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UPPS-P Impulsive Behavior Scale for Children: Turkish Adaptation, Reliability and Validity Study

Uğur TEKEOĞLU[1], Esra ÇÖP[2], Hanife AVCI[3]

ABSTRACT

Objective: In this study we aimed to examine the Turkish validity and reliability of the UPPS-P Impulsive Behavior Scale for Children (UPPS-P-C) and to investigate whether there is a relationship between the UPPS-P-C subscales and Attention Deficit Hyperactivity Disorder (ADHD).

Method: A total of 575 children aged 10-14 years were included in the study. The clinical sample of the study consisted of 50 children with ADHD who had not received treatment for at least 1 month and 525 children living in Sinop as the community sample. In order to investigate the test-retest reliability, UPPS-P-C was re-administered to 50 different children selected from the community sample.

Results: Factor analysis displayed a five-factor model for the test. 'Lack of premeditation' and 'Lack of perseverance' had the highest ability to distinguish children with ADHD. The Cronbach α coefficient was found to be 0.894 for the UPPS-P-C. For the test-retest reliability of the UPPS-P-C, the correlation between the total and subscales of the two tests was examined using ICC, the Spearman's Rank Correlation Coefficient and Bland Altman graphs, and the reliability was good.

Conclusion: Our findings show that the Turkish version of the UPPS-P-C has good validity and reliability and is successful in screening for features related to impulsivity. It has been shown that the UPPS-P-C can be used for symptom profiling and severity assessment.

Keywords: Attention Deficit Hyperactivity Disorder, impulsivity, reliability, UPPS-P, validity

INTRODUCTION

Impulsivity is defined as "the tendency to act quickly without prior thought or conscious decision-making", "to act without sufficient thought" and "to act with less thought than individuals with similar abilities and knowledge" (Moeller et al. 2001). As a personality trait, impulsivity is a characteristic that can affect all areas of human life and concerns the adaptation of the individual (Spinella 2004, Yargıç et al. 2011). In addition, impulsivity has been included in many psychiatric diseases and psychopathological personality models (Moeller et al. 2001).

Eysenck associated impulsivity with risk-taking, inability to plan, inability to gather the mind quickly and reported that it may be appropriate to examine impulsivity in 3 dimensions. These are extraversion, neuroticism and psychoticism (Eysenck and Eysenck 1977). Barratt et al. examined impulsivity in 3 dimensions: attentional impulsivity, motor impulsivity and lack of planning (Spinella 2007). Patton et al. similarly examined impulsivity in 3 dimensions: motor activation, attention and lack of planning (Patton et al. 1995).

Whiteside and Lynam analyzed various previous theories and self-report scales about impulsivity and created a 4-factor model (UPPS). According to this model, the 4 facets of impulsivity are as follows (Whiteside and Lynam 2001):

Negative Urgency: Tendency to behave impulsively in the face of stress and negative affect.

Lack of Premeditation: Acting rashly without proper consideration of possible long-term consequences.

Lack of Perseverance: Difficulty maintaining focus on boring or difficult tasks.

Sensation Seeking: Enjoying and seeking risky, exciting and dangerous experiences.

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[1]Assis. Prof., Recep Tayyip Erdoğan University Faculty of Medicine, Child Psychiatry Rize; [2]Prof., Health Sciences University Ankara City Hospital, Child Psychiatry, Ankara; [3]Hacettepe University, Department of Biostatistics, Ankara, Türkiye

Uğur Tekeoğlu, e-mail: ugurtekeoglu57@gmail.com

Whiteside and Lynam defined impulsivity as an umbrella term covering these four facets (UPPS). Urgency has been associated with bulimia nervosa and borderline personality disorder; lack of premeditation with dementia and antisocial personality disorder; lack of perseverance with ADHD; and sensation seeking with substance use disorders. It has been reported that UPPS may be associated with many psychopathological behaviors (Whiteside and Lynam 2001).

In 2007, Cyders et al. noted that although impulsive action under extreme negative emotions is represented in the model, impulsive action under extreme positive emotions also exists and is not well conceptualized or measured in the literature. Therefore, the authors created a subscale of positive urgency, which was later incorporated into the UPPS model. Thus, the UPPS-P impulsivity model was defined as a multifaceted and multidimensional model that includes five impulsive personality traits (Cyders et al. 2007).

Positive Urgency: The tendency to act impulsively under excessive positive emotions.

The 5-factor approach to impulsivity may help us better understand the occurrence of behaviors that are impulsive in nature. Whiteside and Lynam argued that it is a common mistake to view impulsivity as a single personality trait rather than multifaceted. For example, in one study, the term "impulsivity" may be used for the personality trait of seeking novelty and engaging in risky behaviors, while in another study, the term "impulsivity" may be used for actions that are made quickly without thinking in order to control emotions. In fact, these tendencies related to impulsivity may have very different etiologies (Whiteside and Lynam 2001).

In a large-scale meta-analysis (2015), the relationship between impulsivity and psychopathologies was investigated. While the strongest association with lack of premeditation was shown to be with alcohol substance use, significant associations with borderline personality, suicidality and depression were also reported. The strongest association with sensation seeking was found to be with alcohol use, while significant associations with aggression and non-suicidal self-harm tendency were also reported. While the strongest association with lack of perseverance has been shown to be with borderline personality disorder, significant associations with alcohol substance use, depression and suicidality have also been reported. Negative urgency was the impulsivity component that showed the most association with many psychopathologies. Negative urgency was the subscale showing the strongest association with depression, anxiety, obsessive-compulsive disorder, eating disorders and borderline personality pathologies. Positive urgency showed a stronger relationship with alcohol and substance use (Berg et al. 2015).

Impulsivity in children and adolescents can be seen in attention deficit hyperactivity disorder (ADHD), conduct disorder and many different mental disorders (Moeller et al. 2001). Impulsivity symptoms of ADHD can be seen as wanting to meet demands immediately, being impatient, acting without thinking, acting in a hurry, not waiting for a turn, and not being able to control reactions (APA 2014).

Impulsivity can negatively affect children and adolescents' school life, daily activities, family and friend relationships. Since early engagement in risky and maladaptive behaviors is associated with pathological life patterns, it is necessary to assess such behaviors very early in life, even before adolescence (Moeller et al. 2001). It is important to address each impulsivity symptom due to the many behavioral, academic and relational problems it is associated with. In addition, the numerical increase in the number of impulsivity symptoms increases the risk in terms of the associated problems (Öner et al. 2013). For these reasons, it is very important to identify and measure impulsivity in children and adolescents.

