Abstract

OBJECTIVES: Impulsivity is a construct that is strongly associated with Gambling Disorder (GD). The main objectives in the present study were: 1) to explore the role of sex and age on impulsivity levels in GD patients; 2) to identify the relationship of the different impulsivity facets with comorbid psychopathology and other personality traits in GD patients; and (3) to assess whether impulsivity is a predictor for the severity of GD. **METHOD:** The final sample consisted of 406 consecutive participants. All of them were seeking treatment for GD (88.4% male and 11.6% female) and completed the South Oaks Gambling Screen (SOGS), the UPPS-P Impulsive Behavior Scale, the Symptom Checklist (SCL-90-R), the Temperament and Character Inventory-R (TCI-R) as well as other clinical and psychopathological measures. **RESULTS:** Results show a negative linear trend between age and lower sensation seeking levels as well as lack of premeditation (as high the age as low the UPPS-P scores), and a positive linear trend between age and positive urgency (UR) (as high the age as high the UPPS-P score). However, no sex differences were found for the assessed impulsivity dimensions. Lack of perseverance was positively associated with obsessive-compulsive symptom levels and harm avoidance trait, and negatively related to persistence and self-directedness traits. Positive and negative UR were positively correlated with general psychopathology and the total number of DSM-IV criteria, and negatively related to the personality traits self-directedness and cooperativeness. Finally, only the sensation seeking and negative UR of the UPPS-P showed predictive capacity on the severity of the disorder (as high the impulsivity scores as high the illness severity). **CONCLUSIONS:** These findings highlight the core association between impulsivity traits (measured by the UPPS-P) and GD in a consecutively recruited and large GD clinical sample, taking into account the variables sex and age.

Key words: gambling disorder, impulsivity, UPPS-P, sex, age, psychopathology

1. **Introduction**

Pathological gambling (PG), previously classified as an "impulse control disorder not elsewhere classified", has been renamed as Gambling Disorder (GD) and reclassified as a "substance-related and addictive disorder" in the fifth edition of the Diagnostic and Statistical Manual (DSM-5) (1). The basis of this change lies on the growing scientific evidence from neuroscience, genetics and experimental psychology studies that reveal common substantial elements between GD and substance use disorders (2–8). Still, the strong association between impulsivity and problematic gambling behavior has been widely studied and repeatedly reported as significant (9). Also, impulsivity has been described as a risk factor for GD (10–12)

Impulsivity is a complex construct with multi-dimensional characteristics and its definition has been difficult to ascertain (13) (14). At present, there are different theoretical and conceptual models of impulsivity that lead to different measurements. Among the different empirical approaches, the one purposed by Whiteside & Lynam (15) is of particular interest as it has substantially contributed to improve the assessment of impulsivity through the structural Five Factor Model of personality. Noteworthy, Whiteside & Lynam (15) created and validated the widely known UPPS Impulsive Behavior Scale with 4 different sub-scales designed to measure impulsivity across the dimensions of the Five Factor Model of personality: Urgency (UR), Lack of Perseverance, Lack of Premeditation and Sensation Seeking. Later, the UR dimension was further described and divided into two different personality traits that refer to the emotion-based dispositions to engage in rash actions: positive UR and negative UR (16). The former refers to the tendency to engage in rash action in response to extreme positive emotions; thus impulsivity is associated with positive emotions and immediate positive reinforcement (17,18). Negative UR prompts impulsive actions due to the experience of negative emotional states, such as depression, boredom, and stress. In this case, impulsivity is associated with negative emotions and negative reinforcement (avoidance behavior or relief seeking) (19–22). Accordingly, the UPPS-P Impulsive Behavior Scale (16) assesses the five described personality dimensions for impulsive behaviors (23)

observed in different addictive disorders or impulsive related disorders such as: eating disorders (24), substance use disorders (25), non-suicidal self-injury (26) among others. In fact, the UPPS-P has been proven as one of the most valid and appropriate impulsivity measures.

During the last decade, several studies have concluded that the UR construct is a key component of risky behaviors (27,28), including problematic gambling behavior (20,29). For instance, Whiteside et al. (30) studied a sample of patients with GD, borderline personality disorder, alcohol abusers and healthy controls; according to their results UR was both a predictor of GD as well as the most constant one across all the dimensions (low premeditation, low perseverance and sensation seeking). Furthermore, Cyders & Smith (31) reported a cross-sectional study where higher scores in positive UR predicted increased risk of long term gambling behavior in a sample of university students. Negative UR on the other hand, has been linked to the urge to consume tobacco (27) as well as to binge-eating/purging symptoms in eating disorders (24,32).

