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PSYCHOMETRIC PROPERTIES OF ANXIETY SENSITIVITY INDEX (ASI) IN A CLINICAL AND NON-CLINICAL SAMPLE IN SERBIA

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Abstract: Anxiety sensitivity is an individual cognitive predisposition to arouse fear of anxiety and anxiety related symptoms. The aim of this study was to examine the psychometric properties of Anxiety Sensitivity Index (ASI) in Serbia, on the sample of a clinical and non clinical population (N=140). The sample engaged 70 participants diagnosed with anxiety disorder, and 70 of non clinical population, 27.14% male and 72.85% female, average age 40 years old. Descriptive statistics, Principal component analyisis, Cronbach's alpha, Pearson's coefficient of correlation (ASI with STAI-S and STAI-T) were used. The results confirmed three-factor structure of ASI (physical concern, psychological concern, social concern) with a higher-order factor. Mean value is 32.89 (SD=14.75) for participants with diagnosed anxiety disorder, and for non clinical sample is M=18.57 (SD=12.18). Cronbach's alpha is α=0.88 (physical concern, α=0.87; Psychological concern, α=0.77; Social concern, α=0.56). Correlation between ASI and STAI-S is r=0.567 and between ASI and STAI-T is r=0.668. There are no significant differences by gender. Three-factor structure and valid psychometric properties of Serbian version of ASI, in clinical and non-clinical population, are obtained in this research and confirm the results from other reasearches worldwide. The possibility of applying anxiety sensitivity concept and measurement in sport might be of great importance.

Key words: *anxiety sensitivity, ASI, anxiety disorder, factor structure, reliability, validity*

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INTRODUCTION

Anxiety sensitivity is defined as an individual's cognitive predisposition to arouse fear of anxiety and anxiety-related symptoms (Reiss & McNally, 1985). Theoretical disscussions have initiated a large number of studies (Babić, 2011). The studies show that anxiety is a significant factor of vulnerablity for development of anxiety psychopathology. The results confirm the significance of anxiety sensitivity for development of panic and anxiety disorders (Olatunji, 2005). In order to examine the anxiety sensitivity theory, Reiss, Peterson, Gursky and McNally (1986) built an instrument to measure anxiety sensitivity – Anxiety Sensitivity Index (ASI). ASI is a self-assessment scale, consisted of 16 items that measure fear of anxiety related symptoms, i.e. the belief that those symptoms might be harmful and dangerous. Most ASI items are related to the fear of physical sensations (tremor sensation, racing heart, irritable bowel syndrom, unusual body sensations). Some items are related to beliefs of cognitive control (nervousness effects, lack of concentration), and some beliefs are related to tension observation consequences and nervousness by others (worry if other people will notice nervousness, tension or tremor). Participants were asked to assess the level of agreement for each item on the five point Likert scale, and the final score presents the assessed sum of all items. Early studies in the area of factor analysis indicate inconistent data. There are researchers that support a one-dimensional structure, or favor multidimensional structure (Zinbarg, Mohlman & Hong, 1999).

Nowdays, based on the results of recent factorial analysis, there is a growing consensus that the anxiety sensitivity structure is explained by multidimensional hierarchical model. Although the multidimensional hierarchical structure is supported, there is an inconsistency in relation of the number of lower factors. Several studies support the two-factor option, describing factors as the fear of mental catastrophe and fear of cardiovascular symptoms (Schmidt & Joiner, 2002). Other studies support the factorial structure of the four lower level factors: a) fear of cardiovascular symptoms, b) fear of publicly observable anxiety reactions, c) fear of loss of cognitive control, d) fear of respiratory symptoms (Rodriguez, Bruce & Pagano, 2004; Taylor and Cox, 1998). Most studies support the three-factor lower structure option with one higher factor (Stewart et al., 1997; Taylor, 1995; Zinbarg, Barlow & Brown, 1997).

In the three-factorial option, most often extracted are the following factors (Zinbarg et al., 1997): physical concerns (ASI physical), psychological concerns (ASI psychological) and social concerns (ASI Social). "Physical concern" refers to the fear of somatic sensations such as: fear of palpitations (e.g. "I feel scared when my heart is beating fast"). "Psychological concerns" is associated with cognitive anxiety symptoms, i.e. the fear of losing cognitive control, fear of difficulty in concentration (e.g. "When I cannot concentrate on the task, I worry that I'm going to lose my mind). The "social concern" refers to the fear of publicly visible symptoms such as fear of blushing, trembling (e.g. "It's important that I don't look upset").

