Adolescent Impulsivity: Findings From a Community Sample

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Impulsivity is central to several psychopathological states in adolescence. However, there is little consensus concerning the definition of impulsivity and its core dimensions. In response to this lack of consensus, Whiteside and Lynam (2001, *Pers. Individ. Differ.* 30, 669–689) have developed the UPPS Impulsive Behavior Scale, which is able to distinguish 4 dimensions of impulsivity in adults: Urgency, lack of Premeditation, lack of Perseverance, and Sensation seeking. The question arises of whether these 4 dimensions also exist in adolescents and also of whether gender differences can be observed. A sample of teenagers (314 girls and 314 boys) completed a French version of the scale (Van der Linden *et al.*, *Eur. J. Psychol. Assess.*, 2005). Based on exploratory and confirmatory analyses, the 4-factor model is replicated in girls, boys, and the whole sample. Concerning gender differences, girls have a higher score for Urgency and boys a higher score for Sensation seeking. Overall, this study suggests that the UPPS is a promising tool for studying impulsivity in adolescence.

KEY WORDS: impulsivity; personality assessment; factor analysis; gender differences; adolescence.

Impulsivity is a key concept for psychopathological states, especially among teenagers. Indeed, several problematic behaviors that arise during this period are associated with higher levels of impulsivity. For instance, a high score for Impulsiveness in early adolescence, as assessed by the Junior Impulsiveness Questionnaire (Eysenck *et al.*, 1984), predicts problem gambling in late adolescence (Vitaro *et al.*, 1999). Impulsiveness, assessed by the same scale, and other aspects of impulsivity, assessed by the Barratt Impulsivity Scale (Barratt, 1985), increase the probability of antisocial behavior (Luengo *et al.*, 1994). Some personality traits incorporated in the concept of impulsivity are also related to psychopathology in adolescence. Sensation seeking, assessed by an adaptation of the Zuckerman Sensation Seeking Scale (Zuckerman, 1994), is related to sexual risk-taking (Donohew *et al.*, 2000) and to risky behavior in general (Hansen and Breivik, 2001). Fischer and Smith (2004) have recently found that sensation seeking, as assessed by the Zuckerman–Kuhlman Personality Questionnaire (Zuckerman *et al.*, 1993), is more strongly correlated with positive risk-taking (sports, initiating social interaction, etc.), and that lack of deliberation, assessed by the NEO-PI-R (Costa and McCrae, 1992), is more strongly correlated with negative risk-taking (unprotected sex, drug consumption, shoplifting, etc.). Thus, several personality traits related to impulsivity are strong predictors of problematic behavior in adolescence. But the above-mentioned authors used different self-reporting scales and did not share a common model of impulsivity. Consequently, it is difficult to compare results between studies. Some authors also used different scales within a single study (e.g., Fischer and Smith, 2004; Luengo *et al.*, 1994) and these scales were, a priori, not developed to discriminate between different aspects of impulsivity. The result is that it is difficult to assert which aspect of

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impulsivity is predictive of a given type of problematic behavior in adolescence. It should be noted that the construct of impulsivity and its relationship to psychopathology are also unclear for adults.

In response to this lack of consensus, Whiteside and Lynam (2001) have developed the UPPS Impulsive Behavior Scale, which has the advantage of being derived from previous impulsivity scales and of being related to the 5-Factor Model of personality. Indeed, the 2 authors subjected the principal self-reporting questionnaires on impulsivity found in the literature to a factor analysis; they also included items from 4 facets of the NEO-PI-R questionnaire (Costa and McCrae, 1992) believed to be related to impulsivity (the impulsiveness facet of Neuroticism, the deliberation facet of Conscientiousness, the self-discipline facet of Conscientiousness, and the excitement seeking facet of Extraversion). After analyzing responses from 437 undergraduates, they teased out 4 dimensions of impulsivity related to the 4 facets of the NEO-PI-R: Urgency (related to the impulsiveness facet), lack of Premeditation (related to the deliberation facet), lack of Perseverance (related to the self-discipline facet), and Sensation seeking (related to the excitement seeking facet). They then selected the most representative items for each factor to construct the UPPS Impulsive Behavior Scale (Whiteside and Lynam, 2001). The first dimension of the scale, Urgency, "refers to the tendency to experience strong impulses, frequently under conditions of negative affect" (Whiteside and Lynam, 2001, p. 685). The second dimension, Premeditation, "refers to the tendency to think and reflect on the consequences of an act before engaging in that act" (p. 685). The third dimension, Perseverance, "refers to an individual's ability to remain focused on a task that may be boring or difficult" (p. 685). Finally, Sensation seeking "incorporates 2 aspects: (1) a tendency to enjoy and pursue activities that are exciting and (2) an openness to trying new experiences that may or may not be dangerous" (p. 686). Recently, Van der Linden et al. (2005) replicated the 4-dimensional model in a sample of French-speaking undergraduates by means of a confirmatory analysis. However, the 4-dimensional model of impulsivity had not been tested among teenagers.

