Validation of a short French version of the UPPS-P Impulsive Behavior Scale

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Abstract

Background: Impulsivity is a multifaceted construct that has a prominent role in psychiatry. Lynam et al (2006) have developed the UPPS-P, a 59-item scale measuring 5 impulsivity components: negative urgency, positive urgency, lack of premeditation, lack of perseverance, and sensation seeking. The aim of the present study was to validate a short, 20-item French version of the UPPS-P.
Methods: Six hundred fifty participants filled out the short French UPPS-P. A subgroup of participants (n = 145) took part in a follow-up study and completed the scale twice to determine test-retest stability; another subgroup (n = 105) was screened with other questionnaires also to establish external validity.
Results: Confirmatory factor analyses supported a hierarchical model comprising 2 higher order factors of urgency (resulting from negative urgency and positive urgency) and lack of conscientiousness (resulting from lack of premeditation and lack of perseverance) as well as a separate factor of sensation seeking. The results indicated good internal consistency and test-retest stability. External validity was supported by relationships with psychopathological symptoms.
Conclusion: The short French version of the UPPS-P therefore presents good psychometric properties and may be considered a promising instrument for both research and clinical practice.
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1. Introduction

Impulsivity has a crucial role in psychopathology and neuropsychology. This construct, which is included in all the major models of personality [1], is one of the more common diagnostic criteria included in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* [2]. It is now clearly established that impulsivity encompasses a combination of multiple and separable psychologic dimensions [3]. In an attempt to delimit the facets underlying impulsivity, Whiteside and Lynam [1] asked a sample of undergraduate students to complete several widely used questionnaires of impulsivity as well as the Revised NEO Personality Inventory [4]. Factor analysis resulted in a 4-factor solution, which was the basis for the creation of a 45-item questionnaire named the UPPS Impulsive Behavior Scale (UPPS). The 4 dimensions measured by the UPPS are

urgency, defined as the tendency to experience strong reactions, frequently under the condition of intense negative affect; *premeditation*, defined as the tendency to take into account the consequences of an act before engaging in that act; *perseverance*, defined as the ability to remain focused on a task that may be boring and/or difficult; and *sensation seeking*, considered as a tendency to enjoy and pursue activities that are stimulating or exciting and openness to trying new and unconventional experiences. The UPPS was shown to have high internal consistency [1], and some studies have supported the construct validity of the 4 impulsivity components measured [1,5,6].

In recent years, an additional impulsivity component was added to the UPPS model, namely, positive urgency, which was conceptualized as the tendency to act rashly when in an intense positive affective state [7,8]. Cyders et al [8] have also developed a scale to assess this fifth impulsivity component: the positive urgency measure (PUM). The PUM has recently been combined with the original 45-item UPPS to create a new 59-item questionnaire measuring 5 impulsivity components called the UPPS-P [9].

To date, many studies based on this multidimensional conceptualization of impulsivity have indicated specific relationships between the 5 dimensions of impulsivity and several psychopathological states and problematic behaviors. Notably, negative urgency has been related to substance dependence [10], compulsive buying [11], cyber addictions [12], problem gambling [5], and eating disorders [13]; positive urgency has been related to alcohol abuse [14], problem gambling [15], and risky sexual behaviors [16]; lack of perseverance has been related to the occurrence of obsessive thoughts [17] and procrastination-related behaviors [18] and may represent an important dimension of predominantly inattentive subtypes of attention-deficit hyperactivity disorder [19]; lack of premeditation has been closely related to antisocial personality, psychopathic features, and the involvement in behaviors dangerous to health such as smoking [19]; and sensation seeking has been associated with drug and alcohol use as well as with gambling and delinquent acts [6,19].

Interestingly, several studies have also demonstrated that the various impulsivity facets are differentially involved in problematic behaviors. For example, Billieux et al [20] found a differentiated role of the various impulsivity components in the framework of a study on the problematic use of the mobile phone. More precisely, they found a high urgency to predict addictive patterns of mobile phone use, low premeditation to predict prohibited use (ie, use in forbidden places), low perseverance to predict actual mobile phone use and financial problems resulting from mobile phone use, and high sensation seeking to predict dangerous use of the mobile phone (ie, phoning while driving). These data supported the suggestion that disentangling impulsivity into lower order components is necessary to better understand its causal role in problematic behaviors and psychopathological states.

