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Authors: Vesna Tepšić Ostojić*, Danijela Ristić-Medić†, Tatjana Mraović‡, Zoran Bukumirić||, Nada Vasiljević¶, Milan Latas**; Vojnosanitetski pregled (2017); Online First December, 2017.

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PREDICTORS OF OBESITY TREATMENT OUTCOME
Abstract

Objective. Obesity is the chronic disease and health threatening condition. The number of obese people in the world has taken epidemic conditions. Medical nutritional therapy is the first choice in the treatment of obesity but it is also accompanied with a great percentage of attrition and a significant weight regain. The aim of our study was to evaluate if psychiatric and specific psychological factors (impulsivity) could be the predictors of successful weight loss.

Method. Study sample consisted of eighty four consecutive overweight/obesity women, 20 to 40 years old, who were willing to adhere to medical nutrition therapy. All participants received a personalized nutritional counseling and daily diet treatment with 20% caloric restriction from estimated daily energy requirement. At the beginning of the study 90-item Symptom Check-list (SCL-90) and 30-item Barratt Impulsiveness scale (BIS-11) were administrated. At the end of six months of caloric restriction conventional diet therapy and control weight measurement, patients were divided into two groups. 40 participants (48 %) lost ≥10% of their initial body weight (Successful) and 44 participants (52 %) lost <10% of their initial weight (Unsuccessful).

Results. There were no significant differences between both groups in demographic data (age, education level, employment, marital status), baseline anthropometric measurements and in general psychopathology total score. Successful and Unsuccessful groups were significantly different in the total BIS-11 score (p<0.001) and in Factor II (motor impulsivity) (p<0.05).

Conclusion. Even though successful and unsuccessful diet responded participants did not differ in general psychopathology and symptom dimensions, our results pointed out impulsivity as a discriminative factor between them. Total impulsivity and Factor II (motor impulsivity) as indicator of binge eating are higher in unsuccessful responded overweight/obese women on conventional diet treatment. Focus on impulsivity in psychotherapeutic work might lead to better outcomes in medical nutrition therapy.

Key words: obesity, medical nutrition therapy, general psychopathology, impulsivity
Sažetak

Metode: Studijom je obuhvaćeno ukupno 84 predgojaznih i gojaznih žena starosne dobi 20 do 40 godina, koje su motivisane za medicinsku nutritivnu terapiju. Sve ispitanice su prošle individualno savetovanje i dobile dnevni plan ishrane koji je podrazumijevalo kalorijsku restrikciju od 20 % u odnosu na procenjene dnevne energetske potrebe. Na početku studije primenjene su Lista simptoma od 90 pitanja (90-item Symptom Check-list) i Baratova skala impulsivnosti (Barratt Impulsiveness scale (BIS-11)). Nakon 6 meseci primene kalorijski restriktivnog načina ishrane ponovljena su antropometrijska merenja. Ispitanice su podeljene u dve grupe: 40 ispitanica (48 %) je izgubilo ≥ 10 % od početne telesne mase (Uspešne), a 44 ispitanice (52 %) su izgubile < 10 % od početne telesne mase (Neuspešne).

Rezultati. Nije bilo značajne razlike između grupa ispitanika u odnosu na demografske karakteristike (godine životra, stepen obrazovanja, zaposlenost, bračni status), antropometrijske parametre na početku studije, kao i na skor opšte psihopatologije i dimenzije simptoma. Statistički značajna razlika između Uspešnih i Neuspešnih predgojaznih/gojaznih ispitanica dobijena je za ukupni BIS-11 skor (p<0.001) i za Faktor II (motorna impulsivnost) (p<0.05).


