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Relationship Between Sensory Processing Sensitivity, Personality Dimensions and Mental Health

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Abstract: The aim of this study was to examine the relationship between sensory processing sensitivity, personality dimensions and mental health in a sample of University of Mohaghegh Ardabili students. One hundred and eighty students were included in this study. All participants were asked to complete the highly sensitive person scale, NEO-five factor inventory and general health questionnaire. Analysis of the data involved both descriptive and inferential statistics including means, standard deviations, Pearson's correlation coefficients and regression analysis. The results revealed that ease of excitation was positively correlated to neuroticism and mental health (physical problems, anxiety, disorder in social functioning and depression) and negatively related to extra version. Aesthetic sensitivity was positively related to neuroticism, openness to experience, consienciousness and anxiety. Low sensory threshold was also positively related to neuroticism, physical problems, anxiety and mental health. The results of regression analysis revealed that sensory processing sensitivity can explain considerable variances of personality traits and mental health.

Key words: Sensory processing sensitivity, personality, mental health

INTRODUCTION

Aron and Aron (1997) used the expression of sensory processing sensitivity to explain the interpersonal differences in the sensory processing style. Based on definition sensory processing sensitivity is the inclination towards powerful and deep processing of different sensory stimuli. Construct of sensory processing sensitivity is product of studies that have been done for validity checking of high sensitive persons questionnaire. This test measures the sensitivity level of persons to a range of environmental stimuli like pain, hunger, loud voices and violent films. In the opinion of Aron and Aron (1997) sensory processing sensitivity was a coherent construct however recent studies have shown that this construct is composed of several items. Smolewska *et al.* (2006) in their surveys discovered a three-factor model of sensory processing style and validate it. These investigators after performing a discovery factor analysis concluded that sensory processing sensitivity include three items; ease of excitation, aesthetic sensitivity and low sensory threshold.

One of important concerns of personality psychologists is the finding of variables that are mainstay of personality dimensions. Whereas, Aron and Aron (1997) believed that sensory processing sensitivity is a major element and infrastructure of person's reactions and perceptions and a determining factor in the personality development, it can be assumed that there is relationship between sensory processing sensitivity and personality variables. Performed studies about this concept have shown that sensory processing sensitivity has relationship with neuroticism (Aron and Aron, 1997). This construct, also, have correlation with other constructs like; behavioral suppression (Carver and White, 1994; Gray, 1981), introversion (Eysenck, 1981, 1991) shame (Kagan, 1994) and behavioral inhibition (Aron and Aron, 1997).

On the other hand with regarding sensory processing sensitivity construct as a temperament inclination, which as the mainstay of persons' behaviors, the survey of relationship between this construct and mental health seems important. Some studies have shown that sensory processing sensitivity is associated with negative clinical outcomes. Investigatory findings are indicative of the relationship between this construct and social phobia (Neal *et al.*, 2002) avoidant personality disorder (Mayer and Carver, 2000), anxiety and depression (Liss *et al.*, 2005) and perceived stress and less mental health (Benham, 2006). Others studies, also, shows that among persons with high level of sensory processing sensitivity, low levels of parents' supervision has relationship with depression (Liss *et al.*, 2005). However, Smolewska *et al.* (2006) found out that all items of sensory processing sensitivity aren't associated with negative clinical outcomes.

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In opinion of Aron (2002), personality is of behavioral manifestations of a sensory processing style and sensory processing may be a main factor in the personality development. In his opinion sensory processing sensitivity can pave the way for susceptibility to various pathologies especially neurotic disorders. Then this study aimed to survey the relationship of sensory processing sensitivity to personality dimensions and mental health.

MATERIALS AND METHODS

This is a descriptive correlation survey. All students of Mohaghegh Ardabili University who were studying at second half of 2008-2009 comprise statistical population of this study. One hundred and eighty of this population were selected by simple random sampling as sample of this survey.

Measures

Demographic characteristic questionnaire: This questionnaire has been provided to gather demographic characteristics like sex, age, marital status and educational discipline.

High sensitive person scale: This questionnaire was made by Aron and Aron (1997) and has 27 self-reporting questions. It measures the psychological reactivity to environmental stimuli. This test is composed of three sub-scales; ease of excitation, low sensory threshold and aesthetic sensitivity. The responder will complete this test on the 7-point Likert-type scale (From Strongly disagree to Strongly agree). This test has shown a high level of validity and reliability. Cronbach's alpha coefficient of this test has been reported as 0.80 in the study of Smolewska *et al.* (2006). In this study Cronbach's alpha coefficient of this test has been reported as 0.87, 0.76 and 0.71 for ease of excitation, low sensory threshold and aesthetic sensitivity, respectively.

NEO-FFI (NEO-Five factor inventory): This test has been made by Costa and McCare (1989) and is being used for measurement t of the big five personality factors. This questionnaire is composed of 60 items on the basis of 5-points Likert type scale. Each group of 12 items measures one of the big five personality factors. Each factor will separately be calculated and finally five numbers will be achieved. Reliability coefficients of this questionnaire have been reported 0.73-0.86 in different studies.

