

PSYRGGU 2020

Psychology of Personality: Real and Virtual Context

SENSORY PROCESSING SENSITIVITY IN DRUG ADDICTED AND INTERNET-ADDICTED PEOPLE

Regina M. Ershova (a)*, Ivan V. Semeniak (b), Tatiana M. Koryagina (b), Ekaterina V.
Yarmotz (b), Sergey V. Saveliev (b)

*Corresponding author

(a) State University of Humanities and Social Studies, Kolomna, Russia, erchovareg@mail.ru

(b) State University of Humanities and Social Studies, Kolomna, Russia

Abstract

Phenomenon of sensitivity has always received a lot of critical attention, but there is no uniform view on its nature. Sensitivity is studied within neurophysiology, evolutionary biology, medical science, psychology, physiology. Studies of sensitivity in psychology are mostly based on the works of K. Jung, J. Gray, J. Myers, S. Maysgeir, E. Murphy, R. Dunn, K. Dunn, A. Hendzhum, A. Aron, E. Aron and D. Smollan. The present article is a study of sensitivity in drug- and Internet-addicts. 98 individuals suffering from drug addiction (49 males, 49 females, average age 31.5 ± 7.2) and 98 respondents without a drug addiction (average age 29.9 ± 7.3). For comparative analysis the following methods were employed: Highly Sensitive Person Scale (Russian version), Chen Internet Addiction Scale (CIAS) (adopted by V. Malygin and K. Feklisov). The data showed that that people with drug addiction have the same sensitivity level as healthy people. Subjects with Internet addiction were characterized by higher sensitivity levels as compared with both healthy people and subjects with drug addiction. The results of the study have only partially confirmed our assumptions about the sensitivity of drug- and Internet-addicted subjects. This can be explained by underuse of HSPS methods in the studies of the types of subjects in question, as well as by the peculiarities of self-assessment methods with respect to their objectivity. These results play an important role in the formation of scientific ideas concerning the differences and similarities of behavioral and substance addictions.

2357-1330 © 2020 Published by European Publisher.

Keywords: Addiction, drug addiction, internet addiction, sensory processing sensitivity.



This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 Unported License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

1. Introduction

Despite the long history of the study of sensitivity, there is still a lot of discussion concerning its nature. Currently, sensitivity is studied within the framework of psychology, pedagogy, physiology, neurophysiology, evolutionary biology and medical science. Often, “sensitivity” is defined as a property of an organ, temperamental trait, or a trait of character. Psychological theory of sensitivity has accumulated the findings of experts in biology, psychophysiology, psychopathology, medical science, clinical trials and cognitive science, namely Jung (1950), Gray (1970), Aron et al. (2005) etc.

2. Problem Statement

Initially, Western psychological theories defined sensitivity as personality trait and was described through concepts of an introversion / extraversion or through behavioral system of activation/inhibition, whereas individual differences in its manifestation were explained by a ratio of behavioral inhibition systems (flight / attack) – (BIS) and activation (BAS) (Gray, 1982). In these theories sensitivity was considered to be a temperamental characteristic of a person, which manifested itself in increased susceptibility to events, preference of reflection to action, low sociability, dispassionateness, high anxiety, shyness.

According to Boterberg and Warreyn (2016) sensitivity is a reaction of high susceptibility of the nervous system to deep cognitive processing of physical, emotional and social incentives. Consequently, high sensitivity leads to a decrease in the time of reaction and promotes more careful behaviour.

While studying inhibition in children, Kagan (1994) initially assumed sensitivity to be a neutral characteristic with a number of advantages, however further research of this phenomenon made him change his views. He started to view sensitivity as a forerunner of various psychopathological symptoms: shyness and uneasiness. In the studies of children's temperament, Rothbart and Bateso (2006) pointed out two characteristics of sensitivity.