Ključne reči: gojaznost, medicinska nutritivna terapija, opšta psihopatologija, impulsivnost

Introduction
Obesity is the chronic disease defined as excess body fat in the body (1). The basic pathophysiological mechanism of the accumulation of excess body fat is basically very simple - energy intake is higher than energy consumption (2). In the light of this fact, the solution to the problem of obesity seems relatively easy - to reduce the intake or increase the energy consumption. Even though the solution seems logical and easily feasible the number of obese people in the world has taken epidemic conditions; 35 % of the adult population is overweight, while 12 % obese is considered as a “global pandemic” (3). About 35 % of the adult population in Serbia is overweight and 21 % are obese, while in self-evaluation only 16.9 % of the population consider themselves as obese persons (4).

Obesity is the health threatening condition. Empiric and scientific data confirmed its clear association with plethora of medical conditions (metabolic syndrome, type 2 diabetes, ischemic heart disease, stroke, inflammation, apnea, certain carcinoma etc.) (1,5,6,7) and decreased quality of life (8,9). If a current trend of increased morbidity and mortality due to obesity continues life expectancy in the future could decrease for the first time in modern history (10). However, it is important to point out that there is the evidence that people with obesity are confronted with structural discrimination in their everyday life (11).

Even though obesity is considered to be interplay of genes and environment (12) research focus has been moving from metabolism, resting metabolic rate and energy expenditure. A recent research points out that environmental variables are of greater importance in determining eating behavior than biological (13, 14).

In contemporary culture a person’s physical appearance exceeds the importance of aesthetic liking and becomes one of the main social markers of success or stigma. On the opposite social pole there is extremely obesogenic environment with aggressively marketed cheap calories that are not only easy-to-get but also highly palatable and rewarding (saturated in fat, sugars and/or salt) (14) Hedonic eating is promoted versus physiologic and physical activity is discouraged by modern technology (cars, smart phones...). But not everyone becomes obese despite the environmental temptations. The answer may be in the individual differences. Someone’s reaction to the environmental conditions could be influenced by psychiatric conditions such as anxiety and depression, personality traits or other psychological factors such as impulsivity that they do or do not possess (15). All those factors play a role in the etiology and/or maintenance of obesity.
Treatment of obesity includes medical nutritional therapy, physical activity, behavioral techniques, pharmacotherapy and bariatric surgery. Medical nutritional therapy is the "gold standard" in the treatment of obesity (16, 17). Conventional dietary treatment is based on an energy deficit, which can be achieved in many ways, but most experts agree that the optimal daily deficit is 500 to 1000 kcal, which leads to a loss of about 0.5 to 1 kg per week that can be recommended for everyday practice (16). This therapy yields good results in some patients but it is also accompanied with a great percentage of attrition (20-80%) and a significant weight regain (17, 18). Differences in the individual results in obese subject integrated in weight-loss treatment, leads to analyses potential pre-treatment predictors of weight control (19).

Thus, the aim of our study was to evaluate if psychiatric and specific psychological factors (impulsivity) could be the predictors of successful weight loss.

Methods

Participants

This study was designed as prospective cohort study with two measurements. It was realised from October 2015 to May 2016. Anthropometric measurements and medical nutrition therapy was performed in the Centre of Research Excellence in Nutrition and Metabolism while psychiatric interview and psychometric measurements in the Psychiatric Clinic, Clinical Center of Serbia. The study enrolled eighty four consecutive patients who were willing to treat obesity in the Centre of Research Excellence in Nutrition and Metabolism, Institute for Medical Research. Inclusion criteria for our investigation were female gender, age between 20 and 40 years, overweight and obese class I with body mass index (BMI) between 25 and 34.9 kg/m2 and self-reported weight stable (± 2 kg) for 3 months before the start of the diet treatment. Exclusion criteria were: history of psychiatric illness, inflammatory or infective diseases, hypertension, diabetes mellitus, cardiovascular, cerebrovascular or malignant disease.

Written informed consent was obtained from all participants prior to participation in the study and in investigation were included only those who were volunteered to take part in it. The study protocol was approved by the Ethics Committee, School of Medicine, University of Belgrade and carried out in the accordance to principles of the declaration of Helsinki.