Three studies have been conducted with UPPS-P so far and GD in clinical samples (29,33,34). Billieux et al. (33) described how GD individuals presented higher UR and lack of premeditation when compared to control individuals. Also, Michalczuk et al. (29) reported that UR dimensions (i.e.: negative and positive UR) were strongly associated with gambling behaviors. Besides, differences were also found between GD participants and controls in all the other impulsivity dimensions with the exception of sensation seeking. According to Michalczuk et al. (29), sensation seeking would be associated with enhancing the gambling onset or the preference of gambling behavior but not with GD itself.

Thus, UR appears to be the impulsivity dimension most highly associated with emotion regulation in GD, with gambling behavior being a maladaptive mechanism for regulating positive (e.g.: euphoria, empowerment) and negative emotions (e.g.: stress, boredom or sadness) (35–37)). Finally, Grall-Bronnec et al. (38) reported a positive association between UR and GD severity as well as a strong association between impulsivity and psychopathology (e.g.: mood disorders, risk of suicide, alcohol use disorder and ADHD).

In spite of impulsivity being a well studied construct in GD samples with and without the UPPS-P measure (29,33,34), to our knowledge no previous studies have been conducted so far exploring impulsivity in a consecutively recruited and large GD clinical sample.

The main goal of the present study was threefold: 1) to explore the role of sex and age on impulsivity in GD patients; 2) to identify the relationship of the different impulsivity facets with comorbid psychopathology and other personality traits in GD patients and (3) to assess whether impulsivity is a predictor for the severity of GD.

2. Methods

2.1 Sample

Sample consisted of 406 GD individuals (359 male, 88.4%) with a mean age of 41.2 years old (SD=13.0). All of them were outpatient consecutive referrals for the assessment and treatment of GD at a Gambling Disorder Unit in the Department of Psychiatry of the University Hospital of Bellvitge, in Barcelona (Spain). Sample recruitment was conducted from March 2012 to November 2013. Many participants had primary (50.5%) or secondary (38.5%) education and 53.3% were unemployed. Civil status was distributed as follows: 48.4% married, 16.6% divorced and 35.0% single. All participants were diagnosed with the Diagnostic Questionnaire for Gambling Disorder according to DSM-IV criteria (5). Diagnoses were made by expert psychologists and psychiatrists, who have more than 15 years of clinical experience in the GD field.

2.2 Measures

South Oaks Gambling Screen (SOGS) (39) on its Spanish validation (40). This screening self-report questionnaire contains 20 items that identify probable GD, problematic gambling and non-problematic gambling. The total score ranges from 0 to 20; scores over 4 are indicative of GD. The Spanish validation of this questionnaire shows adequate psychometric properties (test-retest reliability, 0.98; internal consistency, 0.94; and convergent validity, 0.92).

Temperament and Character Inventory-Revised (TCI-R), Spanish validation by Gutiérrez-Zotes et al. (41). This is a 240-item questionnaire with a five-point Likert scale format that measures four temperament (Harm Avoidance, Novelty Seeking, Reward Dependence and Persistence) and three character dimensions (Self-Directedness, Cooperativeness and Self-Transcendence) of personality. The Spanish version has shown acceptable reliability of the seven dimensions (ranged between 0.77 and 0.84).

Symptom Check List–90 items-Revised (SCL-90-R)(42)*,* Spanish validation by Martínez-Azumendi, Fernández-Gómez & Beitia-Fernández(43). This multidimensional self-report questionnaire includes 90 items with a five point scale format and evaluates nine primary symptom dimensions: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. It also includes three global indices: a global severity index (GSI), for measuring overall psychological distress; a positive symptom distress index (PSDI) for measuring symptom severity; and a positive symptom total (PST), which records the total self-reported symptoms. This questionnaire has been validated in a Spanish population, obtaining adequate internal consistency of the items (ranging between .81 and .90) and an acceptable mean internal consistency of 0.75.

UPPS-P Impulsive Behavior Scale (44). This instrument is a 59-item Likert-type self-report scale, assessing five subscales: positive UR, negative UR, premeditation, perseverance and sensation seeking. Items are assessed on a four-point scale, ranging from 1 (agree strongly) to 4 (disagree strongly). The UPPS-P has satisfactory psychometric properties in terms of both convergent and discriminant validity (21)(45)(20) . In our study we used the Spanish Version of the questionnaire as it has been adapted by Verdejo-Garcia et al.(23).

