



New Trends
in Psychology

Adaptation of the Barratt Impulsivity Scale for Category B Car Drivers

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Abstract: Impulsive behavior is found in all people, this includes people who drive cars, but most of the time the level of impulsivity is not known. This can be done using a psychological tool to measure impulsivity such as the Barratt Impulsivity Scale. This instrument was created by Ernest S. Barratt in 1995 and has been revised and adapted over time to different populations. Thus, in the framework of the present research, the statistical analysis of the fidelity and validity of the Barratt Impulsivity Scale at the level of the population of category B car drivers in Romania was carried out. The results obtained highlighted the fact that this tool is faithful and valid in terms of measuring impulsivity at the global level during the research stage. Regarding the first and second-order factors, the results were below the established and accepted level, highlighting the need to expand research in this field.

Keywords: Barratt Impulsivity Scale; impulsivity; category B car drivers; fidelity; validity

1. Impulsivity

Impulsivity is a characteristic of personality that indicates a tendency for rapid, unconsidered responses to internal or external triggers, without consideration for the potential negative effects of these responses on oneself or others (Moeller et al.,

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2001). In studies involving human participants, impulsivity can be assessed through various questionnaires, like the 11-item Barratt Impulsiveness Scale (BIS-11), which indicates that impulsivity includes at least three separate areas: motor disinhibition, impulsive decision-making, and inattention (Patton et al., 1995). The more recent UPPS-P scale measures impulsive behavior across five distinct dimensions derived from the five-factor personality model: urgency, premeditation, persistence, sensation seeking, and positive urgency (Whiteside & Lynam, 2001).

2. Impulsivity and Car Drivers

The specialized literature, through the studies and research carried out, highlights the fact that impulsivity is linked to certain behaviors of car drivers which result in serious consequences for themselves, but also for other people. Research indicates the following behaviors and manifestations of car drivers about impulsivity: aberrant behaviors (Berdoulat, Vavassori & Sastre, 2013; Constantinou et al., 2011; Pearson et al., 2013); driving under the influence of anger/aggression (Deffenbacher et al., 2003; DePasquale et al., 2001; Richer & Bergeron, 2009); driving under the influence of alcohol and harmful substances (Treloar et al., 2012; Richer & Bergeron, 2009; Moan, Norstrom & Storvoll, 2013); crime and traffic accidents (O'Brien & Gormley, 2013; Owsley et al., 2003; Jiang et al., 2008).

All these studies highlight the fact that impulsivity influences and is related to various aberrant behaviors of drivers, to driving under the influence of anger/aggression or alcohol or harmful substances, but also to crimes and traffic accidents.

In these studies, the Barratt Impulsivity Scale was found among the tools used to measure impulsivity. This instrument has been adapted to the level of different groups of people such as those of the Thai population (Juneja et al., 2019), the Brazilian-Portuguese population (von Diemen et al., 2007), the Spanish population (Martinez-Loredo et al., 2015), the one at the level of the Chinese population (Li et al., 2011), that of the Arab/Tunisian population (Ellouze et al., 2013).

3. Adaptation of the Barratt Impulsivity Scale

The Barratt Impulsivity Scale in the original version by E. S. Barratt (1959) is in English for the population of the United States of America. This measure of

impulsivity contains 3 first-order factors and 6 second-order factors as follows: Impulsivity at the attentional level: attention and cognitive instability; Motor impulsivity: at the motor level and perseverance; Lack of planning: Self-control and cognitive complexity.

Juneja et al. (2019) modified three versions of the Barratt Impulsivity Scale, specifically the long, short, and brief forms (BIS-11, BIS-15, and BIS-Brief), and tested them on a Thai adult sample. The BIS-11T and BIS-15T were translated, back-translated, and given to a nonclinical group ($n = 305$) of native Thai speakers, who returned for a retest two weeks later. Psychometric evaluations for the BIS Brief-T were conducted post hoc. Impulsivity scores for the BIS-11T and BIS-15T followed a normal distribution, whereas the BIS Brief-T did not. All translated instruments demonstrated excellent internal consistency, with Cronbach's alpha coefficients greater than 0.80: BIS-11T ($\alpha = 0.86$), BIS-15T ($\alpha = 0.81$), and BIS-Brief-T ($\alpha = 0.81$). A total of 260 participants completed both assessments (85%), with test-retest reliability surpassing $r = 0.81$. The three instruments showed strong correlations ($r = 0.83$ – 0.89). Confirmatory factor analysis supports a three-factor model (attention, motor, non-planning) for the BIS-15T and a two-factor model for the BIS-11T.