Anthropometric parameters
Anthropometric parameters were measured at baseline and at the end of the six months treatment. The body height and weight were measured with the participants wearing light clothes and without shoes. The participants were weighed with a lever-actuated balance to the nearest 0.1 kg. Body mass index was calculated as weight (kg)/height (m) squared. The same qualified nutritionist did measurements for all participants.

Medical nutrition therapy

After completing anthropometric measurements participants were referred to diet therapist for medical nutrition therapy (MNT). All participants received a personalized nutritional counseling and daily diet treatment with 20% caloric restriction from estimated daily energy requirement was prescribed individually (20). Dietary treatment based on conventional-type of intervention with energy limitation and balanced macronutrient composition. Dietary intake was controlled with the size of portion, food choice and composition. Daily energy requirements were calculated according to obesity treatment guidelines issued by the US National Institute of Health and Food and Nutrition Board (20).

After six months of caloric restriction conventional diet therapy and control weight measurement, patients were divided into two groups. First group included 40 participants (48 %) who lost ≥10% of their initial body weight (Successful) and second included 44 participants (52 %) who lost <10% of their initial weight (Unsuccessful).

Psychopathology measures

Before starting MNT all patients were interviewed with a standard psychiatric interview by the same psychiatrist. Patients had 90 minutes in quiet place to fulfill questionnaires. Demographic characteristic were investigated by 4-item socio-demographic self reported questionnaire designed for this study. Four items were age, education (elementary school, high school, college, university degree), employment (employed, unemployed, student) and marital status (married/with partner, single, divorced).

For the purpose of this study 2 self-administered questionnaires: 90-item Symptom Check-list (SCL-90) (21) and 30-item Barratt Impulsiveness scale (BIS-11) (22) were used. SCL-90 was administrated as the screening instrument for the assessment of psychiatric psychopathology as a possible predictor of medical nutrition therapy outcome. Items are rated on 5 point scale of distress (ranging from „not at all“ to „extremely“). There are nine primary symptom dimensions: somatisation, obsession-compulsion, interpersonal
sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism.
The Barratt Impulsiveness Scale was developed to measure impulsiveness as seen by this author (motor aspect, an attentional aspect, and a planning aspect). It is one of the most used scales for measurement of impulsiveness. It consists of six first grade and 3 second grade factors. The factor labels with definitions are as follows: Factor 1, attention - „focusing on the task at hand“; Factor 2 – motor impulsiveness „acting on the spur of the moment“; Factor 3, self-control – „planning and thinking carefully“; Factor 4, cognitive complexity – „enjoy challenging mental task“; Factor 5, perseverance – „a consistent lifestyle“; Factor 6, cognitive instability – „thought insertions and racing thoughts“. The second order factors are combined of to primary factors. Factor I, attentional impulsiveness combines attention and cognitive instability. Factor II, motor impulsiveness combines first order factors motor impulsiveness and perseverance. Factor nonplanning impulsiveness III is combined of cognitive complexity and self-control.

Statistical analysis
Statistical data analysis was performed using IBM SPSS Statistics 22 (IBM Corporation, Armonk, NY, USA). Results were presented as frequency (percent) and mean ± SD. Chi-square test was used to test differences between nominal data (frequencies). For numeric data with normal distribution t-test was used. For ordinal data Mann-Whitney U test was used. All p-values less than 0.05 were considered significant.

