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Research Article

The typology of impulsivity and its relations with aggression

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ABSTRACT

With the development of models that view impulsivity as a multidimensional trait, the question arises as to whether qualitatively distinct profiles (types) of impulsivity can be identified that differ in their relationships with specific outcomes. The aim of this study was to identify and validate profiles of impulsivity based on the multidimensional Impulsive Behavior Scale (UPPS–P). The sample included 1299 participants (49.3% men) from the Serbian general population. Dickman Impulsivity Inventory and the Reactive–Proactive Aggression Questionnaire were used for profile validation. The latent profile analysis identified five profiles, of which three were interpreted as qualitatively different: sensation seeking, urgency, and lack of premeditation and perseverance, while the remaining two profiles were characterized by quantitative differences in impulsivity (i.e., low and moderate impulsivity profiles). The sensation seeking profile was associated with the most adaptive characteristics – high functional impulsivity and low dysfunctional impulsivity and aggression. The urgency profile showed the least adaptive characteristics, including high functional and dysfunctional impulsivity and aggression. Identification of the qualitatively different profiles supports the use of a typological paradigm to describe impulsivity. At the same time, the results indicate the need to differentiate sensation seeking from other dimensions of impulsivity, especially urgency.

Keywords: impulsivity, sensation seeking, urgency, aggression, latent profile analysis

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Introduction

Impulsivity is a multidimensional construct, most often defined as the inability to inhibit and delay behavior, acting without prior consideration and reduced sensitivity to the consequences of behavior (e.g., Reynolds et al., 2006). Impulsivity is a good example of "jingle" and "jangle" fallacies in psychology, with the former referring to the existence of different constructs under the same name and the latter referring to the existence of the same constructs with different names (Block, 1995). Berg et al. (2015) called impulsivity, disinhibition, and sensation seeking "a jingle-jangle triad," stating that each of these dimensions can be found in different personality models as a higher-order dimension that includes the previous two. For example, in Buss and Plomin's (1975) model of temperament, impulsivity is one of the basic dimensions whose subdimensions include, among others, disinhibition and novelty seeking.

Impulsivity was also studied independently of personality models. For example, Dickman's (1990) model of impulsivity includes two independent functions of impulsivity which both refer to the tendency to take action with very little prior thinking. That action may be an optimal strategy in the given moment and may lead to positive outcomes (functional impulsivity), or it may be harmful and lead to negative outcomes (dysfunctional impulsivity). A comprehensive study of impulsivity was conducted by Whiteside and Lynam (2001). Based on a joint factor analysis of items from eight scales of impulsivity and four subscales of NEO–PI–R which measure impulsive tendencies, they extracted four factors: 1) urgency – a tendency to engage in impulsive behavior under conditions of negative affect to alleviate negative emotions, although the action may have harmful long–term consequences; 2) (lack of) premeditation – difficulty in thinking and reflecting on the consequences of an act before engaging in that act; 3) (lack of) perseverance – an inability to remain focused on boring or difficult tasks; 4) sensation seeking – a tendency to enjoy and pursue exciting activities and an openness to new experiences that may be dangerous. The UPPS Impulsive Behavior Scale was proposed based on the obtained factor solution. These four factors had low mutual correlations and unique correlates: urgency was primarily associated with neuroticism, sensation

seeking with extraversion, and (lack of) premeditation and (lack of) perseverance with conscientiousness (Whiteside & Lynam, 2001).

Given their distinctiveness, the authors concluded that these factors did not represent different types of impulsivity but different processes that may lead to impulsive behaviors. Later, the distinction between urgency under negative and positive affect was proposed, resulting in the development of the UPPS–P scale (Cyders et al., 2007; Lynam et al., 2006). Positive urgency accounted for a portion of the variance in risky behavior that was not explained by other impulsivity factors, particularly in relation to drinking and gambling (Cyders et al., 2007; McCarty et al., 2017). The 59-item version of the UPPS–P questionnaire has become a widely used measure of impulsivity and has demonstrated good psychometric characteristics across different populations and cultures (Argyriou et al., 2019; Verdejo-García et al., 2010).