We aimed in the current study to develop a short version of the UPPS-P that would be useful for both research and clinical purposes. Indeed, the original UPPS-P is composed of 59 items, which is relatively time-consuming to complete and could hinder its use both in research (eg, some investigators would be reluctant to incorporate a long questionnaire in their research protocols) and clinical (eg, long scales are rarely incorporated as systematic screening tools) contexts. Accordingly, the current article explores the psychometric properties (factor structure, internal consistency, test-retest stability, and external validity) of a short, 20-item French version of the UPPS-P.

2. Methods

2.1. Participants and procedure

The sample comprised 650 undergraduate psychology students from 4 French-speaking European universities, namely, the University of Geneva, Switzerland (n = 186); the University of Louvain-la-Neuve, Belgium (n = 105); the University of Reims Champagne-Ardenne, France (n = 196); and the University of Strasbourg, France (n = 163). Only native or fluent French speakers were retained for the study. Most of the sample constituted women (84.77%). This sex imbalance was due to the general low proportion of men in the psychology student community. The age of the participants ranged from 17 to 50 years (mean, 21.97 years; SD, 4.89). Groups of 30 to 100 individuals completed the UPPS-P in their university classes. A subgroup of participants (n = 145) completed the scale twice (with an interval of 2 weeks) to establish test-retest stability. In addition, another subgroup (n = 105) filled out 3 supplementary questionnaires to determine the external validity of the scale. Additional questionnaires were the following: the Alcohol Use Disorder Identification Test [21], the Trait-Anxiety Inventory [22], and the Beck Depression Inventory [23]. The questionnaires were completed anonymously, and a personal code instead of an identity was used to trace respondents in the follow-up subgroup across sessions. Participants provided informed consent. No compensation was given for participation in the study.

2.2. Instruments

2.2.1. Short UPPS-P Impulsivity Scale[2]

The short UPPS-P is a 20-item scale that evaluates 5 different impulsivity facets (4 items per dimension) labeled as negative urgency, positive urgency, lack of premeditation, lack of perseverance, and sensation seeking. All items are scored on a Likert scale from 1 ("I agree strongly") to 4 ("I disagree strongly"). To create the short UPPS-P, we selected the 4 items of the French 45-item UPPS [24] that loaded most strongly on each of the 4 factors of this scale (items 36, 41, 24, and 45 for negative urgency; items 30, 22, 34, and 4

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[2] The short French UPPS-P is available on request from the first author.

for lack of perseverance; items 27, 39, 40, and 5 for lack of premeditation; and items 19, 25, 3, and 33 for sensation seeking). One of the 4 items retained for the negative urgency component of impulsivity, contrary to the 3 other items, does not explicitly refer to a rash action in a negative affect context (item 45, "sometimes I do things on impulse that I later regret"), and so we replaced it with the fifth item with the highest loading on the negative urgency factor (item 28, "when I feel rejected, I will often say things that I later regret"). Indeed, it was important that all 4 items measuring negative urgency refer to impulsive actions in negative affect contexts. Next, we translated the 14 items of the PUM proposed by Cyders et al [8] into French. The translation of the positive urgency items was carried out as follows: we translated the items from English to French. After this first stage, a bilingual English-French speaker back translated the translated items into English. Discrepancies emerging between the back translated and the original English versions were discussed, and translation adjustments were consensually made. Then, 148 volunteer participants completed the PUM, and factorial analysis was carried out, which revealed that items 9, 10, 11, and 13 were the 4 items with the highest loadings. These 4 items were thus incorporated in the short French UPPS-P. Finally, the 20 items selected (16 items from the UPPS and 4 items from the PUM) were randomized so that 2 items measuring the same impulsivity facet are never presented successively.

2.3. Statistical analyses

To determine the factor structure of the short UPPS-P, we undertook Confirmatory Factor Analysis (CFA) with maximum likelihood estimation with robust standard errors and a mean-adjusted χ^2 statistic test [25]. We used CFA instead of exploratory factor analysis because the former allows one to test specific a priori hypotheses regarding the factorial structure of the scale, which is particularly suited for translations and/or short versions of scales having received prior validations. In the current study, we compared 4 models that consider the relationships among the 4 components of impulsivity. The first model holds that there is a single, unitary impulsivity construct. The second model identifies 5 interrelated impulsivity constructs. Indeed, prior studies using the French 45-item UPPS in undergraduates [24] and adolescent samples [26] consistently showed that the solution that best fits the data constitutes 4 specific but intercorrelated factors. Nevertheless, validation studies conducted on the original 45-item UPPS and the 59-item UPPS-P have revealed, on the one hand, that both lack of premeditation and lack of perseverance are related to a higher order construct of "conscientiousness" (defined in the 5-factor model of personality; see Costa and McCrae [4]) and, on the other hand, that positive urgency and negative urgency represent a higher order construct of general urgency [6,8]. Therefore, 2 additional models were tested. The third model recognizes 3 interrelated factors, namely, urgency (comprising both