The study carried out by von Diemen et al. (2007) aims to modify and validate the Barratt Impulsivity Scale version 11 for adolescents who speak Portuguese in Brazil. The scale was translated into Portuguese and subsequently back-translated into English. The researchers evaluated the psychometric properties, conducted factor analysis, and determined construct validity using two samples: 18 bilingual medical students and 464 males aged 15 to 20. The intra-class correlation coefficient attained a value of 0.90, while the internal consistency showed an α of 0.62. The factor analysis did not reveal the three factors present in the original scale. Scores for impulsivity on the Barratt Impulsiveness Scale version 11 showed correlation with scores for attention-deficit/hyperactivity disorder, oppositional defiant disorder, and the number of symptoms related to conduct disorder, indicating satisfactory construct validity for the scale.

There exists an adolescent version known as the BIS-11-A, which has not yet been appropriately adapted for the Spanish population. In response, Martinez Loredó et al. (2015) executed a study aimed at creating a more suitable Spanish version of the BIS-11-A and assessing its psychometric properties, such as factor structure, reliability, and predictive validity concerning substance use (including alcohol, tobacco, and cannabis consumption in the last month), instances of intoxication over

the previous month, excessive alcohol use, and issues related to drinking. The BIS-11-A together with items from the European School Survey on Alcohol and Other Drugs (ESPAD) Project were administered to 1,183 students aged between 12 and 14 years from 16 secondary schools across Spain. The BIS-11-A demonstrated a two-dimensional factor structure, exhibited high reliability (with a Cronbach's alpha of .87), and showed good effectiveness in identifying substance use, excessive alcohol intake, and problematic drinking patterns (sensitivity ranging from 67.3% to 75%; specificity between 83.4% and 85.4%). The Spanish version of the BIS-11-A proves to be a reliable and valid tool for application among early adolescents.

The Chinese adaptation of the Barratt Impulsivity Scale was carried out by Li et al. (2011) and given to multistage stratified random samples comprising 603 rural inhabitants of Shandong, 548 urban dwellers of Liaoning, and 627 students from Chongqing. The findings indicated excellent internal consistency for the 30-item scale and its three 10-item subscales (which evaluate impulsive planning, motor impulsivity, and cognitive impulsivity) with Cronbach's alphas ranging from 0.77 to 0.89, while test-retest reliability was found to be good, with intraclass correlation coefficients between 0.68 and 0.89.

The Barratt Impulsivity Scale's Arabic version was created by Ellouze et al. (2013). This research aimed to validate the Barratt scale in its latest version, the Barratt Impulsiveness Scale (BIS-11), in dialectal Arabic. We subsequently examined the prevalence of impulsivity and potential demographic factors linked to it using the BIS-11 in a representative sample of the Tunisian population. This prospective study involved 134 individuals from the general population, following the acquisition of consent. The dialectal Arabic version was developed utilizing the translation-retranslation approach. We evaluated both external and internal validity by determining Cronbach's coefficient. In the subsequent phase, we assessed the prevalence of impulsivity along with its possible associations with demographic variables. The Arabic BIS-11 displayed strong validity and reliability, achieving Cronbach's alpha values of 0.66 for cognitive impulsivity, 0.72 for motor impulsivity, 0.61 for unplanned impulsivity, and 0.78 for overall impulsivity. There were no significant associations identified between various demographic variables and the impulsivity scores.

4. Research Methodology

4.1. The Purpose and Objectives of the Research

The main purpose of the research is to carry out an exploratory analysis of the Barratt Impulsivity Scale on category B car drivers in Romania. The main objective of the research is to adapt the Barratt Impulsivity Scale to the Romanian population, especially to the level of category B car drivers. The secondary objectives refer to the statistical analysis to attest to the psychometric qualities of the instrument. Secondary objectives refer to the following aspects: fidelity research, construct validity research (convergent, divergent), and criterion validity research.

4.2. Research Variables and Hypotheses

The research variables are impulsivity, attentional impulsivity, motor impulsivity, lack of planning, attention, cognitive instability, motor level, persistence, self-control, and cognitive complexity. These variables are found within the Barratt Impulsivity Scale.

In the research, the named variables, impulse control, self-control, and the number of contraventions were also identified. Fidelity and validity are the psychometric qualities of a psychological instrument that are given high attention when considering the adaptation of an instrument from one language to another and from one population to another.

Although there is no firm standard by which to evaluate a fidelity estimate, it is generally recognized that a reliability estimate must be above .70 and a validity estimate must be above .60 to be at an acceptable level (Baumgartner et al., 2003; Odom & Morrow, 2009; Post, 2016).

Hypothesis 1 – we assume that the fidelity of the Barratt Impulsivity Scale along with its first and second-order factors is statistically significant and at a Cronbach's level of at least .70.

Hypothesis 2 – we consider the fact that the verification of the construct validity of the Barratt Impulsivity Scale by comparing it with Impulse Control (Cloninger's Temperament and Character Inventory), Impulse Control (The 44 Lower-Level HPI Scales), Impulse Control (The 45 AB5C Facets), Scale of Self-control (California Psychological Inventory) and Self-control (IPIP-VIA Scales) generate a significant correlation coefficient at a value above .60.