Hence, the first goal of our research was to evaluate the factor structure and internal reliability of the French version of the UPPS Impulsive Behavior Scale among teenagers. Adolescence is associated with major brain and behavioral changes (Spear, 2000). However, there is a growing literature suggesting that there is considerable continuity between early temperament and adult personality (McCrae et al., 2000; Shiner and Caspi, 2003).

Supporting this point of view, the 5-Factor Model of personality was also found to apply in childhood (Mervielde and De Fruyt, 1999) and adolescence (McCrae et al., 2002). The hierarchical organization of NEO-PI-R factors and facets was also replicated in a sample of adolescents 12–17 years old using a Dutch version of the scale (De Fruyt et al., 2000). Because the UPPS Scale is based on 4 facets of the NEO-PI-R, we can hypothesize that the 4-dimensional model of impulsivity found in adults will be replicated in teenagers.

Our second aim was to evaluate gender and age differences with regard to the factors identified on the UPPS Scale. Studies using the NEO-PI-R with adolescents have not analyzed gender and age differences at the facet level (De Fruyt et al., 2000; McCrae et al., 2002). However, significant gender differences exist regarding psychopathology and decision-making during adolescence. Internalized problems are more frequent in girls and externalized problems are more frequent in boys (Bongers et al., 2003). Significant gender differences also exist in the way adolescents make their decisions, with boys taking more risks and choosing more options associated with negative outcomes (d'Acremont and Van der Linden, 2005). These differences may be partially explained by gender-related differences in impulsivity. Thus, the UPPS model of impulsivity needs to be tested separately in boys and girls.

Only if the model is replicated in both gender groups will it be possible to compare their mean score on the 4 dimensions of impulsivity. Gender differences have already been evidenced with the Junior Impulsiveness Questionnaire. Like the Impulsiveness Questionnaire validated in adults (Eysenck et al., 1985), the Junior Impulsiveness Questionnaire considers 2 dimensions of impulsivity. The first one, Impulsiveness, refers to "doing and saying things without thinking" (Eysenck et al., 1984, p. 315). The second dimension, Venturesomeness, contains "sensation-seeking and risk-taking items" (p. 315). In 2 validation studies of the Impulsiveness Questionnaire, the mean score for Venturesomeness was significantly higher for boys. Age was related to neither Impulsiveness nor Venturesomeness (Eysenck et al., 1984; Saklofske and Eysenck, 1983). When they developed the UPPS Scale, Whiteside and Lynam (2001) found that the Impulsiveness dimension of the Impulsiveness Questionnaire loaded on their lack of Premeditation factor and Venturesomeness on their Sensation seeking factor. We therefore expected boys to show a higher level of Sensation seeking. There was no convincing evidence allowing us to predict gender diferences for the other 3 dimensions of the UPPS Scale or age effets.

METHOD

Procedure

A French version of the UPPS Impulsive Behavior Scale was used in several schools (Van der Linden *et al.*, 2005; instruction and items are presented in the Appendix; the original English items can be found in Whiteside and Lynam, 2001, pp. 682–683). Other questionnaires were used along with the French version of the UPPS Scale. All of these other questionnaires used Likert scales with strong disagreement on the left side and strong agreement on the right. To respect this generalization and to avoid errors due to switching between questionnaires, the Likert scale we used for the UPPS was: "Disagree strongly" (1), "Disagree somewhat" (2), "Agree somewhat" (3), and "Agree strongly" (4). Note that this order is the reverse of that used in the original English UPPS Scale (Whiteside and Lynam, 2001) and the French version validated in young adults (Van der Linden *et al.*, 2005). Parents of minors were contacted by mail and their authorization was requested. Teenagers were free to choose whether to participate in the research.