The assessment of impulsivity is particularly difficult due to the contradictions that may occur between the statements of individuals and the reports of observers (Hollander and Stein 2007). Impulsivity in humans is often assessed with self-report scales. Barratt Impulsiveness Scale, Eysenck Impulsivity Scale, Karolinska Personality Scale, Temperament and Character Inventory, UPPS and UPPS-P are the main scales frequently used in the world. In addition, measurement tools such as Conners Assessment Scales and Turgay DSM-IV Based Screening and Assessment Scale are also used to indirectly assess impulsivity.

Zapolski et al. developed a child version of the UPPS-P Impulsive Behavior Scale (UPPS-P Impulsive Behavior Scale for Children, UPPS-P-C). The aim of this version is to measure the UPPS-P model of impulsivity traits in children and adolescents (Zapolski et al. 2010). While the UPPS-P-C scale is widely used in children and adolescents in many languages, its Turkish validity and reliability study has not been previously conducted.

The UPPS-P and UPPS-P-C impulsive behavior scales offer the opportunity to assess more dimensions than the Barratt Impulsiveness Scale (BIS), which is more widely used in Türkiye and whose validity and reliability have been studied in adults. To our knowledge, there are no Turkish validity and reliability studies of scales specifically designed to assess impulsivity in children in the literature. In this study, it was aimed to determine the Turkish validity and reliability of the UPPS-P-C Impulsive Behavior Scale in children and adolescents.

METHODS

Sample

There are clinical and community samples in our study. The clinical sample consisted of 50 children and adolescent volunteers aged 10-14 whose participation in the study was approved by their parents, who were admitted to the Child Psychiatry Clinic of Ankara City Hospital, diagnosed with ADHD with a clinical interview based on DSM-5, and who had not received treatment for at least 1 month.

The community sample consisted of 525 children and adolescent volunteers aged 10-14, who were 5th-8th grade students residing in the center of Sinop and whose parents gave their consent to participate in the study. In order to prevent bias in the selection of students in the community sample, we tried to reach all 5th-8th grade students residing in the center of Sinop.

In the clinical sample, those with a suspected or known history of neurological or psychiatric disorders (except Oppositional Defiant Disorder and Conduct Disorder) and in the community sample, those with a suspected or known history of neurological, psychiatric, learning or developmental disorders (including ADHD) were excluded from the study.

Procedure

Ethical approval was obtained from Ankara City Hospital Clinical Research Ethics Committee on August 19, 2020 (Decision No: E1/2020/973). The scale was finalized and made ready for the study by following standard translation and back translation processes. In the clinical sample group, "Sociodemographic Data Form (SDF)" and "Strengths and Difficulties Questionnaire (SDQ)-Parent Form" were completed by the parents and "UPPS-P Impulsive Behavior Scale for Children (UPPS-P-C)" was completed by the students at the hospital. In the community sample, information about the study was provided online via a web page. Afterwards, the "SDF" and "SDQ-Parent Form" were completed by parents at home and the "UPPS-P-C" was completed by students at school.

The factor validity of the scale and the relationships between the subscales of the UPPS-P-C were analyzed in the community sample (525 children and adolescents). The relationships between the UPPS-P-C scale and SDQ, the predictive effect of the UPPS-P-C scale on ADHD, and the internal consistency of the UPPS-P-C scale were analyzed in all participants (575 children and adolescents).

To compare the samples, 48 children and adolescents in the community sample were matched with ADHD patients in the clinical sample on age, gender, and parental education level. Due to the pandemic conditions, 50 different children and adolescents were randomly selected from the community sample (regardless of any variables, using Excel functions) and the UPPS-P-C was administered once more to investigate test-retest reliability. Although the time required for re-administration was planned to be 6-8 weeks in our study, re-administration of the UPPS-P-C was possible after approximately 13-14 weeks due to the pandemic.

Data Collection Tools

Sociodemographic Data Form-SDF: It was prepared by the researchers to evaluate the sociodemographic characteristics of the participants. The form consisted of questions about age, gender, socioeconomic status, educational status, and family characteristics (parents' togetherness, education and employment status).

UPPS-P Impulsive Behavior Scale for Children (UPPS-P-C): Zapolski et al. developed a child version of the UPPS-P Impulsive Behavior Scale (UPPS-P-C) with fewer items and one-two syllable words. The UPPS-P-C Impulsive Behavior Scale consists of 40 questions and 5 subscales. These subscales are negative urgency, lack of premeditation, lack of perseverance, sensation seeking and positive urgency. Each subscale consists of 8 items. The number of reverse coded items is 15 and these items are in the lack of premeditation and lack of perseverance subscales. The scale is based on self-report and uses a four-point Likert system in which each item is scored between 1-4. Zapolski et al. showed that the scale has good validity and reliability (Zapolski et al. 2010).

Strengths and Difficulties Questionnaire (SDQ) - Parent Form: It was developed by Robert Goodman in 1997 to screen for mental problems in children and adolescents. This questionnaire has a parent form and a school form for ages 4-16 and an adolescent form for ages 11-16, which is completed by the adolescent themselves. The SDQ includes 25 questions, some of which question positive and some of which question negative behavioral characteristics. These questions are grouped under 5 sub-headings; (1) conduct problems, (2) hyperactivity/inattention (HI), (3) emotional problems, (4) peer relationship problems, (5) prosocial behaviors. Each heading is evaluated in itself and the sum of the first four headings gives the 'total difficulty score' (Goodman 1997). Turkish adaptation study was conducted in 2008 (Güvenir et al. 2008).

Statistical Methods

Analyses were performed using the free and open-source software R (version 4.3.1, https://cran.r-project.org), SPSS for Windows Version 23.0 statistical package (Chicago, IL), and AMOS 23 by an academic biostatistician.

The normal distribution assumption of numerical variables was examined with the Shapiro-Wilk goodness of fit test and graphical approaches (Q-Q plot, histogram). Median

(minimum-maximum) values were given for numerical variables that did not show normal distribution, and frequency and percentage values were given for categorical variables. Whether there were differences between community and clinical sample groups in terms of numerical variables was examined with the Mann-Whitney U test, and whether there were differences in terms of categorical variables was examined with Pearson chi-square test, Fisher's Exact test and Fisher-Freeman Halton tests, as appropriate.