2.3 Procedure

This study was carried out in accordance with the latest version of the Declaration of Helsinki. The Ethics Committee of the hospital approved the study and all participants gave their written informed consent. The assessment was conducted prospectively at baseline in a single

session (with a mean duration of 90 min), during which the tests mentioned above were administered by trained clinical psychologists with long clinical experience in this disorder. In addition to the assessment battery, the patients were explored through a semi-structured face-to-face interview regarding their GD, psychopathological symptoms and personality traits (46). The same interview also assessed sociodemographic data (e.g., education, occupation, marital status) and additional clinical information.

2.4 Statistical analysis

The statistical analysis was carried out with Stata13 for windows. The contribution of patients' age and sex on the UPPS-impulsivity raw scores was analyzed with multiple regressions in two steps-blocks: first block included sex and age and second block added the interaction parameter sex by age. For significant interaction-terms ($p \leq .05$), the interaction parameter was retained into the model and single-effects were estimated. For non-significant interaction-terms ($p > .05$), the moderator parameter was excluded and the first block with the main effects were estimated and interpreted.

The associations between UPPS-impulsivity scores and clinical symptoms, TCI-R personality traits and features of GD were calculated by means of partial correlation coefficients adjusted by the covariates sex and age. Due to the large effect size and the correspondent high statistical power, non-relevant coefficients tended to achieve statistical significance. So, only values with good effect size ($|r| > .30$) were interpreted as relevant.

The predictive validity of impulsivity facets on the severity of the GD (SOGS-total and DSM4-total score) was explored with multiple regression models in two blocks-steps: the first block-step included the covariates sex and age and the second block-step added the UPPS-P facet scale raw scores. In this modeling, for non-significant interaction-terms ($p > .05$), the moderator parameter was excluded and the first block with the main effects were estimated and interpreted. For significant interaction-terms ($p \leq .05$), the interaction parameter was retained into the model and single-effects were estimated.

3. Results

3.1 Impulsivity levels in GD patients

Table 1 shows the distribution of the UPPS-impulsivity scores for the sample. No statistical differences emerged based on participants' sex. Based on the groups of age, a negative linear trend was obtained for the lack of premeditation and sensation seeking scores (the higher the age the lower the impulsivity level) and a positive linear trend was obtained for the positive UR score (means tended to increase in this scale according to the patients' age) (Figure 1).

Table 2 shows the results of the multiple regression models valuing the specific contribution of sex and age (measured in years) on the UPPS-impulsivity scores. No interaction sex-by-age parameter achieved significant result, indicating that the potential effect of age and sex was independent. So the main effects obtained in the first block of regressions were interpreted. Entered simultaneously, sex did not contribute on the impulsivity values but age was a significant predictor of lack of premeditation and sensation seeking (older patients obtained lower scores in these two impulsivity scales).

3.2 Association between impulsivity levels and clinical variables

Table 3 shows the results of the partial correlations adjusted by sex and age, measuring the association between UPPS-impulsivity scores and psychopathological variables related to GD. Lack of premeditation was positively correlated with novelty seeking personality trait. Lack of perseverance obtained positive correlation with obsessive-compulsive symptom levels and harm avoidance trait, and negative correlation with persistence and self-directedness traits. Positive UR positively correlated with psychopathological levels of obsessive-compulsive, paranoid ideation, psychotic ideation, GSI index and PST index, positively correlated with self-transcendence trait and it was negatively associated to self-directedness and cooperativeness. Negative UR levels were positively correlated with all the SCL-90 scales, harm avoidance trait and the total number of DSM-IV criteria, and it was negatively related with the personality traits self-directedness and cooperativeness.

3.3 Predictive capacity of impulsivity levels on the severity of GD

Table 4 shows the results of the multiple regressions, adjusted by participants' sex and age, measuring the contribution of the UPPS-P impulsivity scores on the GD severity (SOGS-total score and the total number of DSM-IV criteria for GD). The specific contribution of the UPPS scores on the SOGS-total score was $\Delta R^2=.12$, but only the sensation seeking scale was a significant predictor in the final model (as high the sensation seeking as high the SOGS-total). The contribution of UPPS-P scores on the total number of DSM-IV criteria for GD was $\Delta R^2=.14$, and for this outcome the only significant impulsivity scale was negative UR (positive association: as high the negative UR score as high the number of DSM-IV criteria).