Rector, Szacun-Shimizu and Leybman (2007) carried out a study of

anxiety sensitivity factors in the clinical sample. The results confirm the three-factorial solution that explained 55% of the variance: fear of physical symptoms (Eigenvalue=5.20; 32.5% of variance), fear of loss of cognitive control (Eigenvalue=2.42; 15.1% of variance) and fear of publicly visible symptoms (Eigenvalue=1.28; 8% of the variance). The results are consistent with the previous findings of Zinbarg and associates (Zinbarg et al., 1997), as well as researches by Rodriguez et al. (2001).

The results of factorial analysis in a non-clinical sample in Croatia (N = 945) provide affirmation for a multidimensional hierarchical structure with three lower level factors and one higher order factor (Jurin, Jokić-Begić & Lauri Korajlija, 2011). Jurin and associates name factors in accordance with the results of the previous research: factor 1 - physical concerns (items 4, 6, 7, 8, 9, 10, 11, 14), factor 2 – psychological concerns (items 2, 3, 12, 13, 15, 16) and factor 3 - social concerns (items: 1, 5). The first factor explains 39.62% of variance, with Eigenvalue=6.2. The second factor explains 7.98% variance, with Eigenvalue= 1.3, while the third factor explains 7.34% variance, with Eigenvalue=1.2.

Besides these confirmed relevant psychometric characteristics, ASI scale was still criticized. Taylor and Cox (1998) emphasized that scale is not designed for measuring multi factors, and that there are no sufficient items for measuring lower factors (Olatunji et al., 2005). Blais, Otto and Zucker (2001) were analysing ASI items and found that five items (items 1, 5, 7, 8 and 13) reduce the value of constructive scale validity because they have a low correlation with the scale (to 0.30), as well as being more related to the fear of losing control of emotions rather than fear of emotions itself.

Aim of this study was to test the factorial structure and psychometric properties of the original Anxiety Sensitivity Index - ASI in clinical and non-clinical samples in Serbia.

METHOD

Participants

This study was conducted with a descriptive, correlational and factorial design. The sample engaged 140 participants, 70 with diagnosed anxiety symptoms, and 70 without anxious psychopathology, 27.14% males and 72.85% females. The average participant age was 40. The youngest participant was 20 and the oldest 59 years old. The sample was balanced due to anxious psychopathology, so the presence or the absence of anxiety psychopathology would not affect the results of the factorial analysis. Participants from the clinical subsample were asked to participate in this study by their therapist (private practice). Most participants in a clinical subsample were diagnosed with panic disorder (30%), and generalized anxiety disorder (12.85%). The least number were with specific phobias (1.43%), while 25.72% of participants provided no diagnostic information. 44.28% of the clinical sample used pharmacotherapy as part of their treatment at the time of testing, while with 25.72% of the participants there was no information if they use drugs as part of the treatment or not. Potential participants for the control sample were asked whether they ever needed expert

psychological help, or whether they had psychiatric treatment before. Subjects that have no previous treatment were engaged in further study. Since the clinical sample was a convenience sample regarding age and gender, we tried to adjust the non-clinical sample in regards to the demographic features of the clinical sample. Before starting with a questionnaire, all participants were told that engagement in the study is anonymous and that the information they provide in the questionnaire would be used for research purposes only. All participants were engaged voluntarily in this study.

Instruments

The *Anxiety Sensitivity Index* (Reiss, Peterson, Gursky & McNally, 1986) is a scale consisting of 16 items that measure fear of anxiety related symptoms as a belief that symptoms can be harmful and dangerous. The participants were required to estimate the degree of agreement of each statement on the five point Likert scale, and the final score is the sum of all item assessments.

In this study, Spielberger's Test Anxiety Inventory (STAI) was used for the validation of the Anxiety Sensitivity Index (Spielberger, Gorsuch, Lush, Vagg & Jacobs, 1983). STAI is composed of two scales, 20 items measure situational anxiety or state anxiety (STAI-S) and 20 items measure anxiety as a trait (STAI-T).