The reliability (internal consistency, test-retest reliability) and validity (structural) of UPPS-P-C (40 item) were evaluated. Spearman correlation coefficient was used for the reliability coefficient between the scores obtained according to the test-retest method (Table 5). This coefficient is categorized as r≥0.81-1.0 excellent, 0.61-0.80 very good, 0.41-0.60 good, 0.21-0.40 moderate, and 0-0.21 poor (Norman and Streiner 2003). Intraclass Correlation Coefficient (consistency type) (ICC) value was used to evaluate test-retest reliability. ICC varies between 0.00 and 1.00 and values between 0.60-0.80 indicate good reliability, while values above 0.80 indicate excellent reliability. In addition, test-retest reliability was evaluated with the Bland-Altman graphical approach and the "BlandAltmanLeh" package was used for this (Lehnert 2015). In addition, Cronbach's alpha coefficients for each sub-dimension were calculated for scale reliability. The alpha coefficient is a measure of the internal consistency (homogeneity) of the items in the scale.

Construct validity was examined by confirmatory factor analysis (CFA). Overall model fit was assessed using Chi-Square Fit Index (χ^2), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Normed Fit Index (NFI), Tucker Lewis Index (TLI), Incremental Fit Index (IFI) and Root Mean Square Residual (RMR). The community and clinical sample (ADHD) groups were matched in terms of age, gender, parental education level, and income level variables. Matching was performed using the R software (version 4.3.1) "MatchIt" package (http://www.r-project.org/) (Stuart et al. 2011). The groups were matched with the propensity score matching method at the nearest neighbor (1:1) ratio. The success of the UPPS-P-C subscales in distinguishing the community and ADHD groups was examined with Receiver Operating Characteristic (ROC) analysis, and the predictive power of ADHD was examined with multiple binary logistic regression analysis. According to the Hosmer-Lemeshow test result, it was decided that the model fit the data well. The "metan" package was used to draw the graph of the Pearson correlation coefficients in Figure 2 (Olivoto and Lucio 2020). A p-value of less than 5% was considered statistically significant.

RESULTS

Demographic Characteristics of Participants

The mean age of the children participating in the study was 11.64±1.17 years (11.60±1.51 years in the community sample and 12.02±1.32 years in the clinical sample). It was observed that 43.2% (n=227) of the community sample and 72.0% (n=36) of the clinical sample were male. The ratio of those with poor (16%) and average (30%) academic achievement in the clinical sample and those with very good academic achievement (37.5%) in the community sample were found to be statistically higher compared to the other group ($p<0.05$). Descriptive characteristics of the participants and their parents are presented in Table 1 and Table 2.

Factor Validity of the UPPS-P-C Scale

The conceptual five-factor structure (Zapolski et al. 2010) was adapted to the modeling data (n=575) and fit measures were provided (final model in Table 3, Figure 1). Some fit measures were acceptable according to the modification indices such as the goodness of fit index (GFI) (TLI=0.919, IFI=0.928, RMSEA=0.042 and RMR=0.067), while others showed poor fit (CFI=0.927 and NFI=0.865). Considering the modification indices given in Table 3, it was concluded that the values were at an acceptable level in terms of the fit of the measurement model. As a result, a valid scale structure consisting of 40 items and 5 dimensions was confirmed.

When the relationships between the subscales of the UPPS-P-C were examined, all relationships were statistically significant, and the relationships between lack of premeditation and lack of perseverance and between positive urgency and negative urgency were highly positive ($r>0.50$, $p<0.001$). The relationships between sensation seeking and other subscales were found to be negligible ($r<0.25$). Other relationships between the subscales of the UPPS-P-C are shown in Figure 2.

Discriminant Validity of the UPPS-P-C Scale

In this study, the validity of the sub-dimensions of the UPPS-P-C scale was tested using ROC analysis. The area under the ROC curve, sensitivity and selectivity values were 0.831 (93.75% and 52.08%) for lack of premeditation, 0.655 (29.17% and 97.92%) for negative urgency, 0.766 (81.25% and 58.33%) for lack of perseverance, 0.665 (54.17% and 72.92%) for positive urgency and 0.557 (58.33% and 58.33%) for sensation seeking, respectively. When evaluating the effectiveness of the UPPS-P-C subscales in separating community and clinical (ADHD) groups, a remarkable distinction was observed in the ROC curves only in the lack of premeditation and lack of perseverance subscales (Figure 3).

Concurrent Validity of the UPPS-P-C Scale

In all participants (575 children and adolescents), a highly positive correlation was found between the lack of

Table 1. Descriptive Characteristics of Participants

	Community (n=525)	Clinical (n=50)	Test Statistic	p value
Age (years)	12 (10-14)	12 (10-14)	Z=2.123	**0.034**[a]
Gender				
Female	298 (56.8)*	14 (28.0)		
Male	227 (43.2)	36 (72.0)*	χ^2=15.217	**<0.001**[b]
Grade				
5th	141 (26.9)	14 (28.0)		
6th	141 (26.9)	11 (22.0)		
7th	123 (23.4)	10 (20.0)		
8th	120 (22.8)	15 (30.0)	χ^2=1.654	0.647[b]
Academic achievement				
Poor	2 (0.4)	8 (16.0)*		
Average	92 (17.5)	15 (30.0)*		
Good	234 (44.6)	21 (42.0)		
Very Good	197 (37.5)*	6 (12.0)	χ^2=76.349	**<0.001**[b]
Grade point average				
0-20	1 (0.2)	0 (0.0)		
20-40	4 (0.8)	3 (6.0)*		
40-60	23 (4.4)	10 (20.0)*		
60-80	110 (21.0)	19 (38.0)*		
80-100	387 (73.7)*	18 (36.0)	χ^2=40.962	**<0.001**[c]
Physical illness (present)	19 (3.6)	3 (6.0)	–	0.427[d]

For variables that did not meet the normal distribution assumption, median (minimum-maximum) and for categorical variables, frequency and percentage values were given.
*The relevant rates were found to be statistically higher compared to the other group (p<0.05).
a: Mann-Whitney U test, b: Pearson chi-square test, c: Fisher-Freeman Halton test, d: Fisher Exact test

premeditation and lack of perseverance subscales of the UPPS-P-C and the total difficulty and HI subscales of the SDQ (r>0.50, p<0.001). The relationships between sensation seeking and SDQ scores and between prosocial behaviors and UPPS-P-C scores were found to be negligible (r<0.20). The other relationships between the UPPS-P-C scale and the SDQ are shown in Figure 2.

Predictive Validity of the UPPS-P-C Scale

The predictive power of UPPS-P-C for diagnosis (ADHD) was evaluated by multiple logistic regression analysis. When the subscales were analyzed, it was observed that the subscale with the highest predictive power for ADHD was lack of premeditation (Odds ratio=1.30; Wald=24.142; p<0.001) (Table 4). Accordingly, a 1-unit increase in the lack of premeditation subscale score increases the risk of being diagnosed with ADHD approximately 1.30 times.

Reliability

Internal consistency estimates calculated using Cronbach's alpha for the UPPS-P-C subscales were higher than 0.7.