Participants

The participants were 116, 93, and 109 students from 3 junior secondary schools. In additions, 117, 193, and 100 students from 3 secondary schools also took part. Finally, 85 students from a vocational training secondary school were included. All schools are located in small or medium-sized cities, in the French-speaking region of Switzerland. Of the 813 participants, 48 were not included in the analysis because they had missing values for more than 1 item. Nineteen of the remaining questionnaires were not included in the analysis because of language (the students were not native French speakers or had spoken French for less than 5 years). Of this sample, 27 subjects were younger than 12 or older than 19 years old; their data were also removed from the analysis. To obtain equal numbers of boys and girls, 91 girls were selected at random and their data were removed. The final sample was made up of 628 students (314 girls and 314 boys) aged from 12 to 19 years old. The mean age was 15.57 years with an SD of 2.04.

Statistical Analysis

For some items, choosing answer 4, "Agree strongly," corresponded to a low level of impulsivity. Answers to these items were reversed compared to the others and are marked with an "R" in the Appendix. The number of factors to extract was determined by a Velicer's Minimum Average Partial (MAP) test performed on the correlation matrix (O'Connor, 2000; Velicer, 1976). The MAP test is recommended because it provides the optimal number of factors to retain. Then the covariance matrix was analyzed with an exploratory factor analysis, and finally with a confirmatory factor analysis computed with LISREL 8.54 (Jöreskog and Sörbom, 1996).

For this latter analysis, goodness-of-fit was tested with chi-squares (a nonsignificant value corresponds to an acceptable fit). But the chi-square is known to increase with sample size, and Byrne (1994) has noticed that it is unusual to obtain nonsignificant chi-squares when performing confirmatory factor analyses on self-reporting questionnaires. For these reasons, the chi-square was complemented by examining other indices that depend on a conventional cutoff. There is no agreement concerning the best set of indices, but Hu and Bentler (1998) have recommended the use of two: the Standardized Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA). The combination of the 2 indices is valuable because the SRMR is sensitive to the misspecification of the factor covariance, whereas the RMSEA is sensitive to the misspecification of the factor loadings. If both indices are accepted, the latent and the measurement model are considered to be well specified.

Based on data simulations, Hu and Bentler (1999) have concluded that the combination of an SRMR <0.08 with an RMSEA <0.06 corresponds to a good fit. Many authors have used the Comparative Fit Index (CFI) in confirmatory factor analyses and we also report this index to allow comparison with previous studies. A CFI >0.90 is generally interpreted as indicating a good fit.

Pearson's point-biserial correlation (r_{pb}) was used to evaluate the effect of gender on impulsivity. Women were set at -1 and men at 1; thus, a positive correlation corresponds to a higher score for men. Pearson's correlation is a measure of effect size and has several advantages compared to indexes based on mean differences such as Cohen's *d* or Hedges' *g* (Rosnow *et al.*, 2000). According to Cohen (1988), a correlation of between 0.10 and 0.30 corresponds to a small effect, between 0.30 and 0.50 to a medium effect, and above 0.50 to a large effect.

RESULTS

Preliminary Analysis

Of the 628 adolescents, 33 had 1 item with a missing value. Cronbach's α scores calculated on subjects with no

Table I. Cronbach's α, Mean, and Standard Deviation of the UPPS Scales in Girls, Boys, and the Whole Sample

Scale	No. of items	α	Mean	SD
Urgency	12			
Girls		0.83	30.49	6.51
Boys		0.79	28.74	5.91
All		0.81	29.61	6.27
Lack of premeditation	11			
Girls		0.84	24.08	5.31
Boys		0.80	24.49	5.08
All		0.82	24.29	5.20
Lack of perseverance	10			
Girls		0.83	20.67	5.04
Boys		0.83	20.67	5.02
All		0.83	20.67	5.02
Sensation seeking	12			
Girls		0.83	32.22	7.23
Boys		0.81	37.01	6.47
All		0.84	34.61	7.26

Table II. Fit Indices of the Confirmatory Factor Analyses in Girls, Boys, and the Whole Sample

Sample	χ^2	df	SRMR	RMSEA	CFI
Girls	1751.53***	937	0.077	0.053	0.93
Boys	1843.70***	937	0.076	0.055	0.90
All	2377.82***	937	0.068	0.051	0.93

*** $p < 0.001$.

missing values were greater than 0.80 for all UPPS scales. To allow exploratory and confirmatory factor analysis on all 628 students, missing values were replaced by the mean obtained by the subject on the dimension of impulsivity to which the missing value belonged. This imputation method is reasonable when a scale has an α greater than 0.70 (Schafer and Graham, 2002, p. 158).