Data analysis

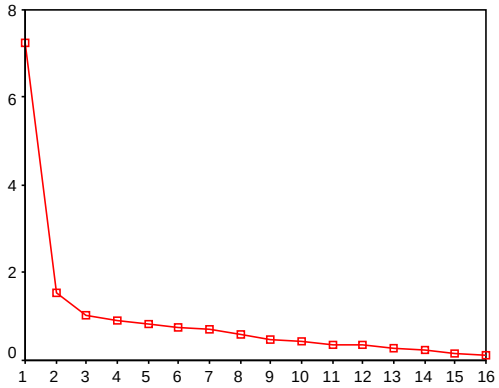
The principal components analysis was applied, descriptive statistics, Cronbach's alpha and Pearson correlation coefficient in SPSS version 22**.**

RESULTS

Suitability of data was tested before conducting the factorial analysis. By examining the correlation matrix, many correlation coefficient values were 0.3 and more. The value of the Kaiser-Meyer-Oklin indicator was 0.857 and Bartlett's sphericity test reached a statistical significance (1216.668; df=120, $p<0.001$). Such data indicate a factorial correlation of the matrix.

According to the Gutman Kaiser criterion, there are three factors. By the Cattell scatter diagram (Figure 1), only one factorial solution is allocated.

Figure 1. *Anxiety Sensitivity Index - Scater diagram*



The principal component analysis pointed out three factors with values higher than 1 (7.234; 1.534; 1.017) that explain 61.158% variance (Table 1). At the same time, the highest percentage of variance explains the first extracted factor (45%). As we can see in the matrix structure (non-rotated) all variables have saturation over 0.3 on the first factor, which indicates the possibility of calculating the total score. However, when oblimin rotation is done, items are arranged relatively evenly in three obtained factors, which provides the basis for calculating three separate scores, especially if we take into account the theoretical assumptions of the earlier findings which confirm the three-factorial solution (Table 2).

Table 1. *Non-rotated matrix structure of anxiety sensitivity scale*

Item	Factor 1	Factor 2	Factor 3
16	0.815		
3	0.780		
15	0.778		
4	0.776		
6	0.758	-0.356	
8	0.752		
14	0.737		
9	0.703	-0.395	
11	0.701	-0.316	
2	0.669	0.443	0.311
12	0.662	0.433	
1	0.584	0.405	-0.414
7	0.489		
10	0.385	-0.444	
5	0.543	0.354	-0.557
13	0.416	0.382	0.506

When we look at items content that are classified into three factors, we can see that most items contribute to the first component. The first factor is the most saturated with items: "I get scared when my heart is beating fast," "When I notice that my heart is beating fast, I worry that I might have a heart attack," "When my stomach is upset, I worry that I might be seriously ill," "I get scared when I feel dizzy," "I get scared when I feel sick." Based on these items content, it is concluded that they measure the fear of cardiovascular and respiratory symptoms, which directs us to name this component as a "fear of somatic symptoms." Also, it is factor structured in such way which is very similar to the "physical concerns" factor (Zinbarg, 1997), so we will keep the title of this component (ASI - Physical). As shown in Table 2, 15 and 16 items were contributing to components 1 and 2, but in further analysis they are attached to the first component due to higher factor loadings.

The second factor is most saturated with items: "Other people notice when I tremble," "When I cannot concentrate on the task, I'm worried that I will lose my mind," "I get scared when I cannot concentrate on the task." Although the items do not indicate clearly that it is a cognitive dimension of anxiety related symptoms, we decided to keep this factor and named it after Zinbarg's title – "psychological anxiety" i.e. the fear of cognitive control loss, ASI - Psychological (Zinbarg, Barlow & Brown, 1997).

The third factor is saturated by the following items: "It's important to me that I control my feelings," "It is important to me not to look upset," "I'm ashamed when my stomach cramps." A factor structure is similar to Zinbarg's "social concern" factor, i.e. the fear of publicly visible anxiety symptoms, so we also kept the title ASI - Social (Zinbarg et al., 1997).