General health questionnaire: This questionnaire was made by Goldberg and Hillier (1979). This is in the following forms; 20, 30, 28 and 12-questions forms. Twenty five questions form was made by Goldberg and Hillier (1979) to increase the variance and on the basis of Factors analysis on the main form of questionnaire. This form includes four sub-scales (physical symptoms, anxiety, Social functioning disorder and depression). Scoring is made in the Likert-type scale. Each question is scoring in the 0, 1, 2 and 4 points. The score of each responder will be in the range of 0-84 and higher score is indicative of low mental health. Goldberg and Hillier (1979) have reported validity coefficient of 0.80 using a clinical interview check list performed on the patients of surgery ward.

After sampling the objectives of study were explained for them and questionnaires were distributed among them.

RESULTS

Results of correlation coefficient showed that ease of excitation has positive significant correlation with aesthetic sensitivity (r = 0.39), low sensory threshold (r = 0.46), neuroticism (r = 0.61), physical symptoms (r = 0.33), anxiety (r = 0.37), social functioning disorder (r = 0.27), depression (r = 0.30) and low mental health (r = 0.45). However, it has significant negative relationship with extroversion (r = -0.23). Aesthetic sensitivity had positive relationship with low sensory threshold (r = 0.50), neuroticism (r = 0.22), openness to experience (r = 0.26), conscientiousness (r = 0.25) and anxiety (r = 0.21). Low sensory threshold had significant positive relationship with neuroticism (r = 0.20), physical symptoms (r = 0.29), anxiety (r = 0.16) and low mental health (r = 0.21). Neuroticism had significant negative relationship with extroversion (r = -0.36), agreeableness (r = -0.23) and conscientiousness (r = -0.19). However, it had significant positive relationship with physical symptoms (r = 0.50), anxiety (r = 0.61), social functioning disorder (0.48), depression (r = 0.55) and low mental health (r = 0.69). Extroversion had positive relationship with openness to experience (r = 0.27) and negative relationship with physical symptoms (r = -0.20), anxiety (r = -0.19), depression (r = -0.29) and low mental health (r = -0.28). Openness to experience had positive relationship with conscientiousness (r = 0.39). Agreeableness had significant negative relationship with Social functioning disorder (-0.18). Conscientiousness didn't have significant relationship with none of mental health indices.

To determine that items of sensory processing sensitivity how affects the neuroticism items of sensory processing sensitivity and neuroticism were entered in the regression equation as predictor and check variables, respectively.

Table 1: Regression analysis of neuroticism on sensory processing sensitivity

Criteria	Predictor	β	t-value	p-value
Neuroticism	Ease of excitation	0.63	8.64	0.00
	Aesthetic sensitivity	-0.03	-0.33	0.74
	Low sensory threshold	-0.14	-1.64	0.10

Table 2: Regression analysis of extroversion on sensory processing sensitivity

Criteria	Predictor	β	t-value	p-value
Extroversion	Ease of excitation	-0.28	-2.86	0.005

Table 3: Regression analysis of openness on sensory processing sensitivity

Criteria	Predictor	β	t-value	p-value
Openness	Aesthetic sensitivity	0.38	3.34	0.001

Table 4: Regression analysis of conscientiousness on sensory processing sensitivity

Criteria	Predictor	β	t-value	p-value
Conscientiousness	Aesthetic sensitivity	0.52	3.88	0.00

Results of regression analysis are being presented in the Table 1.

Table 1 shows that sensory processing sensitivity explains 38% of total variance of neuroticism. Results of regression coefficients, also, shows that of items of sensory processing sensitivity only the t of ease of excitation ($t = 8.46$, $p<0.000$) is statistically significant. It means that ease of excitation can directly predict the neuroticism. However, aesthetic sensitivity and low sensory threshold couldn't predict the neuroticism.

Table 2 shows the mean and standard deviation of subjects in the subscales of mental health questionnaire.

Table 2 shows the share of sensory processing sensitivity in the prediction of extroversion. However, since aesthetic sensitivity and low sensory threshold didn't have significant relationship with extroversion, they weren't entered in the regression equation. Results of regression analysis show that ease of excitation can indirectly predict the extroversion.

Table 3 shows the results of regression analysis openness on aesthetic sensitivity.

Only the aesthetic sensitivity item was entered in the regression equation for determining the share of sensory processing sensitivity in the prediction of openness to experience because there is no significant relationship between openness to experience and two other items (ease of excitation and low sensory threshold). The results shows that aesthetic sensitivity explains 8% of total variance of openness to experience. Results of regression coefficients shows that ease of excitation directly predict the openness to experience ($t = 3.34$, $p<0.001$).