Analysis for Girls

Separate analyses were then conducted for girls and boys. For girls, the internal reliability of each UPPS scale was very good, with Cronbach's α greater than 0.80 (Table I). A MAP test (O'Connor, 2000; Velicer, 1976) recommended extracting 4 factors. A factor analysis was then computed with 4 factors subjected to an oblimin rotation to allow correlations among factors. The sums of the squared loadings were 4.18, 3.96, 3.90, and 3.84 for factors 1, 2, 3, and 4. The 4-factor solution explained 35.3% of the variance, with each factor accounting for a comparable amount of variance (9.3, 8.8, 8.7, and 8.5%, respectively). The maximum loading of each item was found on the predicted factor, except for item 38. Sensation seeking items loaded more on Factor 1, Urgency items more on Factor 2, Perseverance items more on Factor 3, and Premeditation items more on Factor 4. However, item 38 loaded on Urgency rather than on Perseverance.[3] For

concision, loadings will only be reported for the whole sample analysis.

The 45 items of the UPPS Scale were then submitted to a confirmatory factor analysis. To define a model with 4 related dimensions of impulsivity, the 4 latent variables were allowed to correlate. The chi-square statistic was significant, $\chi^2(939) = 1834.17$, $p < 0.001$. The maximum modification indices for Theta-Delta (covariance between errors on observed variables) were found between items 1 and 31 and between items 15 and 42. We let the 2 pairs of errors covariate because items 1 and 31 were very similar[4] and items 15 and 42 both referred to water sports.[5] The chi-square of the modified model was significant, $\chi^2(937) = 1751.53$, $p < 0.001$, and had a better fit than the previous one, $\Delta\chi^2(2) = 82.64$, $p < 0001$. For the other fit indices, we obtained an SRMR = 0.077 and an RMSEA = 0.053. Their combination indicated a good fit. The CFI = 0.93 was also satisfying (Table II). Thus the 4-factor model of impulsivity was confirmed in girls.

Analysis for Boys

The internal reliability of each UPPS scale was good to very good, with Cronbach's α close to 0.80 (Table I). A MAP test (O'Connor, 2000; Velicer, 1976) recommended extracting 4 factors. A factor analysis was then computed with 4 factors subjected to an oblimin rotation. The sums of the squared loadings were 3.90, 3.69, 3.36, and 3.27 for factors 1, 2, 3, and 4. The 4-factor solution explained 31.6% of the variance, with each factor accounting for a comparable amount of variance (8.7, 8.2, 7.5, and 7.3%, respectively). The maximum loading of each item was found on the predicted factor, except for items 1 and 6. Sensation seeking items loaded more on Factor 1, Perseverance items more on Factor 2, Premeditation items more on Factor 3, and Urgency items more on Factor 4. However, item 1 loaded on Sensation seeking rather than on

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[3]Item 38 of the original English UPPS scale is "There are so many little jobs that need to be done that I sometimes just ignore them all."

[4]Item 1 is "I have a reserved and cautious attitude toward life" and item 31 is "I am a cautious person."

[5]Item 15 is "I would enjoy water skiing" and item 42 is "I would like to go scuba diving."

Table III. Pearson's Point-Biserial Correlations (r_{pb}) Between Gender and the UPPS Scales (95% Confidence Interval)

Scale	r_{pb}	df	t	p	Lower	Upper
Urgency	−0.14***	626	−3.53	<0.001	−0.22	−0.06
Lack of premeditation	0.04	626	0.97	0.33	−0.04	0.12
Lack of perseverance	0.00	626	0.01	0.99	−0.08	0.08
Sensation seeking	0.33***	626	8.75	<0.001	0.26	0.40

Note. A positive correlation indicates a higher value for boys.
$^* p < 0.05$; $^{**} p < 0.01$; $^{***} p < 0.001$.