positive and negative urgency items), sensation seeking, and lack of conscientiousness (comprising both lack of premeditation and lack of perseverance items). Finally, we computed a fourth hierarchical model in which lack of premeditation and lack of perseverance are 2 distinct factors both loading on a higher order factor called lack of conscientiousness; positive urgency and negative urgency are 2 distinct factors both loading on a higher order factor–labeled urgency; sensation seeking is a separate impulsivity dimension.

Goodness of fit was tested with χ^2 (a nonsignificant value corresponds to an acceptable fit). However, χ^2 is known to increase with sample size, and some authors have noticed that it is unusual to obtain nonsignificant χ^2 values when performing CFAs on self-reported questionnaires [27]. Consequently, in addition to χ^2, 2 other indices that depend on a conventional cutoff were also computed: the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR) [28]. The combination of these 2 indices is valuable because the RMSEA is sensitive to the misspecification of the factor "loadings" and because the SRMR is sensitive to the misspecification of the factor "covariances." An RMSEA of between 0 and 0.05 indicates a good fit, and between 0.05 and 0.08, an acceptable fit. An SRMR of between 0 and 0.05 indicates a good fit, and between 0.05 and 0.10, an acceptable fit [29]. We also reported the comparative fit index (CFI). A CFI more than 0.90 is generally interpreted as indicating an acceptable fit. Internal reliability of the short French UPPS-P was measured with the Cronbach α coefficient.

Two-tailed Pearson correlations (with 5% significance criterion) were used to evaluate relations between the facets of the short French UPPS-P and the other self-reported questionnaires included in the study. Because the sample's sex was imbalanced, it was not possible to compute separate CFAs for men and women. Consequently, Pearson point-biserial correlation was used to evaluate the effect of sex on the impulsivity facets (women were set at 1, and men, at 2). Pearson correlations were also used to explore test-retest stability of the short French UPPS-P. Pairwise treatment of missing data was used.

3. Results

3.1. Psychometric properties of the short French UPPS-P

Of the 650 participants, 23 had 1 item or more missing after completion of the scale and were removed from the analyses. CFA was then computed on the 20 items of the short French UPPS-P. Four models differing in the way they consider the relationships between the 5 components of impulsivity were tested. Absolute fit indices of the 4 models tested are summarized in Table 1. First, the results showed that the single-factor model in which all the items loaded on a unique latent factor fits the data poorly (see Table 1, model 1). Therefore, our data confirm that impulsivity is not a unitary construct. Second, as in previous validation studies

Table 1
Absolute fit indices of the CFAs for the short French UPPS-P for 4 models

Model	df	χ^2	RMSEA	SRMR	CFI
1	170	2418.28*	0.15	0.15	0.38
2	160	412.85*	0.05	0.05	0.93
3	167	957.82*	0.09	0.08	0.78
4	163	426.18*	0.05	0.05	0.93

* $P < .001$.

of the UPPS-P, the model with 5 distinct but interrelated factors of impulsivity had a good fit (see Table 1, model 2). Third, the 3-factor model regrouping of, on the one hand, positive urgency and negative urgency and, on the other hand, lack of perseverance and lack of premeditation, with sensation seeking as a separate factor, fits the data poorly (see Table 1, model 3). Finally, the hierarchical model fit the data well, assuming that positive urgency and negative urgency are 2 distinct components of an overall urgency factor, whereas lack of perseverance and lack of premeditation are 2 distinct components of an overall lack of conscientiousness factor, and sensation seeking is a separate dimension (see Table 1, model 4). On the whole, models 2 and 4 both showed strong goodness of fit. Nevertheless, model 4 is slightly more parsimonious (this model specifies less covariance between the factors) than model 2. Furthermore, model 4 is able to account for the robust relationships between positive urgency and negative urgency ($r = 0.47$, $P < .0001$) and between lack of premeditation and lack of perseverance ($r = 0.43$, $P < .0001$). Based on these considerations, model 4 was thus retained. This model is depicted in Fig. 1.