Hypothesis 3 – we consider that the verification of criterion validity at the level of the Barratt Impulsivity Scale by comparison with the criterion, and number of contraventions, generates a significant correlation coefficient at a value above.

4.3. Description of Participants

60 people aged between 18-60 participated in the research (16 people - 18-25 years; 9 people - 26-30 years; 14 people - 31-40 years, 41-50 years; 5 people - 51- 60 years old; 2 people – over 60 years old). There were 45 female and 15 male persons. Another characteristic of the group of participants is related to the period since they have held their driving license which starts from less than a year and reaches more than 20 years of experience. Of the participants, 45 drive cars with manual transmissions, and 15 drive cars with automatic transmissions. A final characteristic of the group of participants is related to the number of contraventions received by the participants during the last year (26 participants – 0 contraventions; 10 participants – 2 contraventions; 4 participants – 3 contraventions; 6 persons each – 4 and 5 contraventions respectively).

4.4. Tools Used

4.4.1. Barratt Impulsiveness Scale (BIS)

The Barratt Impulsivity Scale, now in its 11th revision (Patton, Stanford & Barratt, 1995), is a self-report tool consisting of 30 items, aimed at evaluating the traits and behaviors related to impulsivity. It is arguably the most frequently used self-report assessment specifically intended to measure impulsivity in both research and clinical environments.

The original Barratt Impulsiveness Scale (BIS) was created by Dr. Ernest S. Barratt as part of his effort to connect impulsivity and anxiety to psychomotor efficiency (Barratt, 1959). He observed that the impulsivity and anxiety subscales of various self-report tools, like the Thurstone Temperament Schedule (Thurstone, 1953) and the Guilford-Zimmerman Temperament Survey (Guilford & Zimmerman, 1949), often displayed nonsignificant correlations with one another, leading Barratt to suggest that these two constructs were orthogonal. This idea was supported by early research demonstrating that the Taylor Manifest Anxiety Scale (MAS; Taylor, 1953) and the Personality and Aptitude Test Anxiety Scale (Cattell, 1957) showed no

significant correlation with the BIS (Barratt, 1959, 1965, 1967). Barratt proposed that because anxiety, as assessed by the MAS, was connected to “habit strength” within Hull-Spence learning theory (Hull, 1943; Spence, 1956), impulsivity might relate to the concept of “oscillation,” which refers to momentary variations in an organism’s inclination to respond to a stimulus, also within the same theory. The orthogonal hypothesis of impulsivity and anxiety profoundly influenced Barratt’s early research on the BIS, resulting in numerous initial item analyses (both published and unpublished) aimed not only at achieving internal consistency within the BIS but also at removing items correlated with anxiety measures. Another significant factor in the development of the BIS was Barratt’s perspective that impulsivity was not a single-dimensional concept.

The Barratt Impulsivity Scale comprises 30 items that are multiple-choice and utilize a 4-point Likert scale (1-Rarely/Never; 2-Occasionally; 3-Often; 4-Always/Almost always). This assessment includes the following dimensions: Impulsivity at the attentional level, which encompasses attention and cognitive instability; Motor impulsivity, referring to motor control and perseverance; and Lack of planning, which relates to self-control and cognitive complexity.

The items are scored 1,2, 3,4; 4 indicates the most impulsive response, even when the items are reverse scored, the person who originally scored 1 reversed receives 4 points. The higher the total score for all items, the higher the level of impulsivity. Cronbach’s alpha ranges from .79 to .83 (Patton, Stanford & Barratt, 1995).

4.4.2. Tools Used to Validate the Barratt Impulsivity Scale

Three tools for analyzing convergent validity and two tools for analyzing divergent validity were used in the research. All these instruments belong to the International Set of Personality Items: IPIP-Ro. Three scales measuring impulse control and two scales measuring self-control were used. The International Set of Personality Items was adapted by Iliescu, Popa and Dimache (2019). Within this set, there are 2504 items, 371 scales, and 19 categories. Due to the very large number of items, the research could only be carried out on 282 participants. Out of the total number of scales, 270 of them have a level of fidelity of at least .70.