Previous research has found age to be negatively related to all UPPS–P scales, although correlations were low (Argyriou et al., 2019; Cándido et al., 2012; Zhang et al., 2020). Regarding sex differences, previous studies have been inconsistent, with some studies showing no significant sex differences (Cándido et al., 2012) and others showing significant differences in sensation seeking (Cross et al., 2011; Zhang et al., 2020) and positive urgency (Cyders, 2013), with men having significantly higher scores.

Impulsivity is associated with a wide range of risky behaviors, including tendencies toward aggression (e.g., Cale, 2006) and antisocial behavior (e.g., Maneiro et al., 2017). Impulsive and aggressive behavior are often linked, and in some classifications, impulsive aggression is specified as a distinct type of aggression (i.e., opposed to thoughtful aggression; García–Forero et al., 2009).

However, despite being associated, impulsivity and aggression represent distinct (yet related) constructs and show different heritability patterns (e.g., Dinić et al., 2019). According to theoretical assumptions, impulsivity is a characteristic of reactive aggression, i.e., aggression that represents an immediate reaction to a real or perceived threat as opposed to proactive aggression that is instrumental and planned (Dodge, 1991).However, when impulsivity is viewed as a multidimensional construct, meta-analyses have shown that negative urgency, or negative and positive

urgency, as well as lack of premeditation (Berg et al., 2015; Bresin, 2019) are the most important correlates of aggression. Furthermore, positive urgency was more strongly related to proactive aggression, and negative urgency was more strongly related to reactive aggression (Hecht & Latzman, 2015; Maneiro et al., 2017; Miller et al., 2012).

Other impulsivity dimensions also correlate with aggression. For example, lack of perseverance is more related to reactive aggression and lack of premeditation is more related to proactive aggression (Hecht & Latzman, 2015), although some studies show that both dimensions have a stronger correlation with proactive aggression (Latzman & Vaidya, 2013; Miller et al., 2012) – which is not in line with theoretical expectations. Finally, some studies found that proactive aggression is correlated with sensation seeking but not with a lack of premeditation and perseverance (Maneiro et al., 2017), and sensation seeking has nonsignificant or the lowest correlations with aggression (Hecht & Latzman, 2015; Miller et al., 2012). Based on the listed findings, it can be assumed that the dimensions of urgency are consistently associated with aggression, but for other dimensions of impulsivity, there are no consistent patterns of relationships.

Impulsivity was most often examined using a dimensional or variable–centered approach, which is dominant in personality psychology (Roth & von Collani, 2007). This approach focuses on variables that are assumed to have identical "content" for each person, while individual differences are quantitative in their nature (Laursen & Hoff, 2006). The dimensional approach is variable-centered because it focuses on understanding relationships, similarities, and differences among variables, rather than identifying constellations of variables within individuals (Laursen & Hoff, 2006; Robins et al., 1998). As a means of addressing the limitations of a variable-centered approach, the person-centered approach is being increasingly used. This approach aims to identify distinctive types characterized by a similar pattern of scores on a set of variables (Merz & Roesch, 2011; Roth & von Collani, 2007). Nevertheless, person-centered and variable-centered approaches can be considered complementary and not opposing (Robins et al., 1998; Spurk et al., 2020), as they can provide different types of information for the same phenomenon. For example, the dimensional approach should be applied when there is a need to locate a

new construct or measure within the nomological network of traits. On the other hand, a typological approach should be applied if someone is interested in the constellation of traits within a person (e.g., John, 1990).

In previous typological research, impulsivity was typically examined alongside constructs beyond impulsivity itself. For example, in the study that examined types based on UPPS dimensions and symptoms of posttraumatic stress disorder (PTSD), quantitatively different types differed mostly in negative urgency and PTSD symptoms. The profile with the highest negative urgency and PTSD symptoms was characterized by problems in anger regulation (Contractor et al., 2018). Similarly, in the typological study based on the dimensions of UPPS and dimensions of motivation for substance abuse, four quantitatively different types were identified. One profile only included high negative urgency followed by high conformity motive for substance use (Lannoy et al., 2020). Another study identified three profiles based on impulsivity, shopping motives, and self–esteem, with quantitative differences between negative and positive urgency and lack of premeditation (Challet–Bouju et al., 2020). However, the question of whether a typological approach based on impulsivity dimensions alone would be informative remains open.