Mean, SDs, internal consistency coefficient (Cronbach α), test-retest stability indices, and correlations between the various components of the short French UPPS-P are reported

in Table 2. The Cronbach α ranged from .70 to .84, suggesting good internal consistency for the various subscales. Finally, among the participants who completed the scale twice, correlations between the 2 administrations ranged from .84 to .92, which emphasizes strong test-retest stability.

3.2. Pearson correlations between the short UPPS-P and the other measures

Table 3 reports the correlations between the various facets of impulsivity with sex and psychopathology (alcohol abuse, anxiety, depression). Concerning sex, women were found to have higher urgency (both positive and negative), lower premeditation, and lower sensation seeking than men. Interestingly, several links were identified between impulsivity components and measures of psychiatric symptoms. Indeed, on the one hand, negative urgency was positively associated with alcohol abuse, anxiety, and depression. On the other hand, lower levels of perseverance were correlated with higher depression and anxiety. No other significant relationship was found between the other impulsivity facets and psychopathology.

4. Discussion

The present study examined the psychometric properties of a short version of the French adaptation of the English UPPS-P questionnaire developed by Lynam et al [9]. CFAs highlighted that 2 models fit the data, 1 with 5 distinct but related impulsivity facets and a hierarchical model with 2 higher order factors of urgency (resulting from positive urgency and negative urgency) and lack of conscientiousness (resulting from lack of premeditation and lack of perseverance). Internal
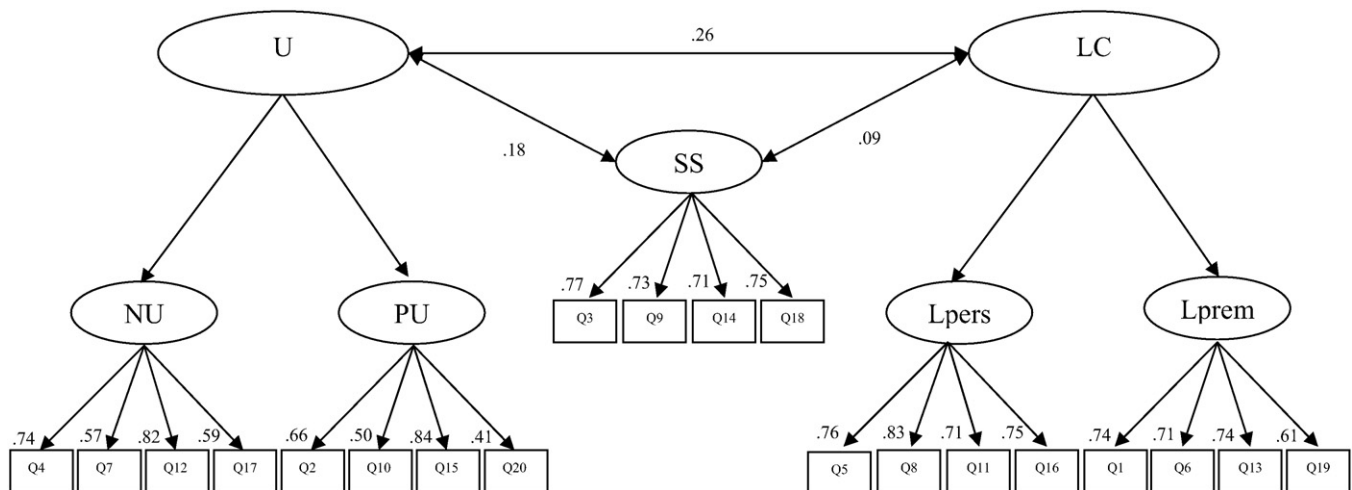

Fig. 1. A hierarchical model (model 4) in which positive urgency and negative urgency depend on a common, higher order construct of urgency; lack of premeditation and lack of perseverance depend on a common, higher order construct that refers to lack of conscientiousness; sensation seeking is a separate construct. Ovals reflect latent variables; rectangles, manifest variables. Double-headed arrows reflect correlations between the latent variables, whereas single-headed arrows reflect factor loadings. All factor loadings and factor intercorrelations are statistically significant at $P < .05$. For ease of presentation, error variances are not presented. PU indicates positive urgency; NU, negative urgency; U, urgency; Lprem, lack of premeditation; Lpers, lack of perseverance; LC, lack of conscientiousness; SS, sensation seeking.

