, impulsivity can negatively influence daily activities and academic performance along with family and friendly relationships in adolescents and children (8-10). Impulsivity in adolescents and children can be seen in Conduct Disorder (CD), Attention Deficit Hyperactivity Disorder (ADHD) and many different mental disorders. Early involvement in risky maladaptive behaviors must be evaluated at a very young age, even prior to adolescence; because they are linked to pathological patterns of life. For these reasons, it is very important to identify and measure impulsivity in adolescents and children (11).

In adolescents and children, functional difficulties associated with impulsive behaviors (e.g., difficulties managing social relations and emotional dysregulation) are pervasive in numerous psychological disorders, such as conduct disorders (12) or pathological video game

use (13). Nevertheless, contrary to what has been observed in adults, few studies have examined children's impulsive behaviors according to the UPPS model (14,15,16). However, the impulsivity traits assessed by the self-reported UPPS provide a valid and reliable framework to assess children's impulsive behaviors, based on the limited data above. For example, Marmorstein (2013) found that positive and negative urgency were linked with both internalizing symptomatology (e.g., depression, generalized anxiety, and panic disorders) and externalizing symptomatology (e.g., alcohol consumption and conduct disorders) in children, whereas a lack of premeditation was related only to externalizing symptomatology.

Since premature involvement in risky and maladaptive behaviors accompanies morbid life patterns, evaluating such behaviors in early life, even before adolescence, is indispensable. For this reason, it is imperative to access a valid instrument that can assess impulsive dispositions in children quickly and accurately and enable prompt risk detection and intervention to prevent negative outcomes linked to these maladaptive behaviors.

A decade ago, Whiteside and Lynam (2001) shed light on the multifaceted nature of impulsivity by developing a tool to explore its various dimensions in adults. The Impulsive Behavior Scale (UPPS) measures four core impulsivity components: (A) sensation seeking; defined as a tendency to enjoy and pursue activities that are exciting and openness to trying new experiences; (B) lack of premeditation; defined as the tendency to take into account the consequences of an act before engaging in that act, (C) lack of perseverance; defined as the ability to remain focused on a task that may be boring and/or difficult, and (D) negative urgency: defined as the tendency to act

rashly while faced with intense negative emotional contexts. In recent years, Siders et al. (2007), responded to the criticism that none of the dimensions of the four-factor model of impulsivity include impulsive action in response to positive mood and if there are individual differences in the tendency to respond hastily or impulsively to extremely high mood states, it does not seem that it can be measured by the existing scales. Another component called positive urgency (tendency to act hastily in response to moods) was added to the four-factor model of impulsivity and expanded the number of impulsivity factors to five factors (17, 18). Consequently, a novel 59-item scale measuring five distinct impulsivity dimensions, known as UPPS-P, was developed by incorporating a positive urgency subscale besides the original negative urgency subscale into the latest versions of questionnaires that assess the UPPS-p impulsivity model (19, 20).

In their seminal work, Whiteside and Lynam (2001) demonstrated that various UPPS versions possess strong psychometric properties: high internal consistency, a consistent and theory-based factor structure dependent on Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and sufficient test-retest reliability of different subscales. (19, 21-26). The short 20-item UPPS-P-C version for children assesses the 5 impulsivity dimensions expressed by Lynam and Whiteside in 2001(27) and Smith et al. in 2007(18). Children, especially impulsive ones, lose motivation easily during tests, and their interference sensitivity usually keeps them from finishing unattractive tasks (e.g., lengthy self-reports) (28). In this sense, Billieux's short version for adult French-speaking participants could be more effective in assessing children's impulsive behaviors compared to the laborious 59-item original version. (19). Geurten et al. (2021),

decided to conduct the validation and adaptation of a Short Version of the Impulsive Behaviors Scale in Children (UPPS-P –C) (29). Moreover, they thoroughly adapted items to ensure that 8-14-year-old children fully understand the statements (29).

Lee et al. (2024) examined the UPPS-P-C psychometrics to verify its five-factorial structure (subscales' Cronbach's alpha = 0.62-0.80). Besides, the test-retest correlation was in the 0.53-0.70 range during six months (30). Tekeoğlu and Çöp (2022) studied Turkish adolescents, reporting a Cronbach's alpha of 0.89 for the whole questionnaire (31). Similarly, Cronbach's alpha was 0.80-0.94 for the UPPS-P-C-Brazilian version subscales (32).