Results
Socio-demographic characteristic of participants are presented on Table 1. The most participants of Successful and Unsuccessful groups have high school degree (55 % vs. 50%, respectively) and are employed (48 % vs. 66 %, respectively) and most commonly are married/with partner (40 % vs. 47 %, respectively). There were no significant differences between both groups in age, employment and marital status.
Anthropometric parameters of participants are shown on Table 2. There were not significant differences between groups in body weight before the starting MNT and in BMI at the baseline of the study, but after 6 months body weight and BMI were significantly different (p<0.001) in Successful and Unsuccessful group with average weight loss 15.89 ± 4.65 kg and 2.63 ± 1.81kg, respectively. Percent loss from initial body weight in Successful
group was 19.17 ± 4.78 % (range 30.79 - 11.60 %) and 3.16 ± 2.3 % (range 7.67-2.53 %) for Unsuccessful participants.

Average scores of particular domains obtained from SCL-90 questionnaire are presented on Table 3. Results indicate that both groups had similar scores in nine primary symptom dimensions, and that there were not significant differences in symptom dimensions and in the total score.

On Table 4 are shown average scores of particular domains obtained from BIS–11 questionnaire with first and second grade factors. There were statistically significant differences between Successful and Unsuccessful groups in Factor II (P<0.05) and in the total BIS-11 score (p<0.001).

Discussion

In the light of the fact that obesity has become the epidemic health threatening condition, its effects on physical health are extensively studied and well documented (5,6,7,16). However, the relationship between psychiatric and/or psychological factors and etiology and obesity treatment is complicated and not well known.

Our study showed that obese/overweight participants who were apparently healthy and homogenous regarding age, education level, employment and marital status had different outcomes adhering to the same medical nutrition therapy protocol for six months. Participants did not differ in the general psychopathology and its symptom domains measured with 90-item Symptom Check-list (SCL-90). Our results pointed out impulsivity measured as total impulsivity on Barratt Impulsiveness scale (BIS-11) as a pre-treatment predictor of the medical nutrition therapy outcome. Total impulsivity and its Factor II (motor impulsivity) being singificantly higher and Factor I (attentional impulsivity) is higher in participants that lost <10 % of their initial weight (Unsuccessful).

Symptoms of general psychopathology and obesity in both groups shared similar risk factors like dietary habits, level of physical activity and sedentary lifestyle (23). Although, one might expect a positive correlation between general psychopathology and etiology and negative on obesity treatment, research evidence was not entirely clear. It is not easy to detect causality i.e. which comes first from obesity or from psychopathology. Some studies showed positive correlation between obesity and a general psychopathology. It was shown for domains: somatization (24), interpersonal sensitivity (25), depression (26,27), anxiety (26,27), anger-hostility (28) and psychoticism (25). Also, in several studies mood disorders
are found to be frequent especially in morbid obesity patients seeking obesity treatment (29). As well, overweight and obese patients are not rare among those who have been diagnosed with mood disorders (29). But, in contrast to these findings, a lot of studies found no relationship between obesity and general psychopathology (30,31). In several community studies mood disorders are not found among obese persons (32). There was some evidence that levels of anxiety among obese person are equal as those who seek general medical or surgical treatment and that required obesity treatment may be the actual cause of anxiety (30).

No differences in SCL-90 scores between Successful and Unsuccessful weight loss overweight/obese women in general psychopathology (i.e. somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism) could be explained with the fact that women who willingly began treatment of obesity were different from those who did not considering the general psychopathology levels. One could hypothesize that overweight and obese women who participated in weight-loss treatment had a lower level of general psychopathology when compared to those who did not and therefore were more prone to start medical nutrition therapy. So, our results did not show that general psychopathology was a pre-treatment predictive factor of medical nutrition outcome.

Impulsivity could be defined as “a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others” (33). Therefore, it was seen as a multidimensional construct. Self-report questionnaires and behavioral measurements such as the task of inhibiting motor response or delaying discounting, measure a different aspect of impulsivity. Impulsivity measured by self reported questionnaires and behavioral measurements was a risk factor for a range of maladaptive behaviors, such as overeating, binge eating and substance abuse or in bipolar disorder or attention-hyperactivity disorder (33).