Research Problem

The aim of this research was to identify and validate types of impulsivity. To the best of our knowledge, rare typological studies that included impulsivity always studied it in combination with other constructs, describing three to five profiles. The most prominent types, according to these studies included negative urgency (e.g., Contractor et al., 2018) or urgency and lack of premeditation (Challet–Bouju et al., 2020). However, based only on impulsivity dimensions, we could expect identification of different types according to the distinction of disinhibition and sensation seeking among the UPPS-P dimensions (Berg et al., 2015). Furthermore, previous research on the UPPS-P questionnaire (Cyders & Smith, 2007) showed that a three-factor hierarchical model could be used, wherein three higher-order factors were: emotion-based rash action (negative and positive urgency as lower-order factors), sensation seeking, and deficits in conscientiousness (lack of perseverance and premeditation as lower-order

factors). Correlations between these higher-order factors were low, suggesting that they reflect distinct processes and behavioral patterns. Thus, the primary aim of this study is to investigate whether a three-factor latent structure of impulsivity is reflected in distinct impulsivity profiles. We hypothesize that three qualitatively different profiles of impulsivity will emerge, differentiating between urgency, sensation seeking, and lack of premeditation and perseverance.

The secondary aim was to determine the construct (concurrent) validity of the profiles. Differences between the profiles in functional and dysfunctional impulsivity were examined, as well as in aggression. Based on previous research, it is expected that the type of impulsivity characterized by high sensation seeking will show high functional impulsivity (e.g., Brunas–Wagstaff et al., 1995), while other types will show higher dysfunctional impulsivity. Furthermore, it is expected that the type characterized by higher negative urgency will show the strongest relation to aggression (e.g., Cale, 2006). It remains unclear whether the identified impulsivity profiles will differentiate between positive and negative urgency. While this distinction is considered crucial for separating tendencies toward different functions of aggression (e.g., Hecht & Latzman, 2015), its theoretical and practical utility has been questioned (Berg et al., 2015). If the profile structure reveals differences between positive and negative urgency, we expect higher proactive aggression in profiles characterized by greater positive urgency and higher reactive aggression in profiles with greater negative urgency[1].

Method

Sample and procedure

The sample consisted of 1299 participants (49.3% men), aged 18 to 69 years (M = 39.95, SD = 13.35) of the general population from Serbia, among which 36.2% finished university, 15.6% finished college, 16.4% were students, 25.3% finished secondary, and 6.4% finished primary school. The sample was collected by the trained students as part of the coursework. There were pre-defined quotas for sex (50% males) and age (33.3% for each of the three age groups [i.e.,18 to 34, 35 to 49, and 50 to 65 years]). The

[1] The original hypothesis was rephrased during revision process to enhance clarity.

sample was convenient and mostly comprised of students' family members, friends, and acquaintances. The questionnaires were distributed in paper-and-pencil format. The study was approved by the Institutional Review Board.

Instruments

Impulsive Behavior Scale (UPPS–P Impulsive Behavior Scale; Cyders et al., 2007; Lynam et al., 2006) [2]

The original UPPS scale proposed by Lynam et al. (2006) consisted of 45 items and measured four dimensions of impulsivity. Later, Cyders et al. (2007) added 14 items to measure the fifth dimension – positive urgency. Therefore, the UPPS-P scale consists of 59 items with a four-point Likert-type scale (from 1 = *strongly disagree* to 4 = *strongly agree*) and measures five dimensions of impulsivity. Negative urgency is defined as the tendency to act quickly under the influence of intense negative affect (e.g., "when I feel bad, I will often do things I later regret in order to make myself feel better now"). Positive urgency is a tendency to act quickly under the influence of intense positive affect (e.g., "when I am in a great mood, I tend to get into situations that could cause me problems"). Lack of premeditation is defined as insufficient consideration of possible consequences of action, while lack of perseverance is defined as having difficulties in focusing on long, difficult, or tedious tasks. Sensation seeking includes seeking innovative and exciting experiences. Cronbach's alpha and the number of items for all scales are shown in Table 1. The UPPS-P was adapted into Serbian using the back-translation procedure. Prof. Dr. Bojana Dinić translated the instrument into Serbian, and a professional English translator independently back-translated it into English. The translated versions were then jointly reviewed to ensure appropriate adaptation to the Serbian context.