Perceptive sensitivity to weak incentives, as a part of a control system and discomfort and sensitivity to intensive irritants, as a part of negative affectivity. Early studies of Thomas and Chess (1977) defined a low threshold of sensitivity in children as one of 9 resilient identity traits.

Numerous studies have disclosed the role of sensitivity in the development of the complex of symptoms of depression, anxiety disorders, neuroses, which is particularly important now, as the number of people with mental health disorders and depression is growing globally. According to WHO estimates of 2018, at least 300 million people worldwide suffer from depression. In the past 10 years the number of people affected has increased by 18%.

The most noticeable contribution to the study of sensitivity was made by American psychologists Aron et al. (2005). They made an attempt to unite basic provisions of evolutionary, psychophysiological and psychological approaches to the study of sensitivity. According to their theory, high sensitivity manifests itself in increased susceptibility to external stimuli and results in strong emotional reactions, deep cognitive processing of perceptual data, sensitivity to fine detail, susceptibility to excessive stimulation.

Having studied the signs listed, the authors defined sensitivity as a temperamental trait – Sensory Processing Sensitivity (SPS) reflecting how touch information is transmitted to brain and processed by it.

At the same time, they claim that it is important to differentiate between high sensitivity and such forms of social behavior as introversion, shyness and autism, which have similar symptoms.

Gorenstein and Newman (1980) assumed that dysfunctional sensitivity system is susceptible to reinforcement in the form of reward, which is the cornerstone of the uninhibited behaviour (psychopathy, early staged of alcoholism, hyperactivity in children and non-pathological impulsiveness), it induces reward-oriented reactions, reduces the ability to anticipate negative reactions from the environment and leads to inability to take negative past experience into consideration.

Currently, we see a growth in the number of studies on the correlation between sensitivity and physical and mental health indicators. Benham (2006) shows that high sensitivity has a positive correlation with the level of stress and physical ailment complaints.

Liss et al. (2008) showed that Ease of Excitation Scale and Low Sensory Threshold in the Highly Sensitive Person Scale (HSPS) are accompanied by symptoms of autism, alexithymia, anxiety and depression, whereas Aesthetic Sensitivity Scale is associated with attention to detail and anxiety.

Meyer and Carver (2000) showed a correlation between sensitivity and personality frustration avoidance, borderline disorder, depression, anxiety and anger. The study conducted by Hofmann and Bitran (2007) showed a significant correlation between high sensitivity and the scale of an agoraphobia of sociophobia questionnaire and uneasiness (Social Phobia and Anxiety Inventory (SPAI)). Liss et al. (2005) revealed a connection between anxiety and depression, observed in highly sensitive people.

3. Research Questions

Russian researchers have produced a range of studies which show a significant importance of sensitivity for fear predisposition (Chernavskii, 2007; Smirnova & Koshkarova, 2005), and for marginal socialization in teenagers (Nikishina & Glushkova, 2009). Despite a significant number of studies of highly sensitive people, there is currently no scientific evidence concerning the role of sensitivity in the structure of a personality, suffering from drug- or Internet-addiction. There is only indirect evidence to its role of a predictor / initiating cause for the development of an addiction. Thus, De Berardis et al. (2009) discovered, that alexithymia plays an important role in computer addiction development. It was revealed that the difficulty to express oneself can produce obsessive-compulsive manifestations, realized through Internet addiction. And since Munteanu et al. (2009), Wieland (2005) revealed a comorbidity of computer- and Internet addiction with a gambling disorder, substance addiction, it is possible that sensitivity has a place role in the structure of dependent behavior

4. Purpose of the Study

The purpose of this study was to identify the peculiarities of sensitivity in people with drug- and Internet-addiction.

Sensitivity, as a temperamental characteristic of a person, was the object of our study. The subject of our study was sensory processing sensitivity in drug addicted and internet-addicted people.

Study hypothesis: people suffering from drug- or Internet addiction show higher sensitivity levels that people who are not suffering from addictive disorders.