Table 4 shows the share of sensory processing sensitivity in the prediction of conscientiousness.

Table 5: Regression analysis of mental health on sensory processing sensitivity

Criteria	Predictor	β	t-value	p-value
Mental health	Ease of excitation	0.43	4.70	0.00
	Low sensory threshold	-0.04	-0.45	0.65

Only the aesthetic sensitivity item was entered in the regression equation because there is no significant relationship between conscientiousness and following items; ease of excitation and low sensory threshold. Table 4 shows that aesthetic sensitivity explains 11% of total variance of conscientiousness. Results of regression coefficients show that aesthetic sensitivity can directly predict the conscientiousness. Since, no significant relationship was obtained between agreeableness factor and three items of sensory processing sensitivity then the effect of sensory processing sensitivity on the agreeableness factor wasn't analyzed.

Table 5 shows the effect of sensory processing sensitivity on the total score of mental health and due to lack of significant relationship between aesthetic sensitivity and mental health, aesthetic sensitivity items wasn't entered in the regression equation. Table 5 shows that aesthetic sensitivity explains 19% of total variance of mental health. Results of regression coefficients shows that ease of excitation can positively predict the mental health however low sensory threshold didn't have significant share in the prediction of mental health.

DISCUSSION

The first objective of current study was to survey the relationship between sensory processing sensitivity with big five personality factors (extroversion, neuroticism, conscientiousness, agreeableness and openness to new experience). Results showed that ease of excitation has positive relationship with neuroticism. Also, ease of excitation directly predicted the neuroticism. On the other hand, in this survey positive relationship was obtained between low sensory threshold and neuroticism. This is in accordance with findings of Aron and Aorn (1997), Aron (2002) and Smolewska *et al.* (2006), who showed that ease of excitation is related with negative affection and emotionality. These investigators discovered that persons who easily get excited often have higher level of vigilance toward environmental stimuli then it seems reasonable that these people are very emotional and susceptible to worry.

In current study, negative relationship was observed between ease of excitation and extroversion. Ease of excitation, also, indirectly predicted the extroversion. This finding accords with results of survey performed by Liss *et al.* (2008). They showed that persons who get

easily excited act cautiously facing environmental stimuli and tend to avoid sensory stimuli. This avoidance can limit their social relations, reduce positive emotions and lead in their introversion. In this survey, no significant relationship was observed between other personality factors (openness to new experience, agreeableness and conscientiousness).

Positive relationship was observed between aesthetic sensitivity and openness to new experience. Aesthetic sensitivity showed significant share in the prediction of openness to new experience. To explain this finding can say that since persons with high scores in the aesthetic sensitivity have rich experiences and extreme positive and negative emotions and these are among traits of persons with high scores in the openness to new experience then it can be expected that as aesthetic sensitivity increases, level of openness to new experience increases, too.

In this survey, there was positive relationship between aesthetic sensitivity and conscientiousness. Aesthetic sensitivity, also, directly predicted the conscientiousness. No other survey has been performed to assess the relationship between aesthetic sensitivity and conscientiousness and only Liss *et al.* (2008) have reported the high conscientiousness as a characteristic of persons with high level of aesthetic sensitivity. Then, explanation of this finding necessitates more surveys. In this survey, no significant relationship was observed between aesthetic sensitivity with extroversion and agreeableness.

The second objective of this survey was to assess the relationship between sensory processing sensitivity with psychopathological indices. Results showed that ease of excitation has significant positive relationship with physical symptoms, anxiety, social functioning disorder, depression and low mental health. Hershfield *et al.* (2007) found out those persons who have high score in the ease of excitation item get easily excited and encountering sensory stimuli and succumb to them. Furthermore, these people have high negative emotionality and low emotional stability due to bias in the data processing. Then, it is expected that they show low mental health.

Findings of surveys performed by Smolewska *et al.* (2006) and Liss *et al.* (2008) are indicative of positive relationship of ease of excitation to anxiety and depression. Persons who get easily excited process the emotional data more deeply (Hershfield *et al.*, 2007) and disorder of data processing can explain their anxiety and depression. Also, ease of excitation can cause physical problems and social functioning disorder through induction of high level of stress.

It was observed that aesthetic sensitivity has positive relationship with anxiety. This accord with survey of Liss *et al.* (2008). Persons who get high scores in the aesthetic sensitivity have a rich complex inner life and are deeply excited by emotional stimuli. These people are dominantly stimulated internally due to having high sensory processing sensitivity then they are introspective and anxious.

It was observed in this study that low sensory threshold has significant positive relationship with physical symptoms, anxiety and low mental health. Persons with low sensory threshold perceive the sensory stimuli extremely and succumb to extreme stimulation and this can cause low mental health (Hershfield *et al.*, 2007). In general, this survey is indicating that sensory processing sensitivity has significant share in the prediction of personality dimensions and mental health. The main limitation of our survey was lack of related literature that made the explanation of findings more difficult.

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