4. Discussion

The present study reaches its objectives on expanding previous knowledge regarding the association between GD and impulsivity (measured by means of the UPPS-P). Specifically, it reports no sex differences in impulsivity among individuals suffering from GD and provides significant information about the role that psychopathology and personality traits play in impulsivity among the studied sample.

Accordingly, previous studies have also found that high impulsivity is associated with GD regardless of sex (12,47,48,49), sugiriendo que el rasgo impulsividad es un factor de riesgo para el desarrollo y mantenimiento de una conducta de juego problemática, tal y como demuestran diversos studios (Fattore et al., 2014; Goudriaan, Yücel & Van Holst, 2014; Leeman & Potenza, 2012; Pagani et al., 2009), independientemente del sexo.

Also, our results displayed a positive association between age, sensation seeking as well as lack of premeditation and positive UR in the UPPS-P, being the first one the impulsivity facet which is most influenced by age. Thus, results show how the older the individual the lower the sensation seeking and the lower the lack of premeditation and the higher positive UR, in agreement

with several previous studies (Alvarez-Moya et al 2007; Granero, Penelo et al., 2014; Kelly, Schochet & Landry 2004; Sauvaget et al., 2015; Steinberg et al. 2008), que informan de una estrecha relación entre estas variables. It is important to mention that individuals with high lack of premeditation levels tend to ignore the advantages and disadvantages of a situation and present more impulsive behaviors despite the consequences. In this line, studies implementing delay discounting tasks report that low premeditation is linked with certain cognitive mechanisms; specifically, GD individuals present more choices based on short-term criteria (50–53) and oriented to highly rewarding activities (Ochoa et al., 2013), tal y como se observa en las elevaciones de la escala positive UR, comúnmente asociada a high-risk and sensation seeking behavior (Berg et al. 2015).

Regarding the exploration of the link between impulsivity, comorbid psychopathology and personality in GD individuals, results show a range of significant associations. Specifically, the lack of premeditation was positive associate with novelty seeking personality trait, while the lack of perseverance was related with high levels of emotional distress and high harm avoidance, as well as with low persistence and self-directedness. Overall, individuals with low premeditation muestran déficits para pensar o anticiparse a las consecuencias de sus actos, mientras que lack of perseverance se ha relacionado con un sentido de la responsabilidad reducido, tendencia a tomar decisiones arriesgadas y desadaptativas (Berg et al., 2015), así como dificultades para manejar la frustración (54). Del mismo modo, the results of the present study are in agreement with those that demonstrated that GD patients are more likely to be unaware of the consequences of their actions because they highly need new sensations and experiences which make them being more focused on the immediate reward rather than in other long term goals (27,45,55,56, Goudriaan et al., 2014).

In addition, positive and negative UR were also both associated with global psychopathology, being negative UR the impulsivity facet which showed the largest effect size. Estos resultados corroboran las conclusiones del reciente studio meta-analítico de Berg et al. (2015), en cuanto a que esta dimensión es la que más estrechamente se relaciona con la presencia de

conductas impulsivas, además de coincidir con otros trabajos que evidencian que la UR es un predictor de juego problemático (22,30,33,28,58-60). Además, our data show that the GD severity is positively correlated with negative UR, in agreement with a previous research conducted with treatment-seekers at-risk and pathological gamblers (as in the present study), que obtuvo una asociación entre UR, impulsividad, psicopatología y severidad del GD (Grall-Bronnec, 2012). In the same line, other studies also demonstrated that impulsivity is a good predictor for GD severity and negative/positive UR. Noteworthy, previous reserach have also revealed that while high UR and low premeditation are predictors of problematic gambling consequences, sensation seeking could be a predictor of gambling frequency (20,21,45). Besides, Torres et al. (14), explored the impulsivity role in addiction by comparing a group of GD, another of cocaine dependent and a healthy control sample. Results showed that negative UR predicted gambling severity. Similar results were also reported by Michalczuk et al.(29), confirming the role of negative UR as a predictor of GD.

The major limitation of this study is its design, which by being cross sectional no causal effects can be obtained. Besides, GD patients were retrieved from a clinical setting and this can be a bias in itself as results might have been different if participants came from a non-treatment seeking population. Nonetheless, it is of utmost importance to study different samples and this research raises significant evidence of the associations between GD and impulsivity in clinical settings.