Table 2
Descriptive statistics, internal consistency, test-retest stability, and correlations among the subscales of the short French UPPS-P

Impulsivity facets	Mean	SD	α	Retest	1	2	3	4
1. Negative urgency	9.38	2.73	.78	0.87**	–			
2. Positive urgency	10.84	2.38	.70	0.84**	0.47**	–		
3. Lack of premeditation	7.98	2.15	.79	0.85**	0.24**	0.23**	–	
4. Lack of perseverance	7.46	2.41	.84	0.85**	0.10*	0.07	0.43**	–
5. Sensation seeking	10.55	2.72	.83	0.92**	0.04	0.26**	0.08*	0.06

* $P < .05$.
** $P < .0001$.

consistency of the various scales and test-retest stability indices ranged from good to very good. Specific links were identified between psychiatric symptoms. More precisely, anxious and depressive symptoms were related to high negative urgency and low perseverance, whereas alcohol abuse was solely associated with high negative urgency. Such links have already been demonstrated in previous studies for anxiety and depressive symptoms [19] as well as for alcohol abuse [19,30]. This supports the good external validity of the scale and confirms that negative urgency and lack of perseverance are 2 impulsivity facets that play a prominent role in psychopathology [31,32]. On the whole, the current study demonstrated that the short French UPPS-P possesses good psychometric properties.

The short French UPPS-P was shown to possess a good and theory-based factorial structure. Although CFAs emphasized similar global fit indices, we advocate that a hierarchical model (model 4, with 2 higher order factors of urgency and lack of conscientiousness) is more parsimonious than a model comprising 5 distinct but interrelated impulsivity facets (model 2). Nevertheless, it is important to specify here that the measurement of impulsivity should focus on the distinction of 5 impulsivity facets (ie, positive urgency, negative urgency, lack of premeditation, lack of perseverance, and sensation seeking) rather than only 3 facets (ie, urgency, lack of conscientiousness, and sensation seeking). Indeed, the model that comprised only 3 facets of impulsivity (model 3) fits the data poorly. Moreover, previous studies as well as the current one showed that the impulsivity components highlighted as relying on a common higher order factor are,

in fact, differentially related to problematic behaviors [6,16]. Thus, although we are confident that the 2 aforementioned higher order factors reflect an underlying conceptual reality, it seems clear that each subscale of the UPPS-P refers to a specific and distinct content.

Developing short forms has become a very common activity in clinical assessment, and guidelines to ensure their validity have been proposed [33]. With respect to these guidelines, some methodological issues regarding the procedure that we used to develop the short form of the UPPS-P warrant further discussion and are addressed in the following paragraphs.

One of the most important aspects of the development of short-form questionnaires is the trade off between reduction in assessment time and loss of validity [33]. Assuming that 15 seconds is necessary to fill out an item of the UPPS-P, the completion time of the original 57-item scale is 15 minutes, whereas the short version takes only 5 minutes to complete. This significant time-saving is, nevertheless, only justified if the psychometric properties of the scale remain largely comparable (or in accordance with recognized validity criteria). We found the short UPPS to have a strong and theoretically based factorial structure similar to that of the original scale [6,8,24]. Moreover, the internal reliability coefficients of the short UPPS-P are near to those obtained with the original scale by Van der Linden et al [24] (Cronbach α ranged from .77 to .83 for the original scale and from .70 to .84 for the short form). Taken together, these results support the use of the short UPPS-P for meaningful time-saving.

Table 3
Pearson correlations between external validity measures and the 5 UPPS-P subscales

	n valid	UPPS-P-NU	UPPS-P-PU	UPPS-P-PR	UPPS-P-PE	UPPS-P-RS
Sex	650	−0.20***	−0.10**	−0.09*	0.04	0.13**
AUDIT	96	0.21*	0.11	0.12	0.07	0.15
STAI-T	96	0.29**	0.11	0.01	0.35***	−0.16
BDI-2	99	0.25*	0.07	−0.06	0.40***	−0.08

UPPS-P-NU indicates UPPS-P: negative urgency; UPPS-P-PU, UPPS-P: positive urgency; UPPS-P-PR, UPPS-P: lack of premeditation; UPPS-P-PE, UPPS-P: lack of perseverance; UPPS-P-RS, UPPS-P: sensation seeking; AUDIT, Alcohol Use Disorder Identification Test; STAI-T, Spielberger Trait-Anxiety Inventory; BDI-2, Beck Depression Inventory. Only a subpart of the sample (n = 105) completed the Alcohol Use Disorder Identification Test, the Spielberger Trait-Anxiety Inventory, and the Beck Depression Inventory, which may account for the difference in the P values despite similar correlation sizes.