[2]Because this is the first use of UPPS-P in Serbian, the factor structure has been tested using confirmatory factor analysis, which was applied on item packages. Model fit was acceptable: MLχ^2 (179) = 1606.80, $p < .001$, CFI = .92, TLI = .90, RMSEA = .07, SRMR = .08).

Dickman's Impulsivity Inventory (DII; Dickman, 1990, for Serbian adaptation see Smederevac et al., 2019).

This inventory consists of 23 items with a binary response format (*Yes*/*No*) that measure functional impulsivity (the tendency to act with very little forethought in situations when it is optimal) and dysfunctional impulsivity (the tendency to act with very little forethought when this tendency is a source of difficulty). The instrument was adapted to Serbian by Smederevac et al. (2019). The validity of Serbian adaptation was confirmed by positive correlations between both functional and dysfunctional impulsivity and the behavioral activation system (BAS; impulsivity) and fight from the Revised Reinforcement Sensitivity Theory (Smederevac et al., 2019). In addition, functional impulsivity showed a negative correlation with the behavioral inhibition system (BIS; anxiety), and dysfunctional impulsivity showed positive correlations with freeze and flight.

Reactive–Proactive Aggression Questionnaire (RPQ; Raine et al., 2006, for Serbian adaptation see Dinić & Raine, 2020)

This questionnaire consists of 23 items with a three-point response format (from 0 = *never* to 2 = *often*) and measures the tendency toward reactive aggression (aggressive reaction to perceived or actual provocation) and proactive aggression (instrumental aggression, independent of external triggers). More information concerning the translation procedure and psychometric properties of the Serbian RPQ could be found in Dinić and Raine (2020).

Results

Descriptive Statistics and Correlations

All scores showed normal distribution (for proactive aggression, skewness was 1.35 and kurtosis was 1.12; for other scales, skewness and kurtosis were in the range between –0.93 and 0.86). The mean inter-item correlations for the UPPS-P scales ranged from .29 (lack of perseverance) to .36 (sensation seeking), reflecting coherence without redundancy across all scales. Most items exhibited acceptable corrected item-total correlations (item discrimination), ranging from .30 to .72. Although six items had lower

corrected item-total correlations (<.30), they were evenly distributed across the UPPS-P scales. No items were removed, as all items contributed to the good alpha reliability of the scales (Table 1).

Table 1

Descriptive Statistics and Alpha Coefficients for the Used Instruments

Instruments	Dimensions	α(*n*)	*M*	*SD*
Impulsive Behaviour Scale (UPPS–P)	Negative urgency	.85(12)	25.58	6.15
	Positive urgency	.86(14)	20.83	5.33
	Lack of premeditation	.82(11)	18.65	4.76
	Lack of perseverance	.79(10)	27.46	8.53
	Sensation seeking	.87(12)	25.30	8.21
Dickman's Impulsivity Inventory (DII)	Functional impulsivity	.80(11)	5.13	3.04
	Dysfunctional impulsivity	.81(12)	3.32	2.92
Reactive–Proactive Aggression Questionnaire (RPQ)	Reactive aggression	.79(11)	1.19	1.52
	Proactive aggression	.82(12)	7.99	3.35

Note. *n* = number of items; the response format for UPPS–P is four-point (1–4), for DII is binary (0–1), and for RPQ is three-point (0–2).