5. Research Methods

We used two methods to study sensitivity characteristics in people with drug- and Internet-addiction.

- 5.1. Highly Sensitive Person Scale (HSPS), operationalized on Russian sample by Ershova et al. (2018). Highly Sensitive Person Scale, (HSPS) contains 27 statements, which are used to measure sensitivity on a 7-tier scale from 1 – ‘totally disagree’ to 7 – ‘totally agree’. The questionnaire was created to measure physiological sensitivity to external stimuli and finer reactivity. Two scales were identified in the process of operationalization: Ease of Excitation (EOE) and Low Sensory Threshold (LST). Integral sensitivity indicator is the sum of the two scales.
- 5.2. Chen Internet Addiction Scale, (CIAS) (Chen) adapted by Malygin and Feklisov (as cited in Malygin, 2011). The scale contains 26 statements concerning various aspects of Internet use, which the respondent has to assign a weight from 1 (totally inapplicable) to 4 (fully applicable). The test includes 5 rating scales: Compulsive Symptoms Scale (COM); Withdrawal Symptoms Scale (WOT); Tolerance scale (TOL); Intrapersonal and Health Problems Scale (IH); Time Management Scale (TM). The sum of the scores on all scales is the indicator of Internet addiction, or the absence thereof. Data processing was conducted using one-way ANOVA test, Student's unpaired t-test and discriminate function analysis (SPSS Statistics v.23 package).

Empirical data was retrieved from the subjects who volunteered to participate in the study. The questionnaire was both paper- and computer-based. Privacy of the participants was ensured by means of using secure computer codes, databases, ciphering of groups and absence of personal data in the documents used. The sample contained 196 volunteers: 98 respondents suffering from drug addiction (49 males and 49 females, (average age 31.5, standard deviation 7.2)). This group comprised the patients of the rehabilitation center under Moscow Research and Practical Centre for Narcology of the Department of Public Health, Moscow, with a confirmed diagnosis “Mental and behavioural disorders due to psychoactive substance use” as per ICD-10, namely: “Mental and behavioural disorders due to use of opioids” (F.11.2) - 32 subjects; “Mental and behavioural disorders due to use of sedatives or hypnotics” (F.13.2) – 6 subjects; “Mental and behavioural disorders due to use of other stimulants, including caffeine” (F.15.2) – 18 subjects; “Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances” (F19.2) – 42 subjects. At the moment of the study all subject have been in remission phase for 1 - 6 months. Additional study follow-up consultation was used as a motivating factor for participation. 98 respondents not suffering from drug addiction (49 males and 49 females, (average age 29.9, standard deviation 7.3)). This group comprised citizens of Kolomna, who participated in the “Fight your flabbiness” fitness challenge and the students of State University of Humanities and Social Studies. This group of participants was motivated by a free psychological consultation.

6. Findings

The retrieval of data was conducted as a part of 3 stage-process: 1) Comparison of sensitivity parameters in the group of drug-addicted (“drug”) and drug non-addicted (“non-drug”). (Data from Internet addicted subject was excluded); 2) Sensitivity parameters’ comparison in Internet-addicted and Internet non-addicted subjects (Data from subjects with drug addiction was excluded); 3) Comparison of sensitivity parameters in drug-addicted subjects who do not suffer from Internet addiction and data from Internet-addicted subjects not suffering from drug addiction.

Sensitivity parameters comparison in the group of drug-addicted subjects (“drug”) and not suffering from drug addiction (“non-drug”) did not show any significant differences as per HSPS: Ease of Excitation (EOE) ($p=0.119$), Low Sensory Threshold (LST) ($p=0.833$), integral sensitivity indicator ($p=0.344$). Table 1 shows the results of statistical difference evaluation in the groups.