* $P < .05$.
** $P < .01$.
*** $P < .001$.

Another obvious issue is the content coverage of the dimensions measured by the short scale compared with those of the original scale. Indeed, it is important that the various subscales of the original instrument are adequately represented in the short version. We have elaborated the short version of the UPPS by retaining the 4 items that loaded most strongly on each of the factors of the original scale. This frequently adopted technique, which avoids the selection of items with the most error variance, has been criticized because it implies that selected items reflect narrower constructs [33]. This potential problem will be illustrated here with respect to one of the impulsivity facets, namely, the (lack of) premeditation. This impulsivity component has been conceptualized as reflecting individual differences in the tendency to take into account the potential consequences of an action before realizing this action [1]. In the original UPPS-P scale, this construct covers a relatively wide range of behaviors or traits (eg, being a careful or cautious individual or being an individual who does not blurt things out without thinking). However, a deeper analysis of the 4 items composing the premeditation component of the short UPPS-P reveals that it probably measures more specific psychologic processes involved in analytic decision making (eg, balancing short- and long-term benefits in the light of all factual relevant information available before making a decision). Accordingly, the reduction in the number of items used to measure this construct at least partly diminished its breadth, implying that the narrower construct of premeditation measured by the short UPPS-P does not encompass all the psychologic processes covered by the broader premeditation facet of the original scale.

A limitation to the study is that we have not considered the overlapping variance between the long and the short forms of the UPPS-P. This could have been done by administering the 2 scales in the same testing session or in 2 independent testing sessions. We, nevertheless, did not include the short and the long scales in the same protocol for practical reasons. Indeed, including the original 57-item UPPS-P in the testing session would have significantly increased the total testing time (approximately 45 minutes instead of 30 minutes), which could have had a negative impact on the accuracy of the participants' responses. Eventually, rather than giving the original 57-item questionnaire in the subsample, which was tested twice, we preferred to administer the short form of the questionnaire twice to establish test-retest validity (an important criterion of validity that is often underestimated).

In conclusion, the current study showed that the short version of the French UPPS-P is a promising instrument for assessing the multidimensional construct of impulsivity in both research and clinical practice.

Acknowledgment

References

[1] Whiteside SP, Lynam DR. The five factor model and impulsivity: using a structural model of personality to understand impulsivity. Pers Indiv Differ 2001;30:669-89.

[2] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington, DC: American Psychiatric Association; 1994.

[3] Evenden J. Impulsivity: a discussion of clinical and experimental findings. J Psychopharmacol 1999;13:180-92.

[4] Costa PT, McCrae RR. Revised NEO personality inventory (NEO-PI-R) and the five factor inventory (NEO-FFI): professional manual. Odessa (Fla): Psychological Assessment Resources; 1992.

[5] Whiteside SP, Lynam DR, Miller J, Reynolds B. Validation of the UPPS Impulsive Behaviour Scale: a four-factor model of impulsivity. Eur J Personality 2005;19:559-74.

[6] Smith GT, Fischer S, Cyders MA, Annus AM, Spillane NS, McCarthy DM. On the validity and utility of discriminating among impulsivity-like traits. Assessment 2007;14:155-70.

[7] Cyders MA, Smith GT. Emotion-based dispositions to rash action: positive and negative urgency. Psychol Bull 2008;134:807-28.

[8] Cyders MA, Smith GT, Spillane NS, Fischer S, Annus AM, Peterson C. Integration of impulsivity and positive mood to predict risky behavior: development and validation of a measure of positive urgency. Psychol Assessment 2007;19:107-18.

[9] Lynam DR, Smith GT, Whiteside SP, Cyders MA. The UPPS-P: Assessing five personality pathways to impulsive behavior. Technical report. West Lafayette, IN: Purdue University; 2006.

[10] Verdejo-García A, Bechara A, Recknor EC, Pérez-García M. Negative emotion–driven impulsivity predicts substance dependence problems. Drug Alcohol Depen 2007;91:213-9.