The UPPS-P dimensions exhibited the expected pattern of correlations, with particularly high correlation between positive and negative urgency and between lack of premeditation and lack of perseverance (Table 2). Sensation seeking showed lower correlation with the other UPPS-P dimensions. All correlations between the dimensions of impulsivity and aggression were significant and positive, except for the correlation between functional impulsivity and negative urgency and positive urgency and the correlation between sensation seeking and lack of perseverance (Table 2). All UPPS–P dimensions had significantly higher correlations with

dysfunctional impulsivity compared to functional impulsivity (Steiger's *Z* ranged from 9.47 to 17.26, all $p < .05$). The only exception was sensation seeking, which was significantly more correlated with functional impulsivity (Steiger's $Z = 7.32$, $p < .05$). Except for negative urgency, which was more correlated with reactive aggression (Steiger's $Z = 1.74$, $p < .05$), all UPPS–P dimensions had a significantly higher correlation with proactive aggression (Steiger's *Z* ranged from 2.26 to 3.24, all $p < .05$).

Table 2

Correlations Between UPPS–P, DII, and RPQ Scales

	NU	PU	PM	PR	SS	FI	DI	RA
PU	.74							
PM	.36	.41						
PR	.41	.42	.52					
SS	.11	.28	.25	–.05				
FI	–.07	.03	.26	–.16	.43			
DI	.51	.47	.56	.36	.18	.22		
RA	.40	.27	.14	.09	.16	.08	.26	
PA	.35	.34	.24	.19	.23	.12	.29	.43

Note. NU = negative urgency, PU = positive urgency, PM = lack of premeditation, PR = lack of perseverance, SS = sensation seeking, FI = functional impulsivity, DI = dysfunctional impulsivity, RA = reactive aggression, PA = proactive aggression. Correlations ≥ ± .07 are significant at $p < .05$.

Latent Profiles of Impulsivity

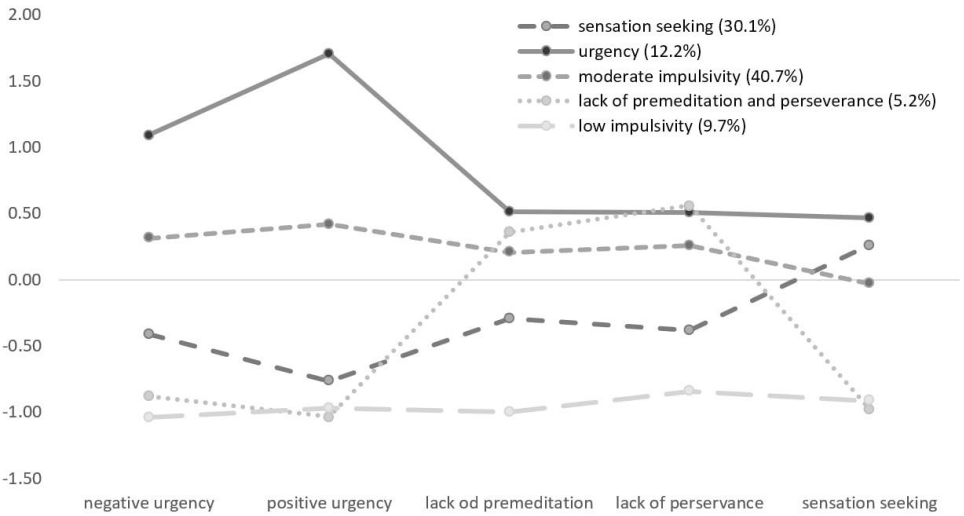
A latent profile analysis (LPA) was conducted to identify the profiles (i.e., types) based on the UPPS–P. Analysis was performed on *z*–scores in the R package "mclust" (Scrucca et al., 2016). The results showed that the best-fitting model was the model that contained five latent profiles (BIC = -14113.02, compared to second the best solution with six profiles BIC = -14131.29), in line with the recommendation that a higher BIC index indicates a better fit (Fraley & Raftery, 2007), while the difference between BIC indices of two models that is greater than 10 can be considered significant and large (Raftery, 1995). To test the stability of the profiles, we used the split-half method. We calculated the BIC coefficient for solutions with 2-6 latent

profiles. In one half of the sample, the optimal solution had 5 profiles (BIC = 7207). In the other half, the optimal solution had 6 profiles (BIC = 7180), but the solution with 5 profiles was the second-best (BIC = 7173), and the difference was below the recommended cut-off criteria (< 10). As the 6th profile included only 19 participants (less than 3%), we opted for a more parsimonious 5-profile solution.