Table 01. Statistical assessment of differences by sensitivity level in the groups of drug-addicted and non-drug addicted subjects

Variable	Mean value		t-crit	Significance p
	Drug	Non-Drug		
Ease of Excitation	35.88	41.33	0.960	0.119
Low Sensory Threshold	14.55	14.11	-0.213	0.833
Integral sensitivity indicator	50.44	55.44	0.186	0.344

Discriminate function analysis showed low discriminant ability (72.2%) of HSPS variables when the subjects are split into “drug” and “non-drug” groups (see Table 2). Thus, healthy respondents and the respondents suffering from drug addiction demonstrate the same sensitivity levels.

Table 02. Observation classification check (stage 1)

		Predicted groups affiliation			Total
		Non-Drug	Drug		
Reference	Frequency	Non-Drug	14	4	18
		Drug	6	12	18
	%	Non-Drug	77.8	22.2	100
		Drug	33.3	66.7	100

*Note: 72,2% initial observations were correct

Statistical analysis of data for groups of Internet addicted (“addicted”) and Internet non-addicted (“non-addicted”) subjects showed a significant dissimilarity for the following parameters: Ease of Excitation (EOE) ($p\leq 0.001$) and Integral Sensitivity Indicator ($p\leq 0.001$). T-test results are given in Table 3.

Table 03. Statistical assessment of differences by sensitivity level in the groups of Internet-addicted and Internet non-addicted subjects

Variable	Mean value		t-crit	Significance p
	Non-Addicted	Addicted		
Ease of Excitation	41.33	52.55	-4.425	0.000*
Low Sensory Threshold	14.11	15.22	-0.886	0.382
Integral sensitivity indicator	55.44	67.77	-3.530	0.001*

*Note: significant distinctions are marked with an asterisk

When the subjects were split into groups of Internet-addicted and Internet non-addicted (Table 4), discriminant function analysis showed a high discriminant ability (83.3%) of such variables as Ease of Excitation and Integral Sensitivity Indicator which means that Internet addiction significantly impacts the subjects' sensitivity. Statistical data processing showed that compared to Internet non-addicted subjects, their Internet-addicted counterparts have higher sensitivity levels.

Table 04. Observation classification check (stage 2).

			Predicted groups affiliation		Total
			Non-Addicted	Addicted	
Reference	Frequency	Non-Addicted	18	0	18
		Addicted	6	12	18
	%	Non-Addicted	100	0	100
		Addicted	33.3	66.7	100

*Note: 83,3% initial observations were correct.

Parameter comparison in the group of drug-addicted respondents who do not suffer from Internet addiction (“drug”) and Internet-addicted respondents who do not suffer from drug addiction (“addicted”) showed the results similar to the previous stage: t-test revealed significant dissimilarities in the groups by such parameters as Ease of Excitation (EOE) ($p \leq 0.001$) and Integral Sensitivity Indicator ($p = 0.002$) (Table 05).

Table 05. Statistical assessment of differences by sensitivity in drug-addicted subjects who do not suffer from Internet addiction and data from Internet-addicted subjects not suffering from drug addiction

Variable	Mean value		t-crit	Significance p
	Drug	Addicted		
Ease of Excitation	35.88	52.55	4.694	0.000*
Low Sensory Threshold	14.55	15.22	0.314	0.756
Integral sensitivity indicator	50.44	67.77	3.288	0.002*

*Note: significant distinctions are marked with an asterisk

Discriminant ability of HSPS variables is identical to the previous stage and equals 83.3%. This stage of data processing is intended to support the results of previous stages and makes us conclude that individuals suffering from drug addiction do not manifest a particular type of sensitivity as temperamental value, whereas Internet-addicted participant showed increased sensitivity. T-test results analysis is given in Table 6.