5.Conclusions

This study explores the association between impulsivity and GD and its findings are consistent with previous research on the field. No sex differences throughout the impulsive dimensions were confirmed. However, the age was negatively associated with impulsivity in patients with GD. Moreover, in our sample, several significant associations were found among impulsivity, personality traits and comorbid psychopathology. Mientras que múltiples estudios han explorado los resultados del UPPS-P en consumo de alcohol y otras sustancias, así como en otros trastornos, son escasas las investigaciones orientadas a analizar el comportamiento de esta escala y el GD y,

menos todavía, con amplias muestras clínicas. Según Berg et al. (2015), es difícil llegar a conclusiones sólidas sobre la relación del UPPS-P y el GD, por la limitación de las evidencias empíricas. Así, en su estudio meta-analítico about implications of the UPPS for psychopathology, solo pudieron incluir un trabajo con GD que hubiera utilizado el UPPS. Por ello, this study enhances the understanding of GD and adds to the current knowledge significant evidence of the association between las diferentes facetas de la impulsivity y la psicopatología, personalidad y severidad del trastorno en GD patients. Future studies exploring GD treatment should consider their impulsivity scores by means of UPPS-P (one of the most reliable impulsivity measures for the here studied population).

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Table 1. Distribution of impulsivity scores in the sample.

	Total sample n=406		Women n=47		Men n=359			Young age n=151		Middle age n=161		Old age n=94		Trends	
														LT	QT
	Mean	SD	Mean	SD	Mean	SD	p	Mean	SD	Mean	SD	Mean	SD	p	
Lack premeditation	24.34	6.47	25.62	6.61	24.17	6.45	.149	25.32	6.00	23.94	6.49	23.44	7.03	**.019**	.507
Lack perseveration	22.48	5.73	23.72	6.46	22.32	5.62	.113	22.66	5.80	22.25	5.48	22.59	6.06	.850	.531
Sensation seeking	26.94	8.29	25.55	9.35	27.13	8.14	.222	30.32	8.00	25.74	7.58	23.57	8.05	**<.001**	.135
Positive UR	32.46	10.61	35.28	9.98	32.09	10.64	.053	31.30	11.16	32.42	10.45	34.38	9.75	**.030**	.696
Negative UR	33.09	7.33	34.72	6.61	32.88	7.40	.105	32.97	7.25	33.18	7.86	33.15	6.56	.831	.876

SD: standard deviation. LT: linear trend. QT: quadratic trend. Age groups: 18-35=young, 35-50=middle, 50-80=old.

Bold: significant difference between groups (.05 level).

Table 2. Contribution of age (measured in years-old) and sex (0=female, 1=male) on the impulsivity levels: multiple regression.

	B	SE	Beta	t-stat	p	95% CI (B)	
Lack of premeditation							
Sex	-1.810	1.007	-.090	-1.797	.073	-3.790;	0.170
Age	-0.061	0.025	-.124	-2.479	**.014**	-0.110;	-0.013
[1]Sex by age	-0.045	0.074	-.123	-0.608	.544	-0.191;	0.101
R^2 = .020							
Lack of perseverance							
Sex	-1.485	0.897	-.083	-1.655	.099	-3.249;	0.279
Age	-0.013	0.022	-.030	-0.596	.551	-0.057;	0.030
[1]Sex by age	0.031	0.066	.097	0.476	.634	-0.098;	0.161
R^2 = .007							
Sensation seeking							
Sex	0.315	1.226	.012	0.257	.797	-2.095;	2.726
Age	-0.214	0.030	-.337	-7.099	**<.001**	-0.273;	-0.155
[1]Sex by age	-0.023	0.090	-.049	-0.255	.799	-0.200;	0.154
R^2 = .115							
Positive UR							
Sex	-2.804	1.654	-.085	-1.695	.091	-6.055;	0.447
Age	0.065	0.041	.080	1.608	.109	-0.015;	0.145
[1]Sex by age	0.139	0.121	.233	1.147	.252	-0.099;	0.378
R^2 = .016							
Negative UR							
Sex	-1.937	1.148	-.085	-1.687	.092	-4.194;	0.320
Age	-0.015	0.028	-.027	-0.547	.585	-0.071;	0.040
[1]Sex by age	0.120	0.084	.290	1.423	.156	-0.046;	0.285
R^2 = .007							

[1]Interaction term sex×age. Bold: significant parameter-coefficient (.05 level).

Table 3. Partial correlation, adjusted by sex and age, for impulsivity and GD outcomes.