Self-report measurements with numerous items are challenging since impulsive children possess a shorter attention span and easily lose their motivation during test sessions. In addition, children often face problems when engaging in boring and unattractive actions, like long reports (29). Hence, shorter versions, e.g., the UPPS-P-C impulsive behavior scale, are usually preferred and employed in different countries. Due to the lack of a valid and adequate tool measuring children's impulsivity in Iran, the researchers considered the UPPS-P-C impulsive behavior scale, a credible questionnaire with proper validity and reliability as reported by studies, to determine its psychometric properties and applicability. Therefore, the present study was an effort for validating Children's Impulsive Behavior Scale specifically through confirmatory factor analysis.

2- MATERIALS AND METHODS

2-1. Design and population

The present research was a descriptive study of correlation type on the statistical population of 8-12-year-old students in the 2023-2024 academic year. The subjects

were 315 students selected by convenience sampling. According to Kline (2016), studies analyzing the confirmatory structures of research instruments should select minimally 5 and maximally 20 participants per test item. Based on Kline's (2016) proposed rationale, the present study chose a total of 320 individuals concerning the 20 items of the scale and the selection of 16 participants per item. However, 315 questionnaires were ultimately analyzed due to the incompleteness of five questionnaires.

2-2. Instruments

Impulsive Behavior in Children (UPPS-P-C): A first version of the questionnaire was designed based on the short version of the UPPS-P for adults (19) by two experienced neuropsychologists (M.G. and C.C.), who specialize in children's cognitive and affective development. The items were adapted so they could be easily understood by children. Geurten et al. (2021) adapted UPPS-P-C from the adults' impulsive behavior scale and it is suitable for the age range of 8 to 14. This questionnaire possesses 20 items scored on a 4-point Likert scale (from strongly agree = 1 to strongly disagree = 4, and some items are scored reversely (Items 2, 3, 4, 7, 9, 10, 12, 14, 15, 17, 18, and 20) (29). All the words composing the items of the questionnaire had to be included in the vocabulary of 8-year-old children. The children's impulsive behavior scale includes five subscales: The lack of premeditation, positive urgency, negative urgency, the lack of perseverance, and sensation-seeking. Geutern et al. (2021) approved the 5-factor structure and item fit of the scale through confirmatory factor analysis. Furthermore, the internal consistency (Cronbach's alpha) of the subscales equaled 0.81, 0.67, 0.71, 0.64, and 0.70 for the subscales, and their test-retest reliability was estimated at 0.69, 0.79, 0.66, 0.72, and 0.92 in an interval of 6-8 weeks (29). The order of the 20 items

was similar to that of the original short version of the UPPS-P (19).

2-3. Procedure

For validation purposes, a proficient translator with a good command of psychology first translated the scale from English to Persian. Then, the Persian version was back-translated into English, and the two English versions were compared in terms of their differences. The final translation was examined by three psychology faculties for its qualitative face validity. They probed the intelligibility of the items, the appearance of the scale, and whether it encompassed all aspects of the topic. Afterwards, the quantitative face validity was examined by the distribution of the scale in a pilot group of 12 children and any ambiguities in the items were considered. Finally, according to the experts' viewpoints, the researchers employed the scale without omitting any items. UPPS-P-C was completed by the participants individually, and the SPSS 24 and AMOS software were used for the statistical analysis.

3- RESULTS

The age mean and standard deviation of the participants equaled to 10.24 ± 1.85 . Among the participants, 107 (33.96%) were female, and 208 (66.03%) were male. Table 1 displays the descriptive statistics (mean, SD, skewness, and kurtosis) of the UPPS-P-C impulsive behavior scale.

Before analyzing the data with the statistical confirmatory factor analysis, the researchers confirmed the assumptions associated with univariate normality by estimating the skewness and kurtosis indices, multivariate normality and outliers using the Mahalanobis distance, and missing data using the expectation-maximization method. In addition, the results of the common dispersion among the observed variables show that the linearity and multicollinearity assumptions have been observed. Thus, we can use the

parametric confirmatory factor analysis test. Table 2 displays the parameters and factor loadings of the scale in this analysis.