Premeditation, and item 6 loaded on Perseverance rather than on Urgency.[6]

To define a model with 4 related dimensions of impulsivity, the 4 latent variables were allowed to correlate. The chi-square statistic was significant, $\chi^2(939) = 1903.71$, $p < 0.001$. The maximum modification indices for Theta-Delta (covariance between errors on observed variables) were found again between items 1 and 31 and between items 15 and 42 and we let the 2 pairs of errors covariate. The chi-square of the modified model was significant, $\chi^2(937) = 1843.70$, $p < 0.001$, and had a better fit than the previous one, $\Delta\chi^2(2) = 60.01$, $p < 0.001$. For the other fit indices, we obtained an SRMR = 0.076 and an RMSEA = 0.055. Their combination indicated a good fit. The CFI = 0.90 was also satisfying (Table II). Thus the 4-factor model of impulsivity was also confirmed in boys.

Gender Comparison

To further analyze possible gender differences, we computed a 2-sample model with no constraints concerning the equality of parameters between boys and girls. The global chi-square was significant, $\chi^2(1874) = 3595.22$, $p < 0.001$. We then added a constraint on the equality of loadings between boys and girls. The global chi-square was significant, $\chi^2(1915) = 3644.88$, $p < 0.001$. The chi-square increase, $\Delta\chi^2(41) = 49.66$, was not significant, $p = 0.17$. This suggests that the loadings for boys and girls are comparable (equivalence of the measurement model). We next added a constraint on the equality of the variance and the covariance of the 4 latent variables. The global $\chi^2(1925) = 3657.25$ was significant, $p < 0.001$. The chi-square increase was not significant, $\Delta\chi^2(10) = 12.36$, $p = 0.26$. This indicates that covariances between latent variables are equivalent between boys and girls (equivalence of the latent model structure).

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[6]Item 6 is "I have trouble resisting my cravings (for food, cigarettes, etc.)."

Comparison of means (reported in Table I) suggested that girls had a higher score for Urgency ($M = 30.49$, SD = 6.51) compared to boys ($M = 28.74$, SD = 5.91), whereas boys had a higher score for Sensation seeking ($M = 37.01$, SD = 6.47) compared to girls ($M = 32.22$, SD = 7.23). Based on point biserial correlations, the effect size for Urgency was small, $r_{pb} = -0.14$, and significant, $p < 0.001$. The effect size for Sensation seeking was moderate, $r_{pb} = 0.33$, and significant, $p < 0.001$ (Table III).

Full Sample

Because the 4-factor model was accepted for both boys and girls, their data were collapsed. The Pearson correlations between score on each UPPS scale and age indicate no significant results. Cronbach's α was 0.81 for Urgency, 0.82 for Premeditation, 0.83 for Perseverance, and 0.84 for Sensation seeking (Table I). These values correspond to a very good internal reliability. A MAP test (O'Connor, 2000; Velicer, 1976) recommended extracting 4 factors. A factor analysis was then computed with 4 factors subjected to an oblimin rotation. The sums of the squared loadings were 4.28, 3.71, 3.62, and 3.52 for factors 1, 2, 3, and 4. The 4-factor solution explained 33.6% of the variance, with each factor accounting for a comparable amount of variance (9.5, 8.3, 8.0, and 7.8%, respectively). The maximum loading of each item was found on the predicted factor. Sensation seeking items loaded more on Factor 1, Perseverance items more on Factor 2, Urgency items more on Factor 3, and Premeditation items more on Factor 4 (Table IV). Values equal to or greater than 0.3 are usually interpreted as high loadings. The maximum loading of each item was greater than 0.30, except for items 6, 10, and 38. A loading equal to or greater than 0.3 was also found on a second factor for items 1 and 31 (see highlighted values, Table IV).

To define a model with 4 related dimensions of impulsivity, the 4 latent variables were allowed to correlate. The chi-square statistic was significant, $\chi^2(939) =$

2522.30, $p < 0.001$. The maximum modification indices for Theta-Delta (covariance between errors on observed variables) were found again between items 1 and 31 and between items 15 and 42, and we let the 2 pairs of errors covariate. The chi-square of the modified model

Table IV. Loadings of the Exploratory Factor Analysis (Whole Sample)