Table 06. Observation classification check (stage 3)

			Predicted groups affiliation		Total
			Addicted	Drug	
Reference	Frequency	Addicted	16	2	18
		Drug	4	14	18
	%	Addicted	88.9	11.1	100
		Drug	22.2	77.8	100

*Note: 83,3% initial observations were correct

This study was aimed to explore sensitivity in people with drug- and Internet addiction. The study showed that sensitivity as a temperamental characteristic manifest itself differently in different groups. When we compared the sensitivity parameter in the people who were split into groups depending on whether they were or were not drug-addicted (per se), we did not observe any peculiarities in sensitivity manifestations. Low Sensory Threshold values were almost identical in both groups, and the Ease of Excitation and Integral Sensitivity Indicator values in drug-addicted participant was, on average, 5-6 points lower as compared to the participants without drug addiction. However, this difference is statistically negligible.

Using CIAS test we have split the participants into two groups depending on whether they suffer or do not suffer from Internet addiction (per se). We have discovered that Internet-addicted participants showed greater Ease of Excitation and Integral Sensitivity Indicator values. Similar results were observed when we compared drug-and Internet-addicted participants per se (Internet-addicted respondents have demonstrated greater values for the scales mentioned). Moreover, we have discovered that such HSPS test parameters as Ease of Excitation and Integral Sensitivity Indicator can eliminate Internet-addicted participant from the sample (drug-addicted and healthy) with a reliability of 83.5%. This allows us to view sensitivity as a differential characteristic for Internet addiction.

As far as we know, HSPS was used on people with substance addiction, thus we cannot compare our results with those of our peers. However, an earlier study of sensitivity in Internet-addicted students conducted by Ershova et al. (2018) confirms our findings, namely, that sensitivity as a temperamental characteristic is highly manifested in Internet-addicted people.

7. Conclusion

Thus, we have come to the following conclusions: people with drug addiction have the same sensitivity level as healthy people; people with Internet-addiction generally manifest higher sensitivity, are more sensitive to sensory discomfort and frustration as compared to both healthy and drug-addicted people.

This makes us conclude, that behavioural and chemical addictions affect psychological characteristics of an individual in a different manner. Thus, our data contradicts the assumptions that these two forms of addictive behaviour have a similar nature and characteristics.

The results of the study have only partially confirmed our assumptions about the sensitivity of drug- and Internet-addicted subjects. By and large, it can be explained by the limitations of HSPS test, to which Russian researchers are still new, as well as the inherent shortcomings of mainstream self-evaluation methodologies when data objectivity is in question.

These results play an important role in the formation of scientific ideas concerning the differences and similarities of behavioral and substance addictions and pose new questions concerning the study of people suffering from addictions.