Table-1: Descriptive measures: Mean, SD, skewness, and kurtosis

Row	Items	Mean	SD	Skewness	Kurtosis
1	Before doing something, I think about it a lot.	2.86	0.93	-0.71	-0.20
2	When I'm really happy, I do not necessarily think about the consequences of my actions(R).	2.67	1.02	-0.43	-0.91
3	From time to time, I like doing things that are a bit frightening (R).	2.89	0.92	-0.80	-0.03
4	When I'm in a bad mood, I act without thinking(R).	2.81	0.95	-0.62	-0.45
5	I usually prefer to finish what I've started.	2.39	1.08	-0.11	-1.35
6	I usually think in a careful, organized way.	3.02	0.78	-0.90	0.97
7	When I'm arguing, I often say things that I regret later(R).	1.96	1.03	0.59	-0.96
8	I finish what I've started.	2.75	1.05	-0.52	-0.91
9	I like taking risks(R).	2.61	1.03	-0.40	-1.02
10	When I'm very happy, I have trouble controlling myself(R).	2.63	0.98	-0.28	0.92
11	Once I have started an exercise or homework, I almost always finish it.	2.42	1.09	-0.05	-1.34
12	When I'm in a bad mood, I often make things worse because I act without thinking(R).	1.59	0.87	-1.26	0.44
13	I usually make decisions after a lot of thought.	2.96	0.88	-0.77	-0.16
14	I usually look for new and exciting things(R).	2.88	0.93	-0.79	-0.10
15	When I'm really happy, I act without thinking(R).	2.69	0.99	-0.44	-0.81
16	I'm an efficient person, and I always complete my work.	2.47	1.05	-0.19	-1.23
17	When I feel rejected, I often say things that I regret later(R).	2.48	1.13	-0.09	-1.39
18	I like new experiences and feelings even if they frighten me or are a bit against the rules (R).	2.09	1.11	0.35	-1.37
19	Before making a decision, I think about all the good and bad things that could happen.	2.72	0.98	-0.53	-0.71
20	When I'm very happy, it seems normal to just do whatever I want (R).	2.86	0.93	-0.69	-0.27

Table-2: Factor loadings of UPPS-P-C in confirmatory factor analysis

Subscale	Item	Unstandardized factor loading	Standardized factor loading	S.E.	C.R.	Sig.
Lack of premeditation	1	1	0.580			
	6	0.767	0.525	0.102	7.495	0.001
	13	0.803	0.497	0.112	7.177	0.001
	19	1.385	0.754	0.145	9.556	0.001
Positive urgency	2	1	0.772			
	10	0.751	0.598	0.071	10.558	0.001
	15	0.875	0.694	0.070	12.450	0.001
	20	0.828	0.694	0.066	12.464	0.001
Negative urgency	4	1	0.584			
	7	0.995	0.534	0.127	7.823	0.001
	12	0.653	0.413	0.103	6.339	0.001
	17	1.439	0.707	0.151	9.561	0.001
Lack of perseverance	5	1	0.700			
	8	1.080	0.779	0.084	12.821	0.001
	11	1.000	0.691	0.087	11.447	0.001
	16	0.801	0.574	0.084	9.566	0.001
Sensation-seeking	3	1	0.567			
	9	1.388	0.701	0.149	9.345	0.001
	14	1.130	0.632	0.129	8.733	0.001
	18	1.353	0.637	0.154	8.786	0.001

Unstandardized factor loadings of Items 1, 2, 3, 4, and 5 were fixed by number 1, and their Standard Errors (SE) and Critical Ratios (CR) were not estimated.

Table 2 shows that the standard factor loadings of all items were above 0.32. Hence, the UPPS-P-C questions had acceptable factor loadings, significant at the <0.01 level. The maximum and minimum factor loadings belonged to items 8 (0.779) and 12 (0.413).

The GOF indices of the confirmatory factor analysis in Table 3 reveal that the assumed model desirably fits the observed data. In the next step, the researchers examined the Cronbach alpha coefficient of the items to estimate the internal consistency of the scale and employed the split-half method to check reliability.

As Table 4 shows that Cronbach alpha coefficient was 0.69 for the lack of premeditation, 0.79 for positive urgency, 0.66 for negative urgency, 0.79 for the lack of perseverance, 0.72 for sensation-seeking, and 0.92 for the entire scale, indicating the acceptable reliability of the impulsive behaviors in children scale. Likewise, the split-half reliability was found to be 0.86, reflecting the desirable and acceptable reliability of UPPS-P-C. Besides, the researchers estimated the correlation among subscales as well as that between the subscales and the total score, the results of which are reported in Table 5.