Scale/item	Factor 1	Factor 2	Factor 3	Factor 4
Urgency				
2	0.18	−0.05	*0.42*	0.17
6	0.11	0.22	0.29	0.06
10	0.17	0.05	0.24	−0.07
14	0.09	0.02	*0.59*	−0.01
18	−0.01	0.02	*0.44*	−0.10
24	−0.03	−0.14	*0.64*	.21
28	−0.12	0.01	*0.63*	−0.12
32	0.05	−0.12	*0.48*	0.06
36	−0.03	0.03	*0.68*	0.10
41	−0.04	−0.02	*0.70*	−0.07
43	−0.14	0.00	*0.31*	0.19
45	0.03	−0.07	*0.66*	−0.02
Lack of premeditation				
1	*0.30*	−0.04	−0.11	*0.39*
5	−0.06	0.12	0.01	*0.56*
9	−0.08	−0.11	0.03	*0.54*
13	0.01	−0.02	0.08	*0.61*
17	0.03	0.14	−0.12	*0.37*
23	−0.07	0.08	0.04	*0.42*
27	0.00	0.01	0.03	*0.66*
31	*0.33*	0.01	−0.04	*0.44*
35	0.00	0.03	0.03	*0.49*
39	−0.05	−0.07	0.04	*0.76*
40	−0.04	0.00	−0.02	*0.60*
Lack of perseverance				
4	−0.08	*0.65*	0.01	0.00
8	−0.04	*0.60*	0.13	−0.13
12	0.03	*0.61*	−0.07	0.05
16	−0.06	*0.57*	−0.21	0.07
20	−0.01	*0.40*	0.10	0.05
22	0.02	*0.74*	−0.03	−0.01
26	0.08	*0.43*	−0.04	0.17
30	0.04	*0.74*	−0.02	−0.03
34	0.04	*0.69*	−0.07	−0.02
38	0.09	0.28	0.27	−0.09
Sensation seeking				
3	*0.66*	−0.05	0.02	−0.01
7	*0.41*	0.06	0.08	−0.01
11	*0.36*	−0.21	−0.04	−0.04
15	*0.46*	−0.06	0.00	0.00
19	*0.73*	0.04	0.02	0.03
21	*0.66*	−0.02	−0.14	0.00
25	*0.64*	0.04	0.09	−0.06
29	*0.49*	−0.04	−0.12	0.02
33	*0.71*	0.00	0.03	−0.03
37	*0.61*	0.00	−0.09	−0.01
42	*0.45*	−0.05	0.03	−0.04
44	*0.53*	0.17	0.01	−0.13

Note. Values greater than 0.30 are in italics.

Table V. Correlation Between Latent Variables (Whole Sample)

Latent variable	1.	2.	3.	4.
1. Urgency	—			
2. Lack of premeditation	0.34***	—		
3. Lack of perseverance	0.25***	0.53***	—	
4. Sensation seeking	0.15***	0.25***	0.02	—

$^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

was significant, $\chi^2(937) = 2377.82$, $p < 0.001$, and had a better fit than the previous one, $\Delta\chi^2(2) = 144.48$, $p < 0.001$. For the other fit indices, we obtained an SRMR $= 0.068$ and an RMSEA $= 0.051$. Their combination indicated a good fit. The CFI $= 0.93$ was satisfying (Table II). The 4-factor model of impulsivity was thus accepted for the whole sample. With the exception of the relationship between lack of Perseverance and Sensation seeking, correlations between the latent variables were significant, $p < 0.001$, with values corresponding to small or moderate effect size (see Table V).

To define a model with only 1 dimension of impulsivity, the intercorrelations between the 4 latent variables were set at 1 and their variances made equal to each other. The chi-square was significant, $\chi^2(946) = 3077.13$, $p < 0.001$. To define a model with 4 independent dimensions of impulsivity, a model with 4 uncorrelated latent variables was tested. The chi-square was significant, $\chi^2(943) = 2616.17$, $p < 0.001$. The model with 4 related dimensions of impulsivity was better than the model with only 1 dimension, $\Delta\chi^2(9) = 699.31$, $p < 0.001$; it was also better than the one with 4 independent dimensions, $\Delta\chi^2(6) = 238.35$, $p < 0.001$.