Table 2. Descriptive Characteristics of Participants' Parent

	Community (n=525)	Clinical (n=50)	Test Statistic	p value
Age of mother, years	39.0 (28-67)	37.5 (30-52)	Z=1.557	0.119[a]
Education level of the mother				
Not literate	3 (0.6)	0 (0.0)		
Primary school	126 (24.2)	15 (30.0)		
Secondary school	87 (16.7)	10 (20.0)		
High school	153 (29.5)	15 (30.0)		
University	138 (26.5)	6 (12.0)		
Master's/ Doctorate	13 (2.5)	4 (8.0)	χ^2=9.517	0.075[b]
Employment status of the mother				
Not working	306 (58.9)	38 (76.0)*		
Working	203 (39.0)*	11 (22.0)		
Retired	11 (2.1)	1 (2.0)	χ^2=5.754	0.056[c]
Mother's medical illness (Present)	71 (13.7)	7 (14.0)	χ^2=0.004	0.950[c]
Age of father, years	42.0 (32-73)	42.0 (30-71)	Z=0.559	0.576[a]
Education level of the father				
Not literate	2 (0.3)	0 (0.0)		
Primary school	93 (18.1)	12 (25.0)		
Secondary school	77 (15.0)	6 (12.5)		
High school	151 (29.3)	16 (33.3)		
University	159 (30.9)	10 (20.9)		
Master's/ Doctorate	33 (6.4)	4 (8.3)	χ^2=3.894	0.557[b]
Employment status of the father				
Not working	21 (4.1)	2 (4.3)		
Working	458 (89.1)	40 (85.1)		
Retired	35 (6.8)	5 (10.6)	χ^2=1.328	0.521[b]
Father's medical illness (Present)	64 (12.4)	7 (14.6)	χ^2=0.185	0.667[c]
Marital status				
Divorced	33 (6.4)	8 (16.7)*		
Married	479 (93.6)*	40 (83.3)	–	0.017
Family income level				
0-1500 TL	32 (6.0)	4 (8.0)		
1500-2500 TL	117 (22.3)	9 (18.0)		
2500-5000 TL	204 (38.9)	21 (42.0)		
5000-10000 TL	138 (26.3)	14 (28.0)		
Over 10000 TL	34 (6.5)	2 (4.0)	χ^2=1.221	0.877[b]
Number of children	2 (1-5)	2 (1-5)	Z=1.745	0.081[a]

For variables that did not meet the normal distribution assumption, median (minimum-maximum) and for categorical variables, frequency and percentage values were given
*The relevant rates were found to be statistically higher compared to the other group (p<0.05).
a: Mann-Whitney U test, b: Fisher-Freeman Halton test, c: Pearson chi-square test

Table 3. Confirmatory Factor Analysis (CFA) Results

Parameter	Abbreviation	Acceptable range	Initial model	Final model
Chi square fit test	CMIN/*df*	2≤*CMIN/df*≤3	2.623	1.989
Comparative fit index	CFI	0,95≤*CFI*≤0,97	0.875	0.927
Goodness of fit index	GFI	0,85≤*GFI*≤0,90	0.852	0.894
Normed fit index	NFI	0,90≤*NFI*≤0,95	0.813	0.865
Tucker-Lewis index	TLI	TL≥0,95	0.866	0.919
Incremental fit index	IFI	0,90≤*IFI*≤0,95	0.876	0.928
Root mean square error of approximation	RMSEA	0,05≤*RMSEA*≤0,08	0.053	0.042
Root mean square residual	RMR	0,05≤*RMR*≤0,08	0.071	0.067

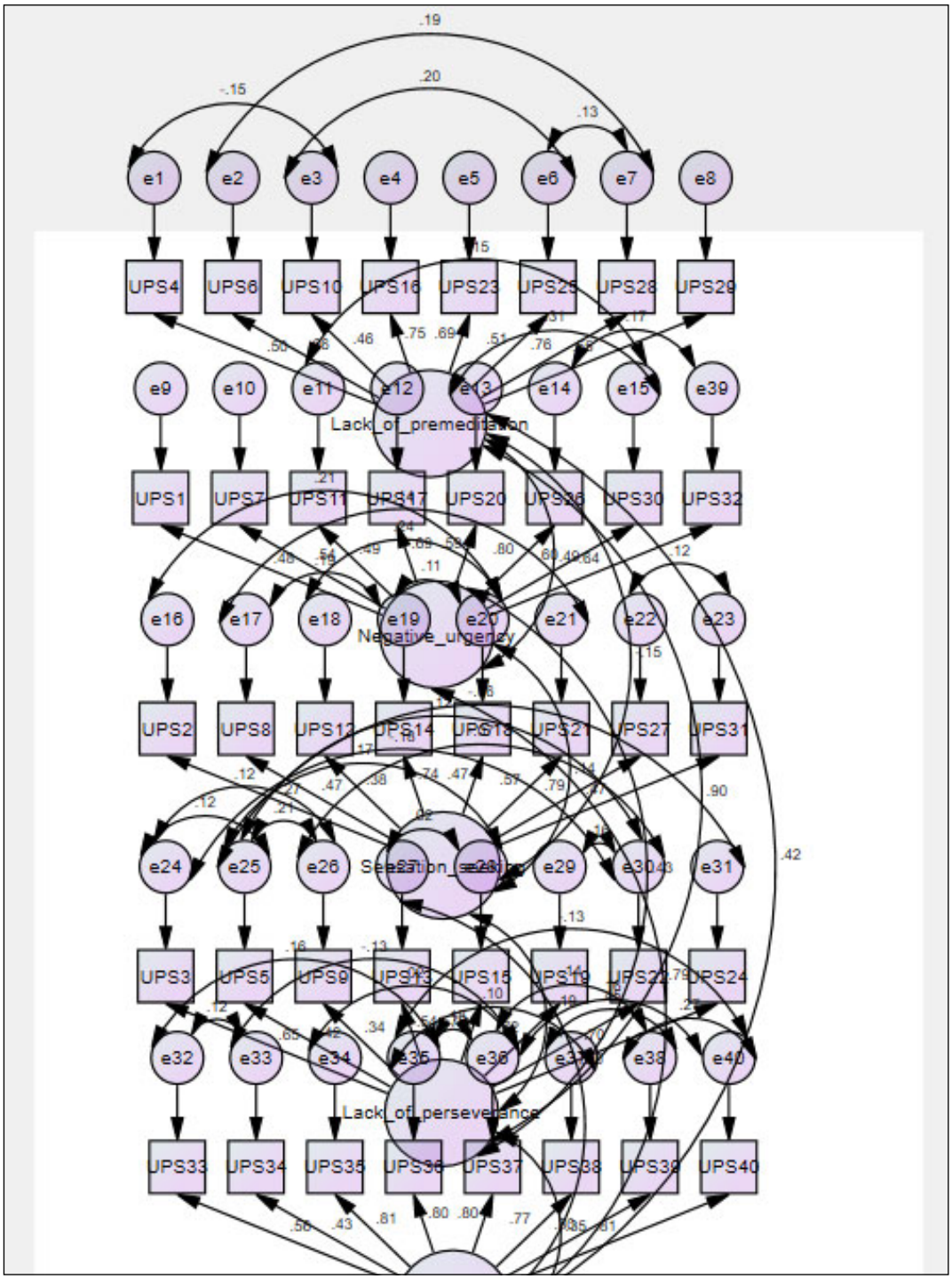

Figure 1. Diagram of Confirmatory Factor Analysis (adjusted model).