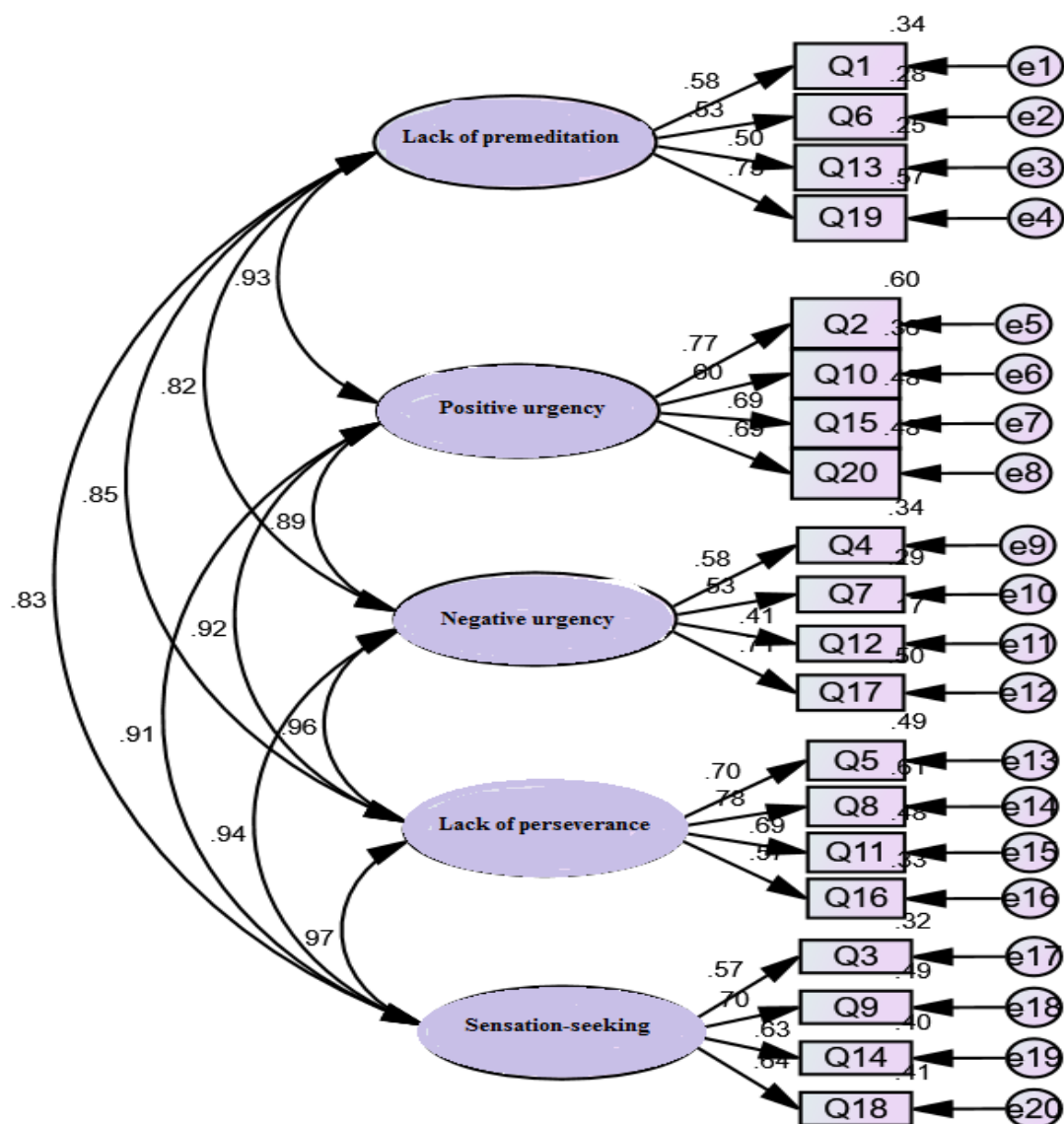


Fig. 1: Factor loadings of UPPS-P-C items

Table-3: Fit indices of confirmatory factor analysis

Indices	Obtained value	Acceptable value
Sig. (P)	0.001	<0.050
X2/df	2.702	<3
RMSEA	0.074	<0.08
CFI	0.903	>0.90
PCFI	0.751	>0.60
PNFI	0.708	>0.60
IFI	0.910	>0.90
GFI	0.902	>0.90
AGFI	0.903	>0.90
NFI	0.904	>0.90

Table-4: Cronbach alpha and split-half coefficients of the scale

Subscale	No. of items	Cronbach alpha	Split-half reliability	
			Pearson correlation coefficient	Sig.
Lack of premeditation	4	0.69	0.86**	0.001
Positive urgency	4	0.79		
Negative urgency	4	0.66		
Lack of perseverance	4	0.79		
Sensation-seeking	4	0.72		
Sum	20	0.92		