In order to carry out the research and thus analyze from a statistical point of view the validity and fidelity of the Barratt Impulsivity Scale, 3 instruments that measure impulse control were used: **Impulse Control (Cloninger’s Temperament and Character Inventory)** is a scale that contains 10 items, 5 of which are score

normally and 5 are scored inversely, regarding the Alfa Crobach coefficient it is .66; **Impulse Control (The 44 Lower-Level HPI Scales)** is another scale that contains 6 items of which 3 are scored positively and 3 are scored negatively, Cronbach's Alpha is .59; **Impulse Control (The 45 AB5C Facets)** contains 11 items of which 2 are scored positively and 9 are scored negatively, and the Cronbach's Alpha coefficient is .69; and 2 instruments that measure self-control: **Self-control (California Psychological Inventory)** is a scale containing 10 items of which 3 are scored positively and 7 are scored negatively and which has a Cronbach's Alpha of .62; **Auto-regulation/Self-control (IPIP-VIA Scales, Values in Action)** represents another scale that contains 10 items, 13 items of which 5 are scored positively and 8 are scored negatively, and the Alpha Cronbach coefficient is .56 (Iliescu, Popa & Dimache, 2019).

4.5. Instrument Procedure and Translation

The study was conducted with the intended goals and objectives in mind. To adapt the Barratt Impulsivity Scale, the translated version by Ana Toma was utilized from the Research Central test platform¹. To assess the validity of the instrument, five questionnaires were utilized from the International Set of Personality Items, including the Romanian adaptation IPIP Ro, and the modifications made by Dragoş Iliescu, Marian Popa, and Roxana Dimache in 2019. The questionnaires employed for the research included S5 Impulse Control (Cloninger's Temperament and Character Inventory TCI), Impulse Control (The 44 Lower-Level HPI Scales HICs), Impulse Control (The 45 AB5C Facets), Self-Control (California Psychological Inventory CPI), and Self-Regulation/Self-Control (IPIP-VIA Scales Values in Action). All of these instruments were transformed into Google Forms and distributed online. The collected responses were scored and entered into the IMB SPSS Statistics software. Within this software, statistical functions were utilized to analyze the reliability and validity of the Barratt Impulsivity Scale.

4.6. Descriptive and Normality Statistics

The variables used in the research are Number of offenses, Impulsivity, Attentional impulsivity, Attention, Cognitive instability, Motor impulsivity, Motor level,

¹ <http://researchcentral.ro/index.php>.

Perseverance, Lack of planning, Self-control, and Cognitive complexity. In addition to these, there are 3 impulse control variables and 2 auto control variables. Descriptive statistics and normality functions presented in Tables 1 and 2 were applied to these.

Table 1. Descriptive statistics at the level of research variables

	N	Mean	S.D.	Minim	Maxim	Skewness	Kurtosis
Number of offenses	60	1,57	1,760	0	5	,773	-,775
Impulsivity	60	55,40	8,320	42	94	1,708	6,533
Attentional impulsivity	60	14,55	3,233	9	24	,586	,121
Attention	60	8,75	2,398	5	15	,199	-,673
Cognitive instability	60	5,80	1,560	3	9	,400	-,382
Motor impulsivity	60	19,53	3,675	13	36	1,1433	5,391
Motor level	60	12,80	3,063	8	25	1,173	2,858
Perseverance	60	6,73	1,625	4	11	,498	-,490
Lack of planning	60	21,32	3,811	14	34	,728	1,172
Self-control	60	10,35	2,629	6	20	1,076	1,895
Cognitive complexity	60	10,97	1,877	6	16	-,061	,466
Impulse control TCI	60	37,37	6,636	23	50	-,223	-,628
Impulse control HPI	60	21,13	3,942	8	28	-,626	,729
Impulse control AB5C	60	41,15	7,260	25	53	-,319	-,754
Self-control CPI	60	37,52	6,826	20	48	-,633	,057
Self-control VIA	60	49,57	7,014	29	60	-,720	,147

Table 2. Normality statistics at the level of research variables

	Kolmogorov-Smirnov		
	Statistic	Df	P
Number of offenses	,247	60	,000
Impulsivity	,121	60	,028
Attentional impulsivity	,135	60	,008
Attention	,139	60	,005
Cognitive instability	,199	60	,000
Motor impulsivity	,083	60	,200
Motor level	,136	60	,007
Perseverance	,241	60	,000
Lack of planning	,133	60	,010
Self-control	,170	60	,000
Cognitive complexity	,140	60	,005
Impulse control TCI	,088	60	,200
Impulse control HPI	,103	60	,179
Impulse control AB5C	,103	60	,184

Self-control CPI	,109	60	,075
Self-control VIA	,091	60	,200

Based on the resulting descriptive data, it can be stated that the means at the level of impulsivity along with the first and second-order factors show low to medium levels of these variables. In addition to these, the tests of symmetry and skewness of the data distribution (Skewness, Kurtosis) indicate that the data in the case of the group of participants are symmetrically distributed (the number of contraventions, attentional impulsivity, attention, cognitive instability, motor impulsivity, perseverance, lack of planning, TCI impulse control, HPI impulse control, AB5C impulse control, CPI self-control, VIA self-control) and asymmetrically distributed (impulsivity, motor impulsivity, at the motor level, self-control).