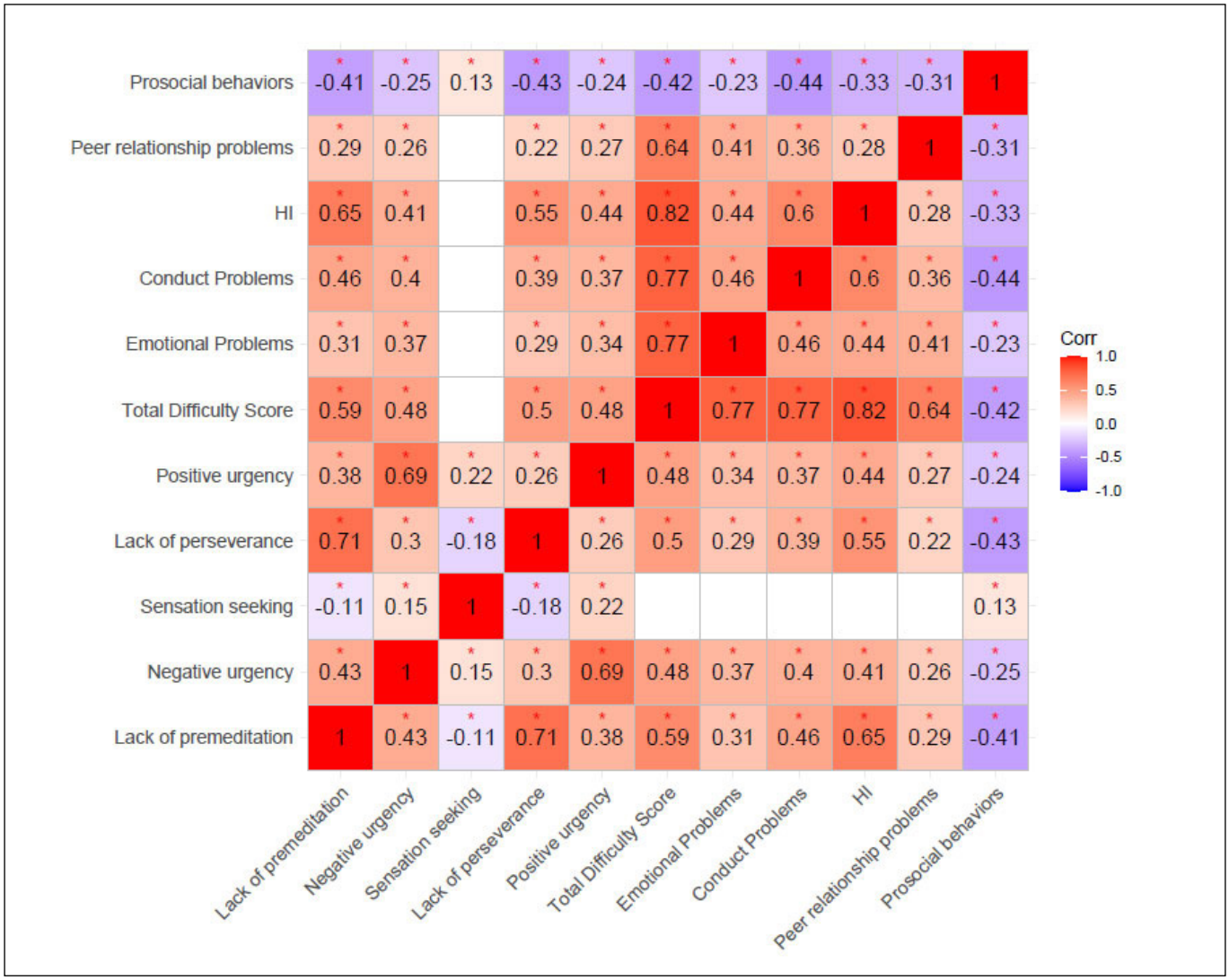

Figure 2. Relationships Between UPPS-P Impulsive Behavior Scale for Children and Strengths and Difficulties Questionnaire Subscales (*p<0.05. Non-significant coefficients are left blank in the graph.), HI: hyperactivity/inattention.

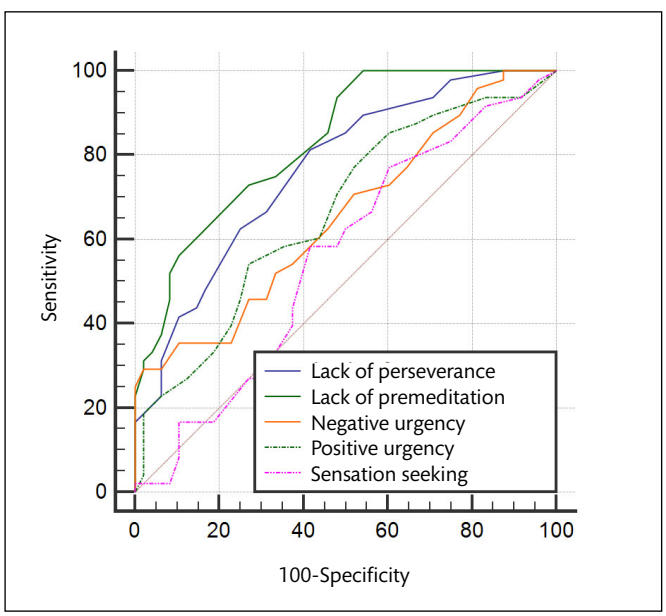

Figure 3. ROC Curve Comparison.

When the correlation between the UPPS-P-C subscales of the test and the retest was examined, it was determined that the ICC values showed good reliability except for the lack of premeditation. Test-retest reliability using Spearman's rank correlation coefficient (rs) ranged from 0.5 to 0.8 (p<0.001), indicating good to very good reliability and stability. Cronbach's alpha values, test-retest findings, ICC values and 95% confidence intervals are shown in Table 5. In the Bland Altman graphs in Figure 4, the data points are very close to the zero line, indicating that the agreement between the test-retest results is reliable.