The BIS-11 scale used in this study measured total impulsivity and three second grade factors: motor impulsiveness (act without thinking), attentional impulsiveness (no focus on the present task), and nonplanning impulsiveness (lack of orientation to the future).

In our study Unsuccessful overweight/obese women group had higher scores of total impulsivity compared to Successful weight loss women. Our findings were in accordance
with the results of other studies that self reported impulsivity was higher in obese individuals (14,15, 34). Davis et al (33) found positive association of overeating and the preference for sweet and fatty food with impulsivity in general population. Also, it is shown that those two factors were in relationship with BMI (32). Literature data provides evidence that higher scores on impulsivity were found not only in participants with negative dieting outcome (16) as it was in our study but also in participants exhibiting food cravings (36), emotional eating (37) and restraint eating (38). All those phenomena are important for development, maintenance and treatment of obesity (34,37). 

Attentional impulsivity measured with BIS-11 subscales is the most often linked with overeating (15,34,37). Unsuccessful group in our study had tendency to higher score for attentional impulsivity (attentional impulsiveness combines first grade factors attention and cognitive instability) than Successful weight loss overweight/obese women. Attentional impulsivity may be the reason why highly palatable food became in the focus and were trigger for eating in participants engaged in weight–loss program (15,37). 

Motor impulsivity score (motor impulsiveness combines first grade factors motor impulsiveness and perseverance) was significantly higher in Unsuccessful participants than in Successful restrictive diet treatment responders in our study. Literature data suggest that motor impulsivity is less often linked to obesity itself (15). Higher scores were found in individuals that engaged in binge eating behavior and higher scores on motor impulsivity were referred to bulimia nervosa and anorexia nervosa binge/purge type but not for anorexia nervosa restrictive type (15,38). Non planning impulsivity was rarely linked to obesity and our results were in accordance with mentioned investigation. So, it seems that combination of high attentional and motor impulsivity might be partly (or a factor) responsible for overeating as well as clinically significant binge eating. 

This study has some limitation. First, we have not divided overweight and obese women into separate groups. Although, there is evidence that overweight and obese women showed the same weight loss from initial body weight during the same treatment period (39). Second the data on impulsivity must be more precise if self reported measures were accompanied with behavioral ones (inhibiting motor response or delaying discounting).
Conclusion
Results of our study showed that obese/overweight women in both Successful and Unsuccessful groups who were apparently healthy did not differ in age, education level, employment and marital status but had different outcomes of the same medical nutrition therapy protocol for six months. Participants, who lost 10 % and more or less than 10 % of their initial body weight, did not differ in the general psychopathology. Even though successful and unsuccessful diet responded participants did not differ in general psychopathology, our results pointed out that impulsivity could be the pre-treatment predictor of the outcome. Overweight/obese women as unsuccessful diet responders had higher total impulsivity and motor impulsivity scores. Our data highlighted the role of total impulsivity and Factor II (motor impulsivity) as indicator of binge eating that may contribute to poor response to conventional diet weight loss treatment. Focus on impulsivity in psychotherapeutic work integrated in weight-loss treatments might lead to better outcome in medical nutrition therapy.

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38. Meule A, Vögele C, Kübler A. Restrained eating is related to accelerated reaction to high caloric foods and cardiac autonomic dysregulation. Appetite 2012;58:638–44
Table 1