Also as can be seen in Table 2 regarding the normality of the data distribution only in the case of the variables Motor Impulsivity, Impulse Control TCI, HPI, AND AB5C and at the level of Self-control CPI and VIA because the results of the Kolmogorov-Smirnov normality test were statistically significant where p calculated >0.05 . In the case of the other variables, the statistical results were statistically insignificant because p was calculated <0.05 . Due to the abnormal distribution of the results at the level of the group of participants for most variables, non-parametric tests will have to be used.

4.7. Statistical Interpretation of Data

The proposed hypotheses refer to the research of the psychometric qualities of an instrument, namely fidelity and validity, in the present case it was possible to achieve construct validity (convergent and divergent) and criterion validity.

4.7.1. Hypothesis 1

The first hypothesis refers to the analysis of the internal consistency through Cronbach's Alpha of the Barratt Impulsivity Scale along with its first and second-order factors. The value of the internal consistency coefficient was assumed to be above .70.

Thus at the level of the Barratt Impulsivity Scale $\alpha = .750$ which represents an acceptable level. Table 3 shows Cronbach's Alpha values if an item is deleted, thus the internal consistency values range from .727 to .783. This translates into acceptable overall test fidelity.

Table 3. Internal consistency of the Barratt Impulsivity Scale

Nr.	Item	M(SD)	Alfa Cronbach / Alfa Cronbach if item deleted
	Impulsivity	55,40(8,320)	,750
1	<i>I plan tasks carefully.</i>	1,53(,676)	,727
2	<i>I do things without thinking.</i>	1,40(,588)	,738
3	<i>I make-up my mind quickly.</i>	2,63(,938)	,758
4	<i>I am happy-go-lucky.</i>	1,32(,725)	,740
5	<i>I don't pay attention.</i>	1,72(,904)	,745
6	<i>I have "racing" thoughts.</i>	2,50(,983)	,769
7	<i>I plan trips well ahead of time.</i>	2,20(,819)	,733
8	<i>I am self controlled.</i>	1,62(,613)	,738
9	<i>I concentrate easily.</i>	1,73(,710)	,736
10	<i>I save regularly.</i>	2,75(,895)	,783
11	<i>I "squirm" at plays or lectures.</i>	1,75(,914)	,737
12	<i>I am a carefull thinker.</i>	1,92(,720)	,741
13	<i>I plan for job security.</i>	1,58(,619)	,729
14	<i>I say things without thinking.</i>	1,50(,597)	,731
15	<i>I like to think about complex problems.</i>	2,08(,996)	,751
16	<i>I change jobs.</i>	1,65(,820)	,752
17	<i>I act "on impulse".</i>	1,85(,685)	,743
18	<i>I get easily bored when solving thought problems.</i>	1,65(,685)	7,32
19	<i>I act on the spur of the moment.</i>	1,73(,710)	,728
20	<i>I am a steady thinker.</i>	1,98(,770)	,743
21	<i>I change residences.</i>	1,37(,551)	,741
22	<i>I buy things on impulse.</i>	2,07(,954)	,746
23	<i>I can only think about one thing at a time.</i>	1,85(,799)	,759
24	<i>I change hobbies.</i>	1,47(,6500)	,742
25	<i>I spend or charge more than I earn.</i>	1,80(1,022)	,738
26	<i>I often have extraneous thoughts when thinking.</i>	1,83(,886)	,747
27	<i>I am more interested in the present than the future.</i>	2,53(,833)	,764
28	<i>I am restless at the theater or lectures.</i>	1,57(,767)	,728
29	<i>I like puzzles.</i>	1,95(,946)	,731
30	<i>I am future oriented.</i>	1,87(791)	,741

Apart from analyzing the internal consistency at the total level, it was also carried out at the level of the first and second-order factors, and the results indicated the following aspects:

- The first-order factor Impulsivity at the attentional level contains 8 items and has a value of $\alpha = .540$ which signifies a weak internal consistency.
- The first second-order factor from the level of Impulsivity at the attentional level is Attention and contains 5 items and an $\alpha = .525$ which indicates a weak internal consistency.
- The second second-order factor is Cognitive Instability with 3 items and an $\alpha = .160$ thus indicating unacceptable internal consistency.
- The next first-order factor is Motor Impulsivity with 11 items and an $\alpha = .537$ which translates into poor internal consistency.
- Within this first-order factor, there is a second-order factor called At the motor level having 7 items and an $\alpha = .585$ which also indicates a weak internal consistency.
- The next second factor in this category is Perseverance with 4 items and with $\alpha = .202$, thus signifying an unacceptable internal consistency.
- The last first-order factor is Lack of planning having 11 items and an $\alpha = .599$ which indicates poor internal consistency.
- Within this first-order factor, there is the second-order factor called Self-control, which has 6 items and $\alpha = .721$, thus highlighting an acceptable internal consistency.
- The last second-order factor is Cognitive Complexity, which has 5 items and an $\alpha = -.116$, which indicates a negative internal consistency.