DISCUSSION

When previous studies on impulsivity subscales are examined, it is seen that an approach that divides impulsivity into five factors instead of a general impulsivity measurement is more consistent. This approach was examined in different studies

Table 4. Multiple Logistic Regression Model of "UPPS-P Impulsive Behavior Scale for Children for ADHD

Variables	B	S.E.	Wald	p-value	Odds ratio	95% Confidence Interval
Constant	-7.225	1.136	40.425	**<0.001**	0.001	-
Lack of premeditation	0.262	0.053	24.142	**<0.001***	1.299	(1.170 – 1.442)
Positive urgency	0.040	0.037	1.139	0.286	1.041	(0.967 – 1.120)
Lack of perseverance	0.031	0.047	0.442	0.506	1.032	(0.941 – 1.132)
Sensation seeking	-0.023	0.034	0.449	0.503	0.977	(0.914 – 1.045)
Negative urgency	0.000	0.039	0.000	0.994	1.000	(0.926 – 1.081)
Hosmer - Lemeshow Test=						

*Dependent variable: ADHD (absent/present), Multiple Logistic Regression Model: Model coefficients were adjusted for Lack of premeditation, Sensation seeking, Lack of perseverance, Positive urgency, Negative urgency variables.
*SE=Standard Error
*Significant at value p≤0.05

Table 5. Findings on Test-Retest Reliability

	ICC (%95 CI)	Cronbach alfa	rs	p
Lack of premeditation	0.484 (0.240-0.670)	0.823	0.534	**<0.001**
Negative urgency	0.645 (0.449-0.782)	0.827	0.623	**<0.001**
Sensation seeking	0.638 (0.440-0.777)	0.771	0.638	**<0.001**
Lack of perseverance	0.620 (0.415-0.765)	0.822	0.704	**<0.001**
Positive urgency	0.709 (0.538-0.824)	0.897	0.696	**<0.001**
Total score	0.635 (0.435-0.775)	0.894	0.637	**<0.001**

ICC: Intraclass Correlation Coefficient; CI: Confidence Interval; rs: Spearman Correlation Coefficient

and similar results were shown (Geurten et al. 2021, Pilatti et al. 2015).

Geurten et al. analyzed 4 impulsivity models in their study (Geurten et al. 2021). In this study, the first model (Model A) describes a single impulsivity construct, while the second model (Model B) describes five interrelated impulsivity constructs. Based on previous studies (Billieux et al. 2012, Cyders and Smith 2007, Smith et al. 2007) showing that lack of premeditation and lack of perseverance may be associated with a higher level of "conscientiousness" construct, while positive and negative urgency may represent a higher level of "general urgency" construct, the third model (Model C) identifies three interrelated factors (general urgency factor - conscientiousness factor - sensation seeking factor). The fourth model (Model D) was defined as a hierarchical model. Accordingly, a) lack of premeditation and lack of perseverance are two separate factors, both of which load on a higher-order factor called "lack of conscientiousness"; b) positive and negative urgency are two separate factors, both of which load on a higher-order factor called "general urgency"; c) sensation seeking is a separate factor. These 4 hypothetical models were analyzed by CFA and it was found that Model B had the best fit, followed by Model D and Model C. Model A had the poorest fit. In this context, Model B, which considers that impulsivity consists of five interrelated characteristics, was retained (Geurten et al. 2021). Therefore, in our study, impulsivity was evaluated as 5 sub-dimensions instead of a single dimension and the conceptual five-factor structure was shown to have an acceptable fit. As seen in previous studies, subscale scores explain impulsivity better than the total score.

When the relationships between the subscales of the UPPS-P-C are examined, there are studies reporting different results in the literature, especially regarding the urgency subscales and the sensation seeking subscale. In one of these studies, Zapolski and Smith's study, similar to our findings, a statistically insignificant and insignificantly weak (r_S<0.30, p>0.05) relationship was found between sensation seeking and other subscales and between lack of perseverance and positive/negative urgency. In addition, positive and negative urgency (moderate, positive (r_S=0.60 and p<0.01)) were the subscales that showed the strongest relationship with each other, which is also consistent with the findings of our study (Zapolski and Smith 2013).

As it became clear that the term "impulsivity" has different meanings in different contexts, there was a need to clarify the specific nature of impulsive action for different disorders. According to Cyders et al., urgency is a mood-based impulsive