The differences between the five profiles on all UPPS–P dimensions were significant ($F(4,1140)$ ranged from 73.76 to 1467.67, all $p < .001$, η^2_p ranged from .21 to .84; for the Bonferroni post hoc test, see Table A in Supplement).

Figure 1

Latent Profiles Based on UPPS–P Dimensions of Impulsivity



The *urgency profile* was characterized by very high scores on both positive and negative urgency, with a significantly higher score on positive urgency, followed by moderately high scores on other UPPS-P scales. This profile was significantly different from all other profiles on both urgency scales, but it did not differ in lack of premeditation and lack of perseverance from the lack of premeditation and perseverance profile. Also, this profile did

not differ from the sensation seeking profile on the sensation seeking dimension.

The *sensation seeking profile* was characterized by elevated scores on the sensation seeking scale; this profile had significantly higher scores on sensation seeking compared to all other profiles, except the urgency profile. Moreover, the sensation seeking profile had significantly lower scores on the other impulsivity dimensions compared to the urgency and moderate impulsivity profiles, but the scores were higher compared to the low impulsivity profile.

The *lack of premeditation and perseverance profile* was characterized by high scores on those two UPPS-P scales and low scores on other impulsivity scales. This profile did not differ from the low impulsivity profile on negative urgency, positive urgency, and sensation seeking, nor did it differ from the urgency and moderate impulsivity profiles in lack of premeditation and from the urgency profile in lack of perseverance.

The members of the *moderate impulsivity profile* had relatively high scores on all impulsivity dimensions, with the average scores on sensation seeking. This profile did not differ from the lack of premeditation and perseverance profile on the lack of premeditation scale, while all other differences were significant, with lower scores compared to the urgency profile and higher scores compared to the low impulsivity and sensation seeking profiles.

Lastly, the *low impulsivity profile* was characterized by low scores on all UPPS-P scales. Specifically, the scores were significantly lower compared to other profiles. The only exception were the scores on positive and negative urgency and sensation seeking, which did not differ between the low impulsivity and the lack of premeditation and perseverance profiles.

Sex and Age Differences Between the Profiles

Sex differences between the profiles were non-significant ($\chi^2(4) = 8.93$, $p = .06$), while the age differences were significant ($F(4, 1136) = 2.94$, $p < .05$). Members of the sensation seeking profile were significantly younger than members of the low impulsivity profile (for the Bonferroni post hoc test, see Table C in Supplement).

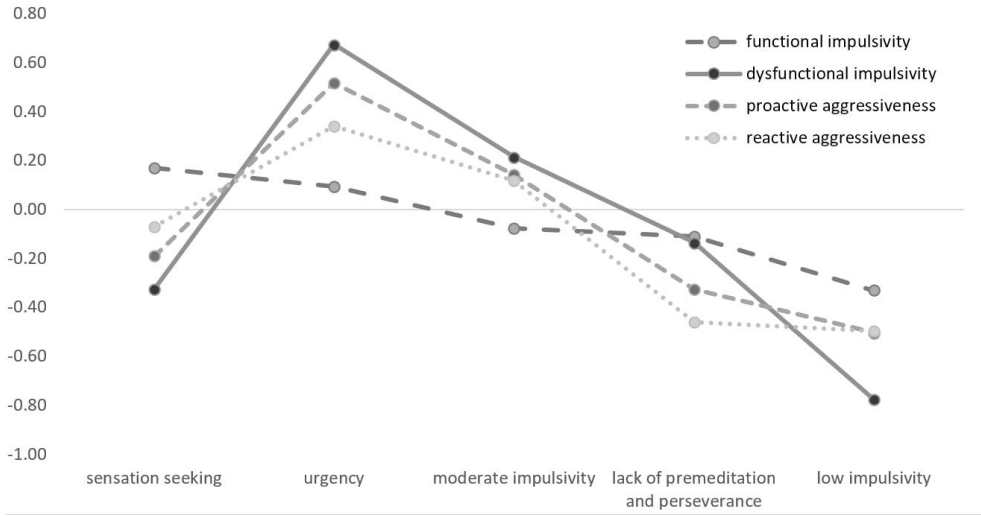
Profile Validation Based on the Dimensions of Impulsivity and Aggression