** P = 0.01

Table-5: Correlation matrix of subscales

Subscale	1	2	3	4	5	6
Lack of premeditation	1					
Positive urgency	0.674**	1				
Negative urgency	0.553**	0.640**	1			
Lack of perseverance	0.582**	0.706**	0.678**	1		
Sensation-seeking	0.589**	0.693**	0.654**	0.738**	1	
Total score	0.787**	0.876**	0.828**	0.883**	0.868**	1

**P = 0.01

Table 5 shows that all subscales significantly correlate with the total score of the scale.

4- DISCUSSION

The present study was an effort for the validation and confirmatory factor analysis of the impulsive behaviors in children scale. The CFA results showed the desirable model fit of the impulsive behaviors in children scale since the CFI, NFI, GFI, and RMSEA indices with values of 0.903, 0.904, 0.902, and 0.074 displayed that the measurement model of the impulsive behaviors in children scale had a desirable fit; and its construct validity was confirmed. The results of the present study agree with the research results of Geurten et al. (2021), Lee et al. (2024), Tekeoğlu and Çöp (2022), and De Castro Machado et al. (2023), who examined the psychometric properties of the impulsive behaviors in children scale (30,31,32,33). Both English and Persian versions of Geurten et al.'s (2021) scale

possess 20 items, and the number of questions has not changed. Besides, a complete confirmation of Geurten et al.'s (2021) five-factor model in the Iranian context indicates the high capacity of the scale to evaluate the impulsivity construct in Iranian samples. Thus, the confirmation of the Persian version of UPPS-P-C with no alteration in the number of items is rooted in the appropriate translation of the terms from English to Persian; and the Persian UPPS-P-C, similar to its English version, led to a thorough perception and interpretation of the items.

The reliability-examining Cronbach alpha coefficients were 0.69 for the lack of premeditation, 0.79 for positive urgency, 0.66 for negative urgency, 0.79 for the lack of perseverance, 0.72 for sensation-seeking, and 0.92 for the entire scale, indicating the acceptable reliability of the impulsive behaviors in children scale. The highest reliability coefficient belonged to positive urgency and lack of perseverance,

and the lowest coefficient pertained to the negative urgency subscale. Thus, we can assert that the determined items in the positive urgency and lack of perseverance subscales are more collectively fit in their construct than other items and can be investigated as the most reliable components.

Positive urgency, i.e., willingness to severe reactions to positive emotional modes, is associated with a broad spectrum of problems, such as sabotage, risky sexual behavior, gambling, substance use, and mania symptoms (34, 35). Even disorders involving negative emotions, e.g., depression and anxiety, are linked to increased impulsivity during positive moods (36, 37). The lack of perseverance, a disposition to abandon something when it gets difficult or boring, resembles lower scores in the self-discipline aspect of conscientiousness (38). This aspect of impulsivity is related to impulsive and addictive behaviors in the real world, e.g., smoking and alcohol use (39), self-injury actions (40), and obesity (41). The next factor is sensation-seeking, which refers to the need for new and exciting experiences and tendency to participate in risky activities (42). Indeed, individuals earning higher scores for sensation-seeking in standardized questionnaires tend to be directed to high-risk activities (43). In addition, the sensation-seeking trait may predict using illegal drugs, stimulants, alcohol, tobacco, and energy drinks (44). The lack of premeditation is the other component of impulsivity. It mirrors a tendency to act thoughtlessly (45) and is associated with gambling (46) and risky drinking (47). The last component of the impulsivity scale is negative urgency, which deals with hasty behaviors in the experience of severe negative feelings (48) and predicts problematic behaviors (49), substance abuse (17), and eating disorders (48). It has also been revealed that negative urgency interacts with pathologic

conditions, such as posttraumatic stress, that intensify alcohol use (49).

4-1. Limitations of the study

Among the limitations of the research was that the social class or cultural level of the children's families was not controlled. Researchers are suggested to consider validating the current instrument in other societies. Furthermore, this research did not examine convergent and incremental validity, and this limitation should be removed in future studies.

5. CONCLUSION

In sum, the results of the present research help deduce that the impulsive behaviors scale is a suitable instrument for measuring children's impulsivity regarding its validity and reliability, required completion time, item fewness, clarity, and simple scoring, which is a paramount operability aspect of the questionnaire

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