	Lack premeditation	Lack perseveration	Sensation seeking	Positive UR	Negative UR
SCL-90: Somatization	.106	.147	-.049	.261	**.348**
SCL-90: Obsessive/compulsive	.162	**.407**	.001	**.300**	**.368**
SCL-90: Interpersonal sensitivity	.110	.277	-.061	.295	**.399**
SCL-90: Depressive	.159	.287	-.002	.240	**.363**
SCL-90: Anxiety	.119	.248	-.097	.295	**.393**
SCL-90: Hostility	.125	.182	.005	.246	**.312**
SCL-90: Phobic anxiety	.099	.258	-.099	.274	**.312**
SCL-90: Paranoid Ideation	.057	.140	.087	**.347**	**.380**
SCL-90: Psychotic	.110	.210	-.058	**.305**	**.367**
SCL-90: GSI score	.135	.280	-.040	**.314**	**.412**
SCL-90: PST score	.113	.241	.034	**.343**	**.456**
SCL-90: PSDI score	.148	.261	-.067	.243	**.338**
TCI-R: Novelty seeking	**.506**	.229	.160	.236	.259
TCI-R: Harm avoidance	.015	**.372**	-.216	.251	**.312**
TCI-R: Reward dependence	-.145	-.201	.145	-.050	-.105
TCI-R: Persistence	-.247	**-.483**	.271	.130	.115
TCI-R: Self-directedness	-.262	**-.392**	-.079	**-.457**	**-.503**
TCI-R: Cooperativeness	-.090	-.255	-.071	**-.330**	**-.313**
TCI-R: Self-Transcendence	-.164	-.132	.239	**.318**	.252
SOGS: total score	.118	.133	.149	.270	.248
DSM-IV: total criteria	.044	.110	.050	.286	**.322**
Age of onset	-.038	-.080	-.107	-.091	-.101
Use of tobacco	.008	.191	-.027	.087	.166
Alcohol abuse	.016	-.007	.087	.217	.185
Substances use	-.025	.031	.004	-.027	-.008
Maximum bets (euros)	.001	-.017	.000	-.083	-.087
Mean bets (euros)	.126	.025	.064	.076	.064
Cumulate debts (euros)	.045	.059	-.068	.039	-.034

Bold: good effect size ($|r|$>.30).

Table 4. Predictive capacity of impulsivity on the severity of GD (SOGS-total and DSM4-total-criteria): multiple regression adjusted by sex and age.

	B	SE	Beta	*t-stat*	*p*	95% CI (B)		ΔR²	*p*
Outcome: SOGS-total									
First block-step									
Sex	-0.081	0.601	-.007	-0.135	.893	-1.262	1.100	.008	.262
Age	-0.022	0.013	-.090	-1.634	.103	-0.048	0.004		
Second block-step									
Sex	0.363	0.574	.033	0.632	.528	-0.766	1.491	.115	**<.001**
Age	-0.011	0.014	-.045	-0.787	.432	-0.038	0.016		
Lack premeditation	0.025	0.032	.050	0.785	.433	-0.038	0.088		
Lack perseverance	0.047	0.037	.081	1.277	.202	-0.026	0.121		
Sensation seeking	0.047	0.023	.117	2.039	**.042**	0.002	0.092		
Positive UR	0.044	0.023	.142	1.918	.056	-0.001	0.090		
Negative UR	0.060	0.032	.136	1.853	.065	-0.004	0.124		
Outcome: total DSM-IV criteria									
First block-step									
Sex	-0.494	0.406	-.065	-1.215	.225	-1.293	0.305	.029	.006
Age	-0.029	0.009	-.167	-3.138	.002	-0.047	-0.011		
Second block-step									
Sex	-0.150	0.383	-.020	-0.392	.696	-0.904	0.604	.138	**<.001**
Age	-0.027	0.009	-.155	-2.848	.005	-0.045	-0.008		
Lack premeditation	-0.006	0.021	-.017	-0.274	.784	-0.048	0.036		
Lack perseverance	0.047	0.025	.117	1.882	.061	-0.002	0.096		
Sensation seeking	0.003	0.015	.011	0.194	.847	-0.027	0.033		
Positive UR	0.018	0.015	.081	1.144	.253	-0.013	0.048		
Negative UR	0.087	0.022	.278	3.966	**<.001**	0.044	0.130		

Bold: significant parameter-coefficient (.05 level).

Figure 1. UPPS-impulsivity levels in the groups of age.