References

- Aron, E. N., Aron, A., & Davies, K. M. (2005). Adult shyness: The interaction of temperamental sensitivity and an adverse childhood environment. *Personality and Social Psychology Bulletin*, 31(2), 181-197. <https://doi.org/10.1177/0146167204271419>
- Benham, G. (2006). The highly sensitive person: Stress and physical symptom reports. *Personality and individual differences*, 40(7), 1433-1440. <https://doi.org/10.1016/j.paid.2005.11.021>
- Boterberg, S., & Warreyn, P. (2016). Making sense of it all: The impact of sensory processing sensitivity on daily functioning of children. *Personality and Individual Differences*, 92, 80-86.
- Chernavskii, A. F. (2007). Psikhofiziologicheskie predposylki proyavleniya strakha [Psycho-physiological preconditions of manifestations of fear] // *Izvestiya rossiiskogo gosudarstvennogo pedagogicheskogo universiteta im. A.I Gertsena*, 19(45), 442-448.
- De Berardis, D., D'Albenzio, A., Gambi, F., Sepede, G., Valchera, A., Conti, C. M., Fulcheri, M., Cavuto, M., Ortolani, C., Salerno, R. M., Serroni, N., & Ferro, F. M. (2009). Alexithymia and its relationships with dissociative experiences and Internet addiction in a nonclinical sample. *CyberPsychology & Behavior*, 12(1), 67-69. <https://doi.org/10.1089/cpb.2008.0108>
- Ershova, R. V., Yarmotz, E. V., Koryagina, T. M., Shlyakhta, D. A., & Eugen, T. (2018). Operatsionalizatsiya shkaly chuvstvitel'nosti (Highly sensitive Person Scale) na rossiiskoi vyborke [Operationalization of the russian version of highly sensitive person scale (Highly Sensitive Person Scale)] // *Vestnik Rossiiskogo universiteta družby narodov. Seriya: Psikhologiya i pedagogika*, 15(1), 22-37. <https://doi.org/10.22363/2313-1683-2018-15-1-22-37>
- Gorenstein, E. E., & Newman, J. P. (1980). Disinhibitory psychopathology: A new perspective and a model for research. *Psychological Review*, 87, 301-315.
- Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour research and therapy*, 8(3), 249-266.
- Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry of the septo-hippocampal system*. Oxford University Press.
- Hofmann, S. G., & Bitran, S. (2007). Sensory-processing sensitivity in social anxiety disorder: Relationship to harm avoidance and diagnostic subtypes. *Journal of anxiety disorders*, 21(7), 944-954. <https://doi.org/10.1016/j.janxdis.2006.12.003>
- Jung, C. G. A. (1950). Study in the process of individuation (W. Collected Works, 9). Princeton University.
- Kagan, J. (1994). *Galen's prophecy: Temperament in human nature*. Basic Books.
- Liss, M., Timmel, L., Baxley, K., & Killingsworth, P. (2005). Sensory processing sensitivity and its relation to parental bonding, anxiety, and depression. *Personality and individual differences*, 39(8), 1429-1439. <https://doi.org/10.1016/j.paid.2005.05.007>
- Liss, M., Mailloux, J., & Erchull, M. J. (2008). The relationships between sensory processing sensitivity, alexithymia, autism, depression, and anxiety. *Personality and individual differences*, 45(3), 255-259. <https://doi.org/10.1016/j.paid.2008.04.009>
- Malygin, V. L. (2011). *Internet-zavisimoe povedenie. Kriterii i metody diagnostiki* [Internet-dependent behavior. Diagnostic criteria and methods]. MGMSU.
- Meyer, B., & Carver, C. S. (2000). Negative childhood accounts, sensitivity, and pessimism: A study of avoidant personality disorder features in college students. *Journal of Personality Disorders*, 14(3), 233-248. <https://doi.org/10.1521/pedi.2000.14.3.233>
- Munteanu, A., Costea, I., Palos, R., & Jinaru, A. (2009). Psychological and behavior aspects regarding internet addiction. *Annals of DAAAM & Proceedings*. <https://web.b.ebscohost.com>
- Nikishina, V. B., & Glushkova, V. P. (2009). Vnutrennie determinanty protsessa sotsializatsii podrostkov

- s sindromom defitsita vnimaniya i giperaktivnost'yu [Inner determinants of socialization process for teenager having Attention Deficiency and Hyper Activity Syndrome (ADHAS)]. *Izvestiya Volgogradskogo gosudarstvennogo pedagogicheskogo universiteta*, 9, 124-126.
- Rothbart, M. K., & Bates, J. (2006). Temperament in children's development. In R. Lerner, N. Eisenberg, & W. Damon (Eds.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 99 - 166). Wiley.
- Smirnova, E. O., & Koshkarova, T. A. (2005). Analiz materinskikh trudnostei v otnosheniyakh s rebenkom (na materiale mladshogo shkol'nogo vozrasta) [The analysis of maternal difficulties in relations with a child (on a material of younger school age)]. *Psikhologicheskaya nauka i obrazovanie*, 3, 5-15.
- Thomas, A., & Chess, S. (1977). *Temperament and development*. Brunner/Mazel.
- Wieland, D. M. (2005). Computer addiction: implications for nursing psychotherapy practice. *Perspectives in psychiatric care*, 41(4), 153-161. <https://doi.org/10.1111/j.1744-6163.2005.00038.x>