There were significant differences between profiles on functional ($F(4, 1135) = 6.92$, $p < .001$) and dysfunctional impulsivity ($F(4, 1135) = 57.55$, $p < .001$). Bonferroni's post hoc tests (Table D in Supplement) showed that the members of the sensation seeking profile had the highest scores on functional impulsivity – significantly higher compared to low and moderate impulsivity profiles, but not significantly higher compared to urgency and lack of premeditation and perseverance profiles. Regarding dysfunctional impulsivity, the urgency profile was characterized by the highest scores and was significantly different from all other profiles. Sensation seeking profile did not differ in dysfunctional impulsivity from profiles of lack of premeditation and perseverance and moderate impulsivity (and these two also did not differ from each other). On the other hand, members of the low impulsivity profile had the lowest scores on both functional and dysfunctional impulsivity, significantly lower than all the other profiles.

Profiles differed significantly in both reactive ($F(4,1139) = 16.25$, $p < .001$) and proactive aggression ($F(4,1139) = 25.11$, $p < .001$). The members of the urgency profile had significantly higher scores on both proactive and reactive aggression compared to other profiles, followed by the members of the moderate impulsivity profile (for the Bonferroni post hoc test results, see Table E in the Supplement). The low impulsivity profile had the lowest scores on both proactive and reactive aggression. There were no differences in proactive aggression between the lack of premeditation and perseverance profile and profiles of sensation seeking and low impulsivity. The members of the lack of premeditation and perseverance profile and the low impulsivity profile had the lowest scores on reactive aggression, and the two profiles were not significantly different.

Figure 2

Differences in Impulsivity Profiles Based on Functional and Dysfunctional Impulsivity and Proactive and Reactive Aggression



Discussion

The aim of this study was to identify latent profiles of impulsivity based on UPPS–P dimensions and to validate those profiles by examining their relationships with another measure of impulsivity and with functions of aggression. Five profiles were identified, among which both qualitative and quantitative differences were obtained. This result supports the view that the dimensional and typological approaches are complementary (Robins et al., 1998; Spurk et al., 2020). Furthermore, the three qualitatively distinct profiles identified in the present study correspond to the three higher-order factor structure of UPPS-P (Cyders & Smith, 2007).

The profile of sensation seeking was characterized by higher scores on sensation seeking and lower scores on all the other dimensions of impulsivity. This profile was also characterized by higher functional impulsivity and lower dysfunctional impulsivity and aggression. Thus, this profile seemed to be the most adaptive profile of the five profiles. It can be assumed that members of this profile strive for new and exciting experiences, and even if they react hastily, their reactions typically do not include hostility

and aggressive outcomes, but rather optimal, quick decisions. Furthermore, this profile contains more younger members compared to low impulsivity profile, which is in line with previous studies (e.g., Argyriou et al., 2019; Zhang et al., 2020). The extraction of this profile supports the view that sensation seeking is a distinct construct, showing different patterns of relationships with the outcome variables compared to other impulsivity characteristics that are predominantly related to disinhibition (Buss & Plomin, 1975). Sensation seeking also demonstrated weaker correlations with other impulsivity scales compared to the other UPPS-P dimensions. Previous research suggests that sensation seeking may be a protective factor: it is positively related to subjective well–being, unlike other dimensions of impulsivity (Ravert & Donnellan, 2021).

The core characteristics of the urgency profile, by which this profile differs significantly from all other profiles, are negative and positive urgency. This profile was characterized by high disinhibition, that is, the lack of ability to delay behavior, especially under strong positive or negative emotions. Members of this profile have higher scores on both functional and dysfunctional impulsivity. Moreover, dysfunctional impulsivity was the most prominent dimension within this profile, meaning that impulsive actions of members of this profile may often lead to negative outcomes.

Furthermore, this profile was characterized by higher aggression, suggesting it may be the least adaptive of the five profiles. In previous typological studies of impulsivity and other constructs, the types that showed a dysfunctional pattern of behavior included high negative urgency (e.g., Contractor et al., 2018; Lannoy et al., 2020). The results of our research are consistent with a meta-analysis showing that urgency is a key correlate of various psychopathological and other problems, including aggression, making it a central dimension of impulsivity (Berg et al., 2015; Bresin, 2019).