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Category</th>
<th>All participants</th>
<th>Successful</th>
<th>Unsuccessful</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
<td>84</td>
<td>40 (48%)</td>
<td>44 (52%)</td>
<td></td>
</tr>
<tr>
<td>Age (yrs) X±SD</td>
<td></td>
<td>30.38 ± 5.95</td>
<td>29.40 ± 6.10</td>
<td>31.27 ± 5.74</td>
<td>0.152</td>
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<tr>
<td>Education N</td>
<td>Elementary school</td>
<td>2 (2%)</td>
<td>1 (2%)</td>
<td>1 (2%)</td>
<td>0.700</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>44 (53%)</td>
<td>22 (55%)</td>
<td>22 (50%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>12 (14%)</td>
<td>5 (13%)</td>
<td>7 (16%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>University degree</td>
<td>26 (31%)</td>
<td>12 (30%)</td>
<td>14 (32%)</td>
<td></td>
</tr>
<tr>
<td>Employment N</td>
<td>Employed</td>
<td>48 (57%)</td>
<td>19 (48%)</td>
<td>29 (66%)</td>
<td>0.125</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>16 (19%)</td>
<td>11 (27%)</td>
<td>5 (11%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>20 (24%)</td>
<td>10 (25%)</td>
<td>10 (23%)</td>
<td></td>
</tr>
<tr>
<td>Marital status N</td>
<td>Married/with</td>
<td>36 (43%)</td>
<td>16 (40%)</td>
<td>20 (47%)</td>
<td>0.696</td>
</tr>
<tr>
<td></td>
<td>partner</td>
<td>8 (10%)</td>
<td>5 (13%)</td>
<td>3 (8%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>40 (47%)</td>
<td>19 (47%)</td>
<td>21 (45%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
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Table 2

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All participants</th>
<th>Successful</th>
<th>Unsuccessful</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X±SD (min-max)</td>
<td>X±SD (min-max)</td>
<td>X±SD (min-max)</td>
<td></td>
</tr>
<tr>
<td>Body height (m)</td>
<td>1.67 ± 0.07</td>
<td>1.67 ± 0.04</td>
<td>1.65 ± 0.08</td>
<td>0.971</td>
</tr>
<tr>
<td>Body weight. initial (kg)</td>
<td>81.56 ± 9.77</td>
<td>82.34 ± 9.40</td>
<td>80.86 ± 10.14</td>
<td>0.491</td>
</tr>
<tr>
<td>Body weight. final (kg)</td>
<td>72.68 ± 10.87</td>
<td>66.52 ± 8.28</td>
<td>78.29 ± 9.91</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI initial (kg/m²)</td>
<td>29.46 ± 2.69</td>
<td>29.58 ± 2.79</td>
<td>29.34 ± 2.62</td>
<td>0.682</td>
</tr>
<tr>
<td>BMI final (kg/m²)</td>
<td>26.71 ± 3.50</td>
<td>23.99 ± 2.62</td>
<td>28.50 ± 2.74</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Weight loss (kg)</td>
<td>8.95 ± 7.50</td>
<td>15.89 ± 4.65</td>
<td>2.63 ± 1.81</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Weight loss (%)</td>
<td>-10.78 ± 8.84</td>
<td>-19.17 ± 4.78</td>
<td>-3.16 ± 2.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Weight loss. participant expected (kg)</td>
<td>17.73 ± 6.20</td>
<td>17.78 ± 5.43</td>
<td>17.68 ± 6.88</td>
<td>0.945</td>
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### Table 3: Psychiatric psychopathology