DISCUSSION AND CONCLUSION

Impulsivity is central to adolescent psychopathology but it is not a unitary personality trait. Combining items from the main impulsivity scales found in the literature with items from the NEO-PI-R questionnaire, Whiteside and Lynam (2001) developed the UPPS Impulsive Behavior Scale to assesses 4 dimensions of impulsivity: Urgency, lack of Premeditation, lack of Perseverance, and Sensation seeking. This 4-dimensional model was developed on an English-speaking sample of undergraduates (Whiteside and Lynam, 2001), and confirmed in a French-speaking sample of undergraduates after translation of the scale (Van der Linden *et al.*, 2005); the aim of this study was to confirm it in a community sample of adolescents.

Exploratory factor analysis of the answers from this sample suggests that a 4-factor solution applies to girls as well as to boys. Confirmatory factor analysis indicates that the UPPS model of impulsivity is accepted for both groups. Moreover, item loadings (measurement model) and relationships between latent variables (latent model) are equivalent for boys and girls. For the sample as a whole, it appears that the 4 UPPS scales have a very good internal reliability. Exploratory and confirmatory factor analysis again yielded a 4-factor solution. A model with 4 related dimensions of impulsivity is significantly better than a model with only 1 dimension or a model with 4 independent dimensions. Thus, the UPPS Impulsive Behavior Scale is able to measure 4 distinct personality traits associated with impulsive behavior in adolescence.

Given that adolescents differ from adults in many aspects of their psychology, the similarity found between the confirmatory factor analysis conducted in adulthood (Van der Linden *et al*., 2005) and in adolescence is interesting and suggests that the UPPS Scale reflects a relatively stable personality organization. The correlations between age and score on each dimension of the UPPS Scale were negligible, suggesting that the level of impulsivity within this organization is also stable throughout adolescence. However, longitudinal studies are needed to test the model's invariance across age more directly. It should be noted that the concurrent and predictive validity of the UPPS Scale was not tested in this study. From this perspective, we suggest using the UPPS Scale in conjunction with well-known, validated personality questionnaires. Another suggestion is to use cognitive tasks along with the UPPS Scale in order to better understand the mental processes underlying the various dimensions of impulsivity.

Although further validation is clearly needed, the UPPS Scale already offers the opportunity to see which dimension of impulsivity is most predictive of a given type of affective or cognitive disturbance. For instance, we may suppose that the first dimension of the UPPS Scale, i.e., Urgency, may be associated with emotion-regulation difficulties and risk of depression or anxiety in adolescence (Kraaij *et al*., 2003). If this hypothesis is correct, the higher level of Urgency for girls found in the present study could partly explain why internalized problems are more frequent in adolescent girls (Bongers *et al*., 2003).

The second dimension of the UPPS Scale, i.e., lack of Premeditation, may foster antisocial actions. For instance, we recently showed that aggressive behavior, as assessed by teachers at school, is first predicted by the adolescent's lack of Premeditation (d'Acremont and Van der Linden, 2004). However, aggressive behavior motivated by anger may also be related to Urgency (for a discussion in adulthood, see Miller *et al*., 2003).

The third dimension of the UPPS Scale, i.e., lack of Perseverance, could be involved in inattention or hyperactivity disorder. From this perspective, we found that hyperactivity or inattention, assessed by teachers at school, was first predicted by the UPPS lack of Perseverance factor (d'Acremont and Van der Linden, 2004).

Finally, the 4th dimension, i.e., Sensation seeking, could be related to risk-taking. In favor of this hypothesis, sensation-seeking is predictive of positive risk-taking, e.g., playing sports, and also of negative risk-taking, e.g., dangerous driving (Hansen and Breivik, 2001). With regard to gender differences, the higher level of Sensation-seeking for boys expected on the basis of previous studies (Eysenck *et al*., 1984; Saklofske and Eysenck, 1983) and replicated in the present study could partly explain the fact that adolescent boys take more risks and are more frequently victims of accidents than girls (Choquet *et al*., 1997). Thus the relationships between problematic behavior and impulsivity could advantageously be explored by using the UPPS Scale.

In conclusion, the UPPS Impulsive Behavior Scale was found to have good psychometric proprieties when completed by French-speaking adolescents. It is well established that impulsivity plays a significant role in psychological distress and conduct disorders during adolescence. In this context, the ability of the UPPS Impulsive Behavior Scale to distinguish among several aspects of impulsivity should encourage both clinicians and researchers to use it.

APPENDIX

Instruction and items in the French Version of the UPPS Impulsive Behavior Scale (original English items can be found in Whiteside and Lynam, 2001, pp. 682–683). Answers to items with an "R" were reversed.