It should be noted that there were no separate profiles that would distinguish between negative and positive urgency. These two dimensions were highly correlated in this study (.74), and both equally contributed to the differences between profiles. Moreover, there was no significant difference in the correlations between those dimensions and proactive aggression, which does not align with previous studies (e.g., Hecht & Latzman, 2015). However, negative urgency was more strongly related to reactive aggression

than positive urgency, which is consistent with previous research (e.g., Hecht & Latzman, 2015). Both dimensions were positively related to dysfunctional impulsivity and were unrelated to functional impulsivity, in line with previous findings (Pawluk & Koerner, 2013). The relation with dysfunctional impulsivity is stronger for negative urgency. Although some distinction between the two urgency dimensions could be made at the dimensional level, it was not observed at the typological level. The distinction between positive and negative urgency has also been questioned in a meta–analysis study of UPPS-P correlates (Berg et al., 2015).

The profile of lack of premeditation and perseverance was characterized by high scores on those two UPPS-P scales, followed by low scores on other impulsivity scales. Members of this profile may experience difficulties with long-term planning and weighing the possible consequences of their actions, as well as difficulties concentrating on the current task if it is tedious or uninteresting. These difficulties do not seem to be related to positive or negative affect, but rather to the unexciting tasks with delayed results. Lack of premeditation and lack of perseverance were highly correlated, reflecting a low conscientiousness disposition. Furthermore, this profile showed lower aggression scores (as did the low impulsivity profile), which does not entirely align with previous research that showed that lack of premeditation was strongly related to aggression (Bresin, 2019).

Profiles of moderate and low impulsivity could be understood as predominantly quantitatively different. They were based on different degrees of impulsivity in general, and these differences were reflected in the differences in functional and dysfunctional impulsivity, as well as in aggression. Specifically, the low impulsivity profile had significantly lower scores on proactive and reactive aggression and dysfunctional impulsivity, while the two profiles did not differ in functional impulsivity.

Interestingly, there were no sex differences between the impulsivity profiles. Some of the previous research showed that men scored higher on the positive urgency and sensation seeking (Cyders, 2013), and in one meta-analysis, women showed higher urgency, but the effect size was small (Cross et al., 2011). It seems that the sex differences in impulsivity are rather inconsistent. Regarding the age structure of the high impulsivity profile, our results are in line with previous research in which older individuals are less

impulsive (e.g., Zhang et al., 2020), as well as research that showed that sensation seeking is more pronounced in younger individuals (Roberti, 2004; Roth et al., 2005).

There are several limitations to this study. The main limitation is that the profiles' stability has not been tested across different independent samples. Instead, we tested profile stability using the split-half method, which, in addition to the five-profile solution, also produced the six-profile solution. We recommend that future studies aim to replicate the impulsivity profiles in larger samples and different cultures and populations. The second limitation is that only the self–assessment data were collected. Further research could explore the congruence of obtained profiles by comparing the findings based on self–reported and others-reported data. The third limitation is related to the sampling procedure, which resulted in the convenient sample. Thus, the generalization of the results is limited.

Despite the limitations, the results of this research support the notion that dimensional and typological approaches could be considered complementary, and that each provides additional insight into the adaptability of impulsivity structure. The differences between the profiles of impulsivity are both quantitative and qualitative. Qualitatively different profiles are in line with the higher-order structure of UPPS-P proposed by Cyders and Smith (2007). Therefore, compared to the other profiles, the sensation seeking profile appears to be the most adaptive, whereas the urgency profile was the least adaptive and was associated with aggressive and broadly negative outcomes. Based on the results, it can be concluded that urgency and sensation seeking are core and distinctive characteristics of impulsivity. However, further research is needed to conclude on the relationship between these two dimensions and address the question of whether they are facets of impulsivity or independent constructs. The results contribute to a better understanding and usefulness of both the dimensional and typological approach in the study of impulsivity.

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Conflict of interest

We have no conflicts of interest to disclose.

Data availability statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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