Table 2. *Rotated matrix structure of anxiety sensitivity scale*

Item	Factor 1	Factor 2	Factor 3
6	0.828		
9	0.824		
11	0.748		
4	0.708		
10	0.669		
8	0.641		
3	0.619		
14	0.600		
16	0.419	0.366	
15	0.407	0.351	
13		0.828	
2		0.788	
12		0.738	
5			-0.867
1			-0.767
7			-0.401

The anxiety sensitivity scale showed a satisfactory reliability. The value of Cronbach's alpha for the whole scale is 0.88 (per factor: Physical α=0.87; Psychological α=0.77; Social α=0.56).

The mean value of ASI as a whole is M=25.73. The standard deviation is SD=15.26. In regards of the presence or absence of a diagnosis of anxiety disorders, the results show that the mean value is M=32.89 (SD=14.75) in clinical and M=18.57 for non-clinical samples (SD = 12.18). Considering gender differences, females established a higher level of anxiety sensitivity (M=27.02; SD=15.70), than males (M=22.26; SD=13.59).

The anxiety sensitivity index was validated in this study by the use of the Spielberger's test anxiety inventory (STAI), which measures anxiety as a state (STAI-S) and as a trait (STAI-T). There were significant correlations between the ASI and the STAI scale. Pearson's coefficient of correlation between ASI and STAI-S is r=0.567, p<0.01; and r=0.668 (p<0.01) for the relation between ASI and STAI-T.

DISCUSSION

The results indicate the three-factorial structure, with one factor of a higher order and good psychometric properties, which are consistent with data from other studies.

In a study which involves twelve studies, a total of 4 517 respondents (Plehn & Peterson, 1999), showed that the mean value for the general population is 19.01 and the standard deviation is 9.11 (mean value varies from 14.2 to 22.5). Taylor's and associates (Taylor, Koch & McNally, 1992) findings indicate higher scores in participants with diagnostic sample: with panic attacks disorder M=36.6, SD=12.3; participants with a generalized anxiety disorder M=26.2, SD=10.8; participants with an obsessive compulsive disorder M=25.4, SD=12.4; and participants with social phobia M=24.9, SD=12.3. Research suggests that scores above 25 are "possible problems," and scores above 30 may indicate a diagnosis of panic disorder, agoraphobia, PTSD or other psychopathology (Plehn & Peterson, 1999). Jurin, Jokić-Begić and Lauri Korajlija (2011) conducted research on a non-clinical sample of 984 adult participants in Croatia. The result of mean values is 19.5 and the standard deviation is 10.1 and they are in line with the research results on the majority of European and American samples. Findings from Croatia are lower than those obtained on a sample of Puerto Ricans, M=24.6, SD=13.9 (Cintron et al., 2005), higher than the normative results for people born in Alaska (M=17.6, SD=9.4) and higher than the mean values of American Natives, M=15.8; SD=8.4 (Jurin, Jokić-Begić & Lauri Korajlija, 2011). The descriptive statistics in our study agree with these data. The mean value for people diagnosed with anxiety disorders (panic disorder as the most frequent diagnosis) is 32.89. In a non-clinical sample, the mean value is 18.57 which is in accordance with the value mentioned in the relevant research of the general population.

Studies that dealt with the assessment of ASI scales psychometric

properties indicate good internal consistency (from 0.82 to 0.93). Peterson and Reiss (1992) found a high degree of internal consistency (from 0.80 to 0.90). Zinbarg et al. (1997) obtained the value of Cronbach's alpha 0.88 for the whole scale; 0.89 for the factor "fear of negative consequences, physical anxiety related symptoms," the value of 0.85 for the factor "fear of psychological consequences of anxiety symptoms," the value of 0.62 for the "fear of negative social consequences of anxiety symptoms." The results of the above mentioned Croatian study are in accordance with the results of ASI scale validity. In the Croatian study, the value of the alpha coefficient on the entire scale was 0.88, the factor of fear of physical consequences resulted in the value of 0.86, the value 0.80 for the fear of the psychological consequences component and the value of 0.45 for fear of negative social consequences of anxiety symptoms (Jurin, Jokić-Begić, Lauri Korajlija, 2011).

Results of reliability tests in our study are consistent with the data presented in the literature. Value of Cronbach's alpha for the entire scale is 0.88 in our study. Reliability of subscales most closely resembles Croatian research. The reliability of the scale "fear of physical symptoms" is 0.87 and for the subscale "fear of psychological symptoms" is 0.77. The lowest reliability showed sensitivity to the scale of social anxiety symptoms ($\alpha = 0.56$).