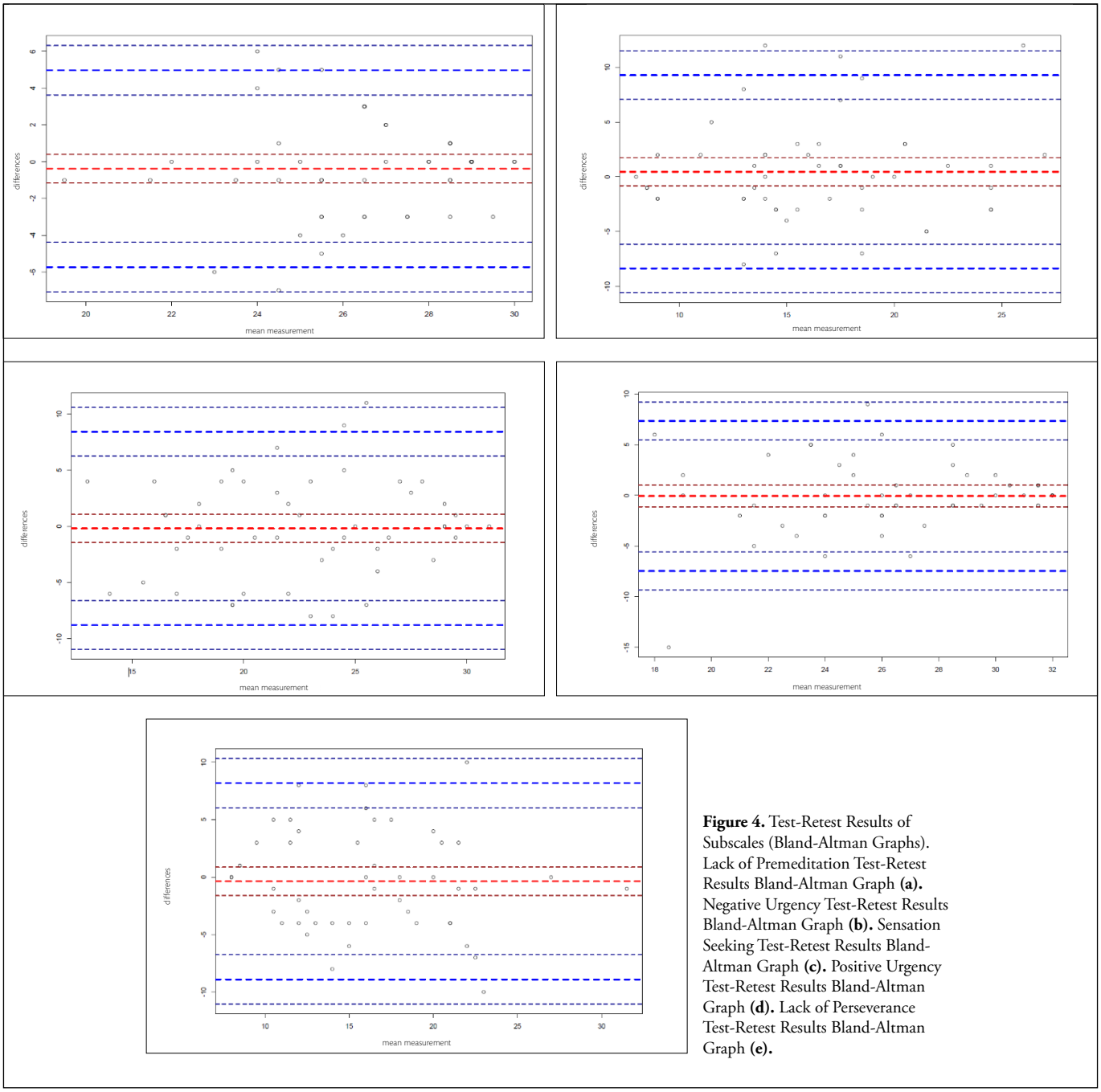

Figure 4. Test-Retest Results of Subscales (Bland-Altman Graphs). Lack of Premeditation Test-Retest Results Bland-Altman Graph **(a).** Negative Urgency Test-Retest Results Bland-Altman Graph **(b).** Sensation Seeking Test-Retest Results Bland-Altman Graph **(c).** Positive Urgency Test-Retest Results Bland-Altman Graph **(d).** Lack of Perseverance Test-Retest Results Bland-Altman Graph **(e).**

act and is associated with difficulties in emotion control. Accordingly, positive and negative representations of urgency may be associated with different aspects of difficulties in emotion control (Cyders et al. 2007).

There are several studies that suggest that the urgency subscales represent different dimensions of impulsivity and therefore need to be considered separately. First of all, there is evidence of impulsive tendencies in response to a stimulus that elicits a positive emotion. In one study, a significant difference was found between positive and negative affect in risk-taking tendencies (p=0.01). There is a positive correlation between affect and risk-taking tendency (r=0.319, p=0.019), meaning that the more positive the affect, the higher the risk-taking tendency of the individual (Yuen and Lee 2003). In a study conducted with university students, the likelihood of drinking on celebration days was found to be higher than on weekdays. This drinking tendency is severe and is associated with increased physical violence, alcohol-related injuries and deaths, drunk driving and unwanted sexual intercourse (Del Boca et al. 2004). In another study, negative urgency predicted negative affect-based impulsive action 3 times more than positive urgency. Positive urgency predicted positive affect-based impulsive behavior 6.5 times more than negative urgency (Cyders and Smith 2007).

When comparisons are made between the urgency subscales, there are some similarities and important differences in the results. Positive and negative urgency can predict the same impulsivity states at different levels. One study notes a clear difference between the predictive utility of positive and negative urgency values, although there is similarity in some aspects between the findings (Willie et al. 2022). The original design of the UPPS-P model (Lynam et al. 2006) and confirmatory factor analysis in the UPPS-P (Teese et al. 2021) suggest the importance of this distinction. However, it has also been argued that these two traits are closely interrelated and considering them separately may be of limited conceptual and methodological value. In one study, it was shown that it is more consistent to treat scale items for positive and negative urgency as a single set of items, referred to as "generalized urgency" in both clinical and non-clinical samples (Billieux et al. 2021). Therefore, further work is warranted in the future to investigate the importance and necessity of dichotomizing urgency into positive and negative.

The discriminative power of the UPPS-P-C scale scores was analyzed to distinguish the clinical sample (ADHD) from the community sample. When the AUC values were analyzed, it was seen that lack of premeditation (at a good level) has the highest discriminative power for children with ADHD, followed by lack of perseverance (at an acceptable level). In the multiple logistic regression analysis, the predictive power of the UPPS-P-C for the diagnostic status (ADHD) was evaluated, and as in the discriminant validity analysis, lack of premeditation was found to be a subscale with high predictive power for ADHD.

There are many studies examining the relationship between ADHD and UPPS-P subscales. Zapolski and Smith reported that attention problems were mostly associated with lack of premeditation ($p<0.01$), followed by lack of perseverance and positive urgency ($p<0.05$) (Zapolski and Smith 2013). Another study revealed that lack of premeditation, positive urgency and negative urgency subscales can distinguish between children diagnosed with ADHD and the control group (Geurten et al. 2021). In the study by Whiteside and Lynam, lack of perseverance was again associated with ADHD. However, it was also stated that the UPPS-P subscales could potentially distinguish between ADHD subtypes (Whiteside and Lynam 2001). Accordingly, since attention deficit-dominant ADHD primarily involves difficulty staying on task and sustaining attention, it may have a stronger correlation with lack of perseverance directly related to these abilities. Hyperactivity/impulsivity-predominant ADHD, on the other hand, may have a stronger correlation with sensation seeking and lack of premeditation, as it involves inability to stay seated and high levels of mobility. In the meta-analysis conducted by Berg et al., the highest effect size with ADHD was lack of perseverance, followed by negative urgency and lack of premeditation, while sensation seeking was not found to be significant with its negative correlation (Berg et al. 2015). However, only three studies examining ADHD in the context of the UPPS-P were included in this meta-analysis. In addition, the relationship between the ADHD subtypes and the UPPS-P subscales was not taken into account.