Table 4. Internal consistency of the first and second-order factors of the Barratt Impulsivity Scale

Nr.	Scale/Item	M(SD)	Alfa Cronbach
First order factor (8 items – 5,6,9,11,20,24,26,28)	Impulsivity	14,55(3,233)	,540
Second order factor (5 items – 5,9,11,20,28)	Attentional impulsivity	8,75(2,395)	,525
Second order factor (3 items – 6,24,26)	Attention	5,80(1,560)	,160
First order factor (11 items – 2,3,4,16,17,19,21,22,23,25,30)	Cognitive instability	19,53(3,675)	,537

Second order factor (7 items – 2,3,4,17,19,22,25)	Motor impulsivity	12,80(3,063)	,585
Second order factor (4 items – 16,21,23,30)	Motor level	6,73(1,625)	,202
First order factor (11 items – 1,7,8,10,12,13,14,15,18,27,29)	Perseverance	21,32(3,811)	,599
Second order factor (6 items – 1,7,8,12,13,14)	Lack of planning	10,35(2,629)	,721
Second order factor (5 items – 10,15,18,27,29)	Self-control	10,97(1,877)	-,116

The obtained results indicate that the factors of the Barratt Impulsivity Scale do not present an accepted internal consistency except for the second-order factor Self-control where Cronbach's Alpha was over .70. At the level of the other factors Cronbach's Alpha recorded low levels below the level of .70. And in the case of the second-order factor Cognitive Complexity, the coefficient was negative, which signifies a major problem in that the items on this scale correlate negatively with each other.

In conclusion, hypothesis 1, which attests to the fidelity of the Barratt Impulsivity Scale, is partially confirmed because at its level the internal consistency coefficient was found to be above the proposed acceptable value of .70, the instrument being thus suitable for measuring impulsivity at a total level. In the case of the scales of this instrument, the internal consistency values were below the level of .70, which indicates a low internal consistency and thus a low fidelity of the scales when evaluated and used separately. But overall the instrument is faithful in measuring impulsivity.

Table 5. Internal consistency across impulse control and self-control variables

Nr.	Scale	M(SD)	Alfa Cronbach	Alfa Cronbach original
1.	Impulse control TCI	37,37(6,636)	,79	,66
2.	Impulse control HPI	21,13(3,942)	,70	,59
3.	Impulse control AB5C	41,15(7,260)	,85	,69
4.	Self-control CPI	38,75(6,016)	,69	,62
5.	Self-control VIA	49,57(7,014)	,78	,56

Table 5 shows internal consistency coefficients at the level of the instruments used for construct validation of the Barratt Impulsivity Scale. As can be seen at the level of the group of participants, the following values were obtained: Impulse Control (ICI) $\alpha=.79$; Impulse Control (HPI) $\alpha=.70$; Impulse Control (AB5C) $\alpha=.85$; Self-

control (CPI) $\alpha=.69$; Self-regulation/Self-control (VIA) $\alpha=.78$. These obtained values indicate an acceptable internal consistency to be used in research.

4.7.2. Hypothesis 2

Hypothesis 2 refers to the construct validity research between the Barratt Impulsivity Scale, along with its factors and 3 variants of Impulse Control (TCI, HPI, AB5C) and two other variants of Self-control (CPI, VIA). Due to the fact that in the previously presented information, an abnormal distribution of the data was highlighted for most of the variables, the Spearman Correlation was used at the level of convergent and divergent validity.

Table 6. Spearman correlation between Impulsivity and Impulse Control (TCI, HPI, AB5C) and Self-control (CPI, VIA)

	M(SD)	1	2	3	4	5	6
1. Impulsivity	55,40(8,320)	1	-	-	-	-	-
			,605**	,396**	,653**	,629**	,646**
2. Impulse control TCI	37,37(6,636)		1	,292*	,529**	,461**	,499**
3. Impulse control HPI	21,13(3,942)			1	,323*	,411**	,675**
4. Impulse control AB5C	41,15(7,260)				1	,337**	,856**
5. Self-control CPI	37,52(6,823)					1	,455**
6. Self-control VIA	49,57(7,014)						1

**Significant correlation at $p<0.01$

*Significant correlation at $p<0.05$

The correlation between impulsivity and impulse control (IC) is a high negative one at a correlation coefficient of $\rho=-.605$ at a significance threshold of $p<0.05$ which indicates an acceptable convergent validity. The correlation between impulsivity and impulse control (HPI) is a moderate negative one with a correlation coefficient of $\rho=-.396$ and a significance threshold of $p<0.05$ which indicates convergent validity below the proposed acceptable level. The correlation between impulsivity and impulse control (AB5C) is also negative with a correlation coefficient of $\rho=-.653$ and a significance threshold of $p<0.05$ thus indicating an acceptable level of convergent validity. These correlations were intended to test the convergent validity of the impulsivity level of the Barratt Impulsivity Scale. The results were statistically significant, in two of the associations the data indicated acceptable validity at a level above .60 on the level of impulsivity and impulse control (TCI and AB5C).