[11] Billieux J, Rochat L, Rebetez MML, Van der Linden M. Are all facets of impulsivity related to self-reported compulsive buying behavior? Pers Indiv Differ 2008;44:1432-42.

[12] Billieux J, Chanal J, Khazaal Y, Rochat L, Gay P, Zullino D, et al. Psychological predictors of problematic involvement in massively multiplayer online role playing games (MMORPG): illustration in a sample of male cybercafés players. Psychopathology 2011;44:165-71.

[13] Mobbs O, Crépin C, Thiéry C, Golay A, Van der Linden M. Obesity and the four facets of impulsivity. Patient Educ Couns 2010;79:372-7.

[14] Cyders MA, Smith GT. Mood-based rash action and its components: positive and negative urgency. Pers Indiv Differ 2007;43:839-50.

[15] Cyders MA, Smith GT. Clarifying the role of personality dispositions in risk for increased gambling behavior. Pers Indiv Diff 2008;45:503-8.

[16] Zapolski TCB, Cyders MA, Smith GT. Positive urgency predicts illegal drug use and risky sexual behavior. Psychol Addict Behav 2009;23:348-54.

[17] Zermatten A, Van der Linden M. Impulsivity in non-clinical persons with obsessive-compulsive symptoms. Pers Indiv Differ 2008;44:1824-30.

[18] Dewitte S, Schouwenburg HC. Procrastination, temptations, and incentives: the struggle between the present and the future in procrastinators and the punctual. Eur J Personality 2002;16:469-89.

[19] Miller J, Flory K, Lynam DR, Leukefeld C. A test of the four-factor model of impulsivity-related traits. Perso Indiv Differ 2003;34:1403-18.

[20] Billieux J, Van der Linden M, Rochat L. The role of impulsivity in actual and problematic use of the mobile phone. Appl Cognitive Psych 2008;22:1195-210.

[21] Gache P, Michaud P, Landry U, Accietto C, Arfaoui S, Wenger O, et al. The Alcohol Use Disorders Identification Test (AUDIT) as a screening

tool for excessive drinking in primary care: reliability and validity of a French version. Alcohol Clin Exp Res 2005;29:2001-7.

[22] Spielberger CD, Gorsuch RL, Lushene R, Vagg PR, Jacobs GA. Manuel de l'inventaire d'anxiété état-trait. Forme Y. Paris: Editions du Centre de Psychologie Appliquée (ECPA); 1993.

[23] Beck AT, Steer RA, Brown GK. Inventaire de dépression de Beck (version 2 BDI-2). Paris: Editions du Centre de Psychologie Appliquée; 1998.

[24] Van der Linden M, d' Acremont M, Zermatten A, Jermann F, Larøi F, Willems S, et al. A French adaptation of the UPPS Impulsive Behavior scale: confirmatory factor analysis in a sample of under-graduates. Eur J Psychol Assess 2006;22:38-42.

[25] Muthén LK, Muthén BO. Mplus user's guide. 4th ed. Los Angeles: Muthén & Muthén; 2006.

[26] d' Acremont M, Van der Linden M. Adolescent impulsivity: findings from a community sample. J Youth Adolescence 2005;34:427-35.

[27] Byrne BM. Structural equation modeling with EQS and EQS/ Windows. Thousand Oaks, CA: Sage; 1994.

[28] Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct Equ Modeling 1999;6:1-55.

[29] Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: test of significance and descriptive goodness-of-fit measures. Meth Psychol Res Online 2003;8:23-74.

[30] Whiteside SP, Lynam DR. Understanding the role of impulsivity and externalizing psychopathology in alcohol abuse: application of the UPPS Impulsive Behavior scale. Exp Clin Psychopharm 2003;11:210-7.

[31] Billieux J, Gay P, Rochat L, Van der Linden M. The role of urgency and its underlying psychological mechanisms in problematic behaviours. Behav Res Ther 2010;48:1085-96.

[32] Gay P, Courvoisier DS, Billieux J, Rochat L, Schmidt RE, Van der Linden M. Can the distinction between intentional and unintentional interference control help differentiate varieties of impulsivity? J Res Pers 2010;44:46-52.

[33] Smith GT, McCarthy DM, Anderson KG. On the sins of short-form development. Psychol Assess 2000;12:102-11.