In a study conducted with undergraduate students to examine the relationship between UPPS-P subscales and ADHD subtypes, it was found that all subscales except sensation seeking were positively correlated with inattention and all subscales including sensation seeking were correlated with hyperactivity/impulsivity (Roberts et al. 2014). Confirming the data of this study, another recent study showed that for men, lack of perseverance was positively correlated with inattention, while negative urgency, lack of perseverance and sensation seeking were positively correlated with hyperactivity/impulsivity. For women, negative urgency, positive urgency, lack of premeditation and lack of perseverance were the subscales positively correlated with inattention, while positive urgency and lack of premeditation were the subscales positively correlated with hyperactivity/impulsivity (Gomez and Watson 2023). In addition, in the same study, the predictive power of the interaction between the UPPS-P dimensions for ADHD subtypes was examined and it was reported that the interaction of lack of premeditation with the positive urgency dimension was more important in predicting both inattention and hyperactivity/impulsivity for women. In men, inattention was predicted by the interactions with the positive and negative urgency dimensions of lack of premeditation. In another study, UPPS-P subscales were shown to have good predictive validity and classification accuracy for ADHD subtypes and ADHD/ Oppositional Defiant Disorder (Miller et al. 2010). However, there is not enough finding to support the diagnostic use of this scale. In our study, although the ROC analysis results of the UPPS-P-C scale were significant, it is thought that the UPPS-P-C scale can be used for symptom profile and severity assessment.

Considering that the relationships between sensation seeking and other subscales are weak, the area under the ROC curve is insignificant for sensation seeking, and the relationships between sensation seeking score and SDQ scores are negligibly weak; it can be inferred that the sensation seeking subscale is not useful for ADHD. However, the relationship between ADHD-hyperactivity/impulsivity and sensation seeking has been discussed conceptually by the scale developers (Whiteside and Lynam 2001) and shown in different studies (Gomez and Watson 2023, Roberts et al. 2014). In our study, the reason why the predictive performance of sensation seeking on ADHD was found to be insufficient may be due to the fact that the ADHD subtypes were not evaluated. In addition, this does not mean that the sensation seeking subscale is not useful for other psychopathologies that have been shown to

be related (such as substance use disorders, aggression and non-suicidal self-harm tendencies). In this study, only one impulsivity-related psychopathology (ADHD) was studied. However, each of the UPPS-P subscales is associated with different impulsivity-related psychopathologies (Whiteside and Lynam 2001, Berg et al. 2015, Miller et al. 2003, Miller and Lynam 2001).

Whiteside and Lynam suggested that sensation seeking may be associated with substance use disorders (Whiteside and Lynam 2001). In one study, it was shown that urgency and sensation seeking differentiated alcohol use disorder patients (with and without antisocial personality traits) and controls (Whiteside and Lynam 2003). In another study, it was shown that urgency, lack of premeditation, and sensation seeking distinguished alcohol use disorder patients from borderline personality disorder, pathological gambling, and antisocial traits from alcohol use disorder patients without antisocial personality traits and normal controls (Whiteside et al. 2005).

In addition, the UPPS-P scale overlaps with major personality theories. In Thurstone's Big Five Factor theory and NEO PI-R personality theory, neuroticism overlaps with urgency, extraversion overlaps with sensation seeking, and conscientiousness overlaps with lack of perseverance and lack of premeditation (Costa and McCrae 1997, Thurstone 1934). In conclusion, the validity of the sensation seeking subscale has been shown in many studies. Studies can be conducted to determine the functionality of this and other subscales and the impulsivity states they are related to.

A highly positive correlation was found between the lack of premeditation and lack of perseverance subscales of the UPPS-P-C and the HI subscale of the SDQ. In a study investigating the advanced psychometric properties of the SDQ, it was shown that the mean HI subscale score of the group clinically diagnosed with ADHD was statistically significantly higher than the group without this diagnosis (Yalın 2008). Therefore, considering that the power of the lack of premeditation and lack of perseverance subscale scores in our study to distinguish ADHD was higher than the other subscales, the relationship between the two scale subgroups (lack of premeditation/lack of perseverance and HI) is an expected result.

The internal consistency of the UPPS-P-C scale and all its subscales was found to be high, as in the study of Zapolski et al. (2010). In that study, the internal consistency Cronbach's alpha value of the UPPS-P-C was 0.84 for lack of premeditation, 0.87 for negative urgency, 0.90 for sensation seeking, 0.81 for lack of perseverance and 0.89 for positive urgency (Zapolski et al. 2010). For the test-retest reliability of the UPPS-P-C scale, the correlation between the total and subscales of the two tests was examined using ICC, Spearman's rank correlation coefficient and Bland Altman plots and it was shown that the reliability was at a good level. The ICC value of the lack of premeditation subscale was below 0.60. It is thought that this may be due to the fact that the retest application could not be performed within the planned period in our study.

The most critical aspect of test-retest reliability measurement is the ability to adjust the time interval between the two measurements. Too short an interval may lead to artificially high reliability, as it will facilitate recall, while too long an interval may lead to some changes in the trait being measured, making it difficult to interpret the reliability measure by making it difficult to ensure the 'same conditions' for the two measurements. In other words, it is not possible to distinguish whether the reliability of the scale is low or whether there has been a change in the characteristics of the individuals (Karakoç and Dönmez 2014).

The main aim of this study was to adapt and validate an instrument that allows the assessment of the five impulsivity dimensions that make up the UPPS-P impulsivity model in children. Overall, our findings suggest that the UPPS-P-C is a valid and reliable instrument for assessing the multidimensional construct of impulsivity in children. The strengths of the study are being the first scale adaptation study on impulsivity in children in our country; the size of the community sample; the mean and distribution of ages being similar in the two samples; and the selection of subjects who were diagnosed with ADHD for the first time and who did not receive treatment.

The limitations of the study include the comparison of two different samples in terms of geographical region and cultural environment, the test-retest study being conducted after 13-14 weeks, the intelligence level being assessed clinically in the clinical sample without being measured with psychometric tests, and being dependent on reporting in the community sample. Since the discriminant validity study was conducted only among ADHD patients and healthy individuals, the discriminative power of the subscales from other diseases is not known. In addition, ADHD subtypes were not taken into account in the study. Further studies that do not include the limitations of our study will contribute to the use, validity and reliability of the scale.

There are reasons why the self-report scale, the UPPS-P-C, is a good tool to adapt for assessing children's impulsivity. First, it can provide important information about the areas that children see as their main difficulties. In addition, many items of the UPPS-P-C consist of items that require children to reflect on internal states that are not externally observable (e.g., "When I feel bad, I often do things I regret later in order to feel better in the moment.", "When I get really excited, I tend not to think about the consequences of my actions."). In some cases, parents and teachers tend

to misinterpret how children feel or what they think, which can lead to misleading information from them. It is considered important to have a scale that allows children to express themselves in combination with information from various sources, such as parents and teachers.

In conclusion, the use of UPPS-P-C, which can assess the multidimensional nature of impulsivity, may help improve the understanding of symptomatology and phenomenology in psychiatric diagnoses for both typically developing and ADHD children and adolescents. Findings from further studies on different impulsivity traits in psychiatric disorders could allow clinicians to use a transdiagnostic approach to individualize the treatment of disorders.

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