Regarding divergent validity, the self-control construct was used in correlation with impulsivity from the Barratt Impulsivity Scale. The results revealed a high negative

correlation at $\rho = -.629$ and a significance threshold of $p < 0.05$ between self-control (CPI) and impulsivity. The same was the case with the correlation between self-regulation/self-control (VIA) and impulsivity with a correlation coefficient $\rho = -.646$ and at a significance threshold of $p < 0.05$. According to the results recorded at the divergent validity level between impulsivity and self-control, it can be considered statistically significant and at an acceptable level of over 60. In conclusion, at the level of construct validity (convergent and divergent) between impulsivity impulse control and self-control, it can be considered that this type of validity is significant for the Barratt Impulsivity Scale.

In Table 7 are the correlations between the first and second-order factors of the Barratt Impulsivity Scale and Impulse Control (TCI, HPI, AB5C) and Self-control (CPI, VIA). Regarding the convergent and divergent validity between the first and second-order factors of the Barratt Impulsivity Scale and impulse control, but also self-control the results were statistically significant in that there were significant correlations at a $p < 0.05$ but most of these were below the proposed level of .60 with a few exceptions namely:

- In the case of convergent validity between attentional impulsivity and impulse control (ICI) the correlation coefficient $\rho = -.631$ at a significance threshold of $p < 0.05$.
- A significant divergent validity was recorded at the level of motor impulsivity and self-control (CPI) where $\rho = -.612$ at a significance threshold of $p < 0.05$.
- At the level of the second-order factor regarding impulsivity at the motor level, a significant convergent validity was registered by association with impulse control (AB5C) at a $\rho = -.639$ at a significance threshold of $p < 0.05$, but also a divergent validity by association with self-control (VIA) $\rho = -.675$ at a significance threshold of $p < 0.05$.
- There were also convergent and divergent validities for self-control as a second factor of the Barratt Impulsivity Scale other impulse control (TCI) where $\rho = -.602$ at a significance level of $p < 0.05$ and (AB5C) where $\rho = -.608$ at a significance threshold of $p < 0.05$, and in the case of self-control (VIA) $\rho = -.618$ at a significance threshold of $p < 0.05$.

Table 7. Spearman correlation between Barratt Impulsivity Scale factors and Impulse Control (TCI, HPI, AB5C) and Self-control (CPI, VIA)

	M(SD)	Impulse control TCI	Impulse control TCI	Impulse control TCI	Impulse control TCI	Impulse control TCI
Attentional impulsivity	14,55(3,233)	-,631**	-,241	-,399**	-,379**	-,417**
Attention	8,75(2,398)	-,571**	-,209	-,433**	-,467**	-,409**
Cognitive instability	5,80(1,560)	-,375**	-,216	-,091	-,077	-,172
Motor impulsivity	19,53(3,675)	-,249	-,470**	-,552**	-,612**	-,585**
Motor level	12,80(3,063)	-,189	-,546**	-,639**	-,435**	-,675**
Perseverance	6,73(1,625)	-,277*	-,104	-,067	-,535**	-,088
Lack of planning	21,32(3,811)	-,448**	-,231	-,463**	-,395**	-,451**
Self-control	10,35(2,629)	-,602**	-,377**	-,608**	-,415**	-,618**
Cognitive complexity	10,97(1,877)	-,137	,031	-,176	-,219	-,111

**Significant correlation at $p < 0.01$ *Significant correlation at $p < 0.05$

In conclusion, it can be stated that the Barratt Impulsivity Scale is a valid instrument from the point of view of construct validity, convergent and divergent at a correlation threshold of over .60 at the level of total impulsivity by association with impulse control (TCI Impulse Control Scale and AB5C) and by association with self-control (CPI and VIA Self-control Scale). Regarding the first- and second-order factors, there were significant correlations with at least one construct of convergent and divergent validity, but most were below the proposed threshold of .60, except for the second-order factors of impulsivity at the motor level and self-control.

4.7.3. Hypothesis 3

The third hypothesis wanted to investigate criterion validity through the form of concurrent validity, thus achieving the correlation between the number of contraventions and Impulsivity within the Barratt Impulsivity Scale. The correlation between these two variables is a medium-level positive one at a correlation coefficient of $r = .326$ and a significance threshold of $p < 0.05$. The results obtained are statistically significant, but the level is low to be able to consider the number of contraventions as a significant criterion for Impulsivity within the Barratt Impulsivity Scale. Therefore, hypothesis 3 attesting criterion validity is partially

confirmed because the data were statistically significant, but below the acceptable level of .60.