<table>
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<tr>
<th>SCL – 90 Symptom dimension</th>
<th>All participants</th>
<th>Successful</th>
<th>Unsuccessful</th>
<th>P</th>
</tr>
</thead>
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<tr>
<td></td>
<td>X± SD</td>
<td>X± SD</td>
<td>X± SD</td>
<td></td>
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<tr>
<td>Somatization</td>
<td>1.50 ± 0.46</td>
<td>1.53 ± 0.47</td>
<td>1.48 ± 0.46</td>
<td>0.684</td>
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<tr>
<td>Obsessivity-compulsivity</td>
<td>1.58 ± 0.57</td>
<td>1.63 ± 0.69</td>
<td>1.54 ± 0.45</td>
<td>0.458</td>
</tr>
<tr>
<td>Interpersonal sensitivity</td>
<td>1.54 ± 0.60</td>
<td>1.50 ± 0.65</td>
<td>1.57 ± 0.55</td>
<td>0.632</td>
</tr>
<tr>
<td>Depression</td>
<td>1.53 ± 0.53</td>
<td>1.55 ± 1.62</td>
<td>1.51 ± 0.43</td>
<td>0.771</td>
</tr>
<tr>
<td>Anxiety</td>
<td>1.65 ± 0.62</td>
<td>1.69 ± 0.72</td>
<td>1.61 ± 0.51</td>
<td>0.589</td>
</tr>
<tr>
<td>Anger-hostility</td>
<td>1.35 ± 0.44</td>
<td>1.33 ± 0.47</td>
<td>1.36 ± 0.41</td>
<td>0.813</td>
</tr>
<tr>
<td>Phobic anxiety</td>
<td>1.17 ± 0.31</td>
<td>1.11 ± 0.20</td>
<td>1.22 ± 0.38</td>
<td>0.095</td>
</tr>
<tr>
<td>Paranoid ideation</td>
<td>1.50 ± 0.60</td>
<td>1.44 ± 0.54</td>
<td>1.56 ± 0.65</td>
<td>0.385</td>
</tr>
<tr>
<td>Psychoticism</td>
<td>1.20 ± 0.31</td>
<td>1.21 ± 0.39</td>
<td>1.19 ± 0.22</td>
<td>0.838</td>
</tr>
<tr>
<td>Total score</td>
<td>1.48 ± 0.42</td>
<td>1.48 ± 0.48</td>
<td>1.48 ± 0.37</td>
<td>0.939</td>
</tr>
</tbody>
</table>

SCL-90 (90-item Symptom Check-list)

### Table 4: Impulsiveness

<table>
<thead>
<tr>
<th>BIS Factors</th>
<th>All participants</th>
<th>Successful</th>
<th>Unsuccessful</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X± SD</td>
<td>X± SD</td>
<td>X± SD</td>
<td></td>
</tr>
<tr>
<td>Attention</td>
<td>15.13 ± 2.14</td>
<td>14.78 ± 2.42</td>
<td>15.45 ± 1.81</td>
<td>0.147</td>
</tr>
<tr>
<td>Motor impulsiveness</td>
<td>17.07 ± 3.10</td>
<td>16.6 ± 3.51</td>
<td>17.5 ± 2.65</td>
<td>0.198</td>
</tr>
<tr>
<td>Self-control</td>
<td>13.64 ± 2.65</td>
<td>13.73 ± 2.83</td>
<td>13.56 ± 2.50</td>
<td>0.789</td>
</tr>
<tr>
<td>Cognitive complexity</td>
<td>13.07 ± 1.54</td>
<td>13.00 ± 1.66</td>
<td>13.13 ± 1.44</td>
<td>0.688</td>
</tr>
<tr>
<td>Perseverance</td>
<td>8.13 ± 1.74</td>
<td>8.25 ± 1.60</td>
<td>8.02 ± 1.87</td>
<td>0.553</td>
</tr>
<tr>
<td>Cognitive instability</td>
<td>7.40 ±1.93</td>
<td>7.15 ± 2.09</td>
<td>7.63 ± 1.77</td>
<td>0.252</td>
</tr>
<tr>
<td>FACTOR I</td>
<td>22.54 ± 3.22</td>
<td>21.92 ± 3.63</td>
<td>23.09 ± 2.72</td>
<td>0.097</td>
</tr>
<tr>
<td>FACTOR II</td>
<td>25.08 ± 3.65</td>
<td>24.10 ± 3.67</td>
<td>25.98 ± 3.44</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>FACTOR III</td>
<td>26.38 ± 3.87</td>
<td>26.65 ± 3.52</td>
<td>26.14 ± 3.84</td>
<td>0.543</td>
</tr>
<tr>
<td>Total score</td>
<td>72.21 ± 9.06</td>
<td>68.57 ± 10.79</td>
<td>75.52 ± 5.42</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

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