Instruction

Vous trouverez ci-dessous un certain nombre d'énoncés décrivant des manières de se comporter ou de penser. Pour chaque affirmation, veuillez indiquer à quel degré vous êtes d'accord ou non avec l'énoncé. Si vous êtes **Tout à fait en désaccord** avec l'affirmation encerclez le chiffre **1**, si vous êtes **Plutôt en désaccord** encerclez le chiffre **2**, si vous êtes **Plutôt d'accord** encerclez le chiffre **3**, et si vous êtes **Tout à fait d'accord** encerclez le chiffre **4**. Assurez-vous que vous avez indiqué votre accord ou désaccord pour chaque énoncé ci-dessous. Il y a encore d'autres énoncés sur la page suivante.

Urgency

2. J'ai des difficultés à contrôler mes impulsions.

6. J'ai des difficultés à résister à mes envies (pour la nourriture, les cigarettes, etc.).

10. Je m'implique souvent dans des situations dont j'aimerais pouvoir me sortir par la suite.

14. Quand je ne me sens pas bien, je fais souvent des choses que je regrette ensuite, afin de me sentir mieux tout de suite.

18. Parfois quand je ne me sens pas bien, je ne parviens pas à arrêter ce que je suis en train de faire même si cela me fait me sentir plus mal.

24. Quand je suis contrarié(e), j'agis souvent sans réfléchir.

28. Quand je me sens rejeté(e), je dis souvent des choses que je regrette ensuite.

32. C'est difficile pour moi de me retenir d'agir selon mes sentiments.

36. J'aggrave souvent les choses parce que j'agis sans réfléchir quand je suis contrarié(e).

41. Quand la discussion s'échauffe, je dis souvent des choses que je regrette ensuite.

43. Je suis toujours capable de maîtriser mes émotions. (R)

45. Parfois je fais des choses sur un coup de tête que je regrette par la suite.

Lack of Premeditation

1. J'ai une attitude réservée et prudente dans la vie. (R)

5. Ma manière de penser est d'habitude réfléchie et méticuleuse. (R)

9. Je ne suis pas de ces gens qui parlent sans réfléchir. (R)

13. Je préfère m'interrompre et réfléchir avant d'agir. (R)

17. Je n'aime pas commencer un projet avant de savoir exactement comment procéder. (R)

23. J'ai tendance à valoriser et à suivre une approche rationnelle et "sensée" des choses. (R)

27. D'habitude je me décide après un raisonnement bien mûri. (R)

31. Je suis une personne prudente. (R)

35. Avant de m'impliquer dans une nouvelle situation, je préfère savoir ce que je dois en attendre. (R)

39. D'habitude je réfléchis soigneusement avant de faire quoi que ce soit. (R)

40. Avant de me décider, je considère tous les avantages et inconvénients. (R)

Lack of Perseverance

4. Je préfère généralement mener les choses jusqu'au bout. (R)

8. J'ai tendance à abandonner facilement.

12. Je n'aime vraiment pas les tâches inachevées. (R)

16. Une fois que je commence quelque chose je déteste m'interrompre. (R)

20. Je me concentre facilement. (R)

22. J'achève ce que je commence. (R)

26. Je m'organise de façon à ce que les choses soient faites à temps. (R)

30. Je suis une personne productive qui termine toujours son travail. (R)

34. Une fois que je commence un projet, je le termine presque toujours. (R)

38. Il y a tant de petites tâches qui doivent être faites que parfois je les ignore simplement toutes.

Sensation Seeking

3. Je recherche généralement des expériences et sensations nouvelles et excitantes.

7. J'essayerais tout.

11. J'aime les sports et les jeux dans lesquels on doit choisir son prochain mouvement très rapidement.

15. Ça me plairait de faire du ski nautique.

19. J'éprouve du plaisir à prendre des risques.

21. J'aimerais faire du saut en parachute.

25. Je me réjouis des expériences et sensations nouvelles même si elles sont un peu effrayantes et non-conformistes.

29. J'aimerais apprendre à conduire un avion.

33. J'aime parfois faire des choses qui sont un petit peu effrayantes.

37. J'aimerais la sensation de skier très vite sur des pentes raides.

42. J'aimerais aller faire de la plongée sous-marine.

44. J'aimerais conduire vite.

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