Table 8. Spearman correlation between Impulsivity and the criterion factor Number of offenses

	M(SD)	1. Impulsivity	2. Number of offenses
1. Impulsivity	55,40(8,320)	1	,326*
2. Number of offenses	1,57(1,760)		1

*Significant correlation at $p < 0.05$

At the level of correlations between the first and second-order factors of impulsivity within the Barratt Impulsivity Scale and the criterion variable Number of contraventions, statistically significant data were obtained in the case of the first-factor motor impulsivity together with its second-order factors, at the motor level and persistence, but also in the case of the first-order factor lack of planning and the second-order factors self-control and cognitive complexity because $p < 0.05$. Statistically insignificant correlations were recorded at the level of the first-order factor impulsivity at the attentional level together with attention and cognitive instability.

Table 9. Spearman correlation between the factors of the Barratt Impulsivity Scale and the criterion variable Number of offenses

	M(SD)	Number of offenses
Number of offenses	1,57(1,760)	1
Attentional impulsivity	14,55(3,233)	,020
Attention	8,75(2,398)	,082
Cognitive instability	5,80(1,560)	-,038
Motor impulsivity	19,53(3,675)	,418**
Motor level	12,80(3,063)	,293*
Perseverance	6,73(1,625)	,374**
Lack of planning	21,32(3,811)	,367**
Self-control	10,35(2,629)	,328**
Cognitive complexity	10,97(1,877)	,281**

**Significant correlation at $p < 0.01$

*Significant correlation at $p < 0.05$

In conclusion, at the level of hypothesis 3, it can be argued that the results were statistically significant, but they are below the proposed correlation threshold of .60, which means that for impulsivity, along with its factors, the number of contraventions does not represent a significant criterion variable. Thus the instrument is not valid from the point of view of criterion validity.

Finally, following the statistical analysis of the results to verify the fidelity and validity of the instrument called the Barratt Impulsivity Scale, the following conclusions can be drawn:

- The results indicated an acceptable fidelity at a level of $\alpha=.750$ at the impulsivity level which means that from this point of view the instrument is faithful in measuring impulsivity at the total level;
- Regarding the first and second-order factors of the instrument, the internal consistency coefficient was below the accepted value of .70 which means that these factors used separately are not considered faithful in measuring the proposed traits except for the second-order factor Self-control;
- Regarding construct validity, the results indicated that the instrument when measuring impulsivity is valid in that correlations of a level above .60 were obtained with two of the constructs proposed for convergent validity (TCI Impulse Control and AB5C) and divergent validity (CPI and VIA self-control);
- At the level of the first and second-order factors the results were not conclusive because although there were significant correlations between the factors and the proposed constructs they were below the proposed level of .60 except for the second-order factor impulsivity At the motor level and Self-control;
- Finally, criterion validity was researched through its form of concurrent validity, thus correlating the number of contraventions with impulsivity and its factors, the results indicate that this is not a significant criterion to consider that the instrument is valid from the point of view of criterion validity.

5. Conclusions, Limitations, and Future Research Directions

5.1. Barratt Impulsivity Scale Following Statistical Analysis

Following the statistical analysis, the following aspects were highlighted:

- The Barratt Impulsivity Scale used to measure impulsivity at the total level is a reliable and valid instrument (convergent and divergent validity);

- The first and second-order factors used separately for the research did not meet the conditions of fidelity and validity, the results being below the proposed levels of .70 for fidelity and .60 for validity except for the second-order factor Self-control;
- Regarding the criterion validity at the level of impulsivity and its factors, the results indicated significant correlations with the criterion variable, the number of contraventions, but the coefficient was below the proposed level of .60.

Finally, following the analysis of the specialized literature and the research undertaken, it can be considered that the Barratt Impulsivity Scale is a faithful and valid instrument able to measure the impulsivity of category B car drivers in Romania at the research level and not for the diagnosis of specialty.

The purpose of the research was to perform an exploratory analysis of the psychometric qualities of the Barratt Impulsivity Scale for category B car drivers in Romania with the possibility of using the instrument at the research level. Thus, due to this purpose, the main limitations were reduced to the small number of participants, the use of a translation already made, and also to the characteristics of the group of participants. Considering their small number and the fact that most of the data were not normally distributed, it can be considered that the participants were not suitable for measuring impulsivity in category B drivers. Another aspect identified was related to the criterion validity of whose hypothesis was not confirmed, thus the number of contraventions was not a valid criterion at the level of the group of participants.

Considering the results obtained and highlighted limitations, it is recommended to increase the number of participants and choose them from groups of people suitable for measuring impulsivity. It is also recommended to expand research to identify suitable factors for measuring criterion validity and analyzing other types of validity.

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