Research of ASI scales reliability indicates that scale measures a stable personal construct for test retest with a reliability of r=0.75 (Reiss, Peterson, Gursky & McNally, 1986) for two weeks, and the value of r=0.71 for a period of 3 years (Maller & Reiss, 1992). Research of convergent validity confirms the validity of the ASI scale. The correlation between ASI score and Spielberger's anxiety scale is between 0.50 and 0.60 (Isyanov & Calamari, 2004, McWilliams, Stewart & MacPherson, 2000; Cox & McWilliams, 2001), while the correlation between ASI and Beck's inventory of depression was low r=0.41 (Smári et al., 2003). Slightly lower correlation values were obtained in the aforementioned study on the Croatian sample (Jurin, Jokić-Begić, Lauri Korajlija, 2011), the correlation between ASI and STAI-T was 0.324, while the correlation with Beck's anxiety inventory was 0.179.

The correlation between ASI and STAI in our study is consistent with the data of other authors. The correlation between ASI and STAI-S is r=0.567, and r=0.668 between ASI and STAI-T.

Previous studies on non-clinical populations indicate that women have a greater fear of anxiety, as well as a fear of physical manifestations of anxiety in comparison with men (Stewart, Baker & Taylor, 1997). Peterson and Reiss (1992) got an M=19.8 for women (N=1974), and for men M=17.6 (N=1762). Steward et al. (1997) compared the ASI scores for men and women on a sample of 528 women and 290 men and found significant differences. A mean value for women was M=17.4 (SD = 9.4), while the mean value for men was M=14.6 (SD = 8.7). Steward et al. (1997) suggested that there are differences by gender on individual anxiety sensitivity factors. The results were significantly higher in women for the factor of fear of physical symptoms, while other factors did not differ between men and women. The results indicate that women are generally more afraid of anxiety, but also express more fear of the physical symptoms of

anxiety that are perceived as harmful. The aforementioned study on the Croatian sample (Jurin, Jokić-Begić, Lauri Korajlija, 2011) confirms that there is a significant difference between men and women in the ASI score. The average score for women was M=20.7 (SD=10.45), while for men it was M=17.7 (SD=9.12).

The data from our research indicate that within the clinical sample there are no statistically significant differences by gender. The average value in men is M=26.33, SD=12.71 (n=18), and women M=35.16; SD=14.79 (n = 52). Within the non-clinical sample there are also no statistically significant differences by gender. The mean value obtained in men is M=18.60, SD=13.61 (n = 20), and in women M=18.63, SD=11.82 (n=49). The results of our study are consistent with the relevant data of other authors.

The factor analysis of ASI in our sample approved the three-factorial structure of the questionnaire. The obtained factors of physical concerns, psychological and social concerns related to anxiety symptoms, are in line with the theoretical assumptions and in line with the results of previous research (Barlow 2002; Zinbarg, Barlow, Brown & Rapee, 2001; Rector, Szacun Shimizu, 2006; Jurin et al, 2010). The first factor of anxiety sensitivity is most saturated by items such as "I get scared when my heart is beating fast." This factorial structure is very similar to the factor that Zinbarg (Zinbarg et al., 1997) called physical concern. "Physical concern" refers to the fear of somatic sensations such as vertigo, rapid heartbeat, sweating, dizziness, muscular tension and so on, as well as the harmful consequences that these symptoms have. The second factor is most saturated by items like "Other people notice when I tremble," "I get scared when I cannot concentrate on the task," etc. With regard to content, the items that are grouped on this factor, we took Zinbarg's (1997) term "psychological anxiety." "Psychological concerns" is associated with the fear of loss of cognitive control and the mental symptoms of anxiety such as concentrating difficulty, lack of memory and so on. The third factor is saturated by items such as "It is important to me that I control my feelings." This factorial structure is similar to Zinbarg's et al. (1997) factor called "social concern." "Social anxiety" refers to the fear of publicly visible anxiety related symptoms, the fear that others will notice one's nervousness, tension or tremor, as well as concerns about possible negative reactions.

Based on the analysis of psychometric properties in this study, we may conclude that the ASI is a reliable and valid instrument and that it adequately measures the anxiety sensitivity in Serbian population.

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