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# Psycho-social adaptation in patients with paranoid schizophrenia addicted to synthetic cannabinoids (spice)

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**Abstract:** *Introduction:* The use of synthetic cannabinoids by patients with paranoid schizophrenia interferes with their psycho-social adaptation and leads to further re-hospitalizations among these patients. *Objective:* To study the features of the psycho-social adaptation of patients who have a paranoid form of schizophrenia and suffer from a dependence on synthetic cannabinoids. *Methods:* A sample of 120 men with paranoid schizophrenia and dependence on synthetic cannabinoids with an average age of  $30.3 \pm 0.63$  years were examined. STAI, TPA, MMPI, SMMPR, and LSI were used for assessing research participants. *Results:* The personality traits, anxiety level, behaviour modus, hierarchy of reaction variants of psychological defenses, and features of mechanisms for adjustment to stressful situations influence the features of psycho-social adaptation mechanisms of patients with paranoid schizophrenia who are dependent on synthetic cannabinoids. *Conclusion:* The adaptation of patients with paranoid schizophrenia who are dependent on synthetic cannabinoids is affected by psychotic personality traits including hypochondria, impulsiveness, emotional instability, paranoia, psychasthenia, and schizophrenia. This can manifest with reduced socialization, loss of contact with reality, paradoxical perception and behaviour catalyzed by delusional ideas, and drug use motive. A direct positive correlation of active negativism, conflict, aggressiveness, an increase in drug use, and intensity of destructive psychological defenses with an increase in anxiety has been established. Disturbance of adaptation mechanisms led to addictive, non-normative and delinquent types of behaviour. Hospitalization stabilized the adaptation mechanisms among patients and helped them to identify and interact with others who had the same diagnosis, but at the same time led to the development of hospitalism among the participants. Changes in the patients' habitual patterns of behavior (drug addiction) caused self-dislike among participants.

**Keywords:** Synthetic Cannabinoids, Schizophrenia, Psycho-social Adaptation Comorbidity, Abuse.

### **Introduction**

People living in stressful conditions may experience maladjustment and psychological discomfort. This condition is characterized by an increase in feelings of fear, anxiety, self-doubt, the formation of interpersonal and intrapersonal conflicts, disturbances resulting from the construction of psychological defense mechanisms, destructive patterns of behaviour that can initiate psychotic episodes in patients with paranoid schizophrenia, and addictive behaviour through the use of synthetic cannabinoids, which disturbs psycho-social adaptation (Bokhan et al., 2018).

Synthetic cannabinoids (SC) are a rapidly spreading form of psychoactive substance (Golovko et al., 2016). As their popularity increases, the variety of SC is expanding; more than 140 types of SCs have been synthesized to date (Bokhan & Semke, 2009; Glue et al., 2013; Bokhan & Selivanov, 2015; Golovko et al., 2016; Bokhan et al., 2019; UNODC, 2019). This has caused a crowding out of more typical drugs, indicating diversification in the drug market (Mechoulam et al., 1988).

The mental health of patients with paranoid schizophrenia (PS) who use SC is attracting increasing attention from psychiatrists and addiction specialists (Bokhan et al., 2016). Prior research has shown that the use of SC can initiate transient psychotic episodes and be a predisposing factor in the development of schizophrenia (Muller et al., 2010; Gureeva et al., 2016; Vinnikova & Shahova, 2016; Nikolkina & Zamogil'nyj, 2017). There has been an increasing number of PS patients who have a syndrome of SC dependence as part of their psychopathological profile. Changes in personality are exacerbated with addictive behaviour, therefore treatment with one drug cannot address all of the features of psycho-social maladjustment (Gureeva et al., 2016; Patrikeeva et al., 2016; Sinevich et al., 2017).

Because of the reasons reported above, practical and successful treatment of PS patients with SC dependence relies on patients' personal resources, making it possible to adapt in any society. It is also necessary to examine the mechanisms of deviant behaviour, features of pathological adaptation and the psychological defenses they use, and their decision-making process.

The main national classification of social and labor maladjustment for patients with mental illness is disability status, which entails social and financial support from the state. In cases of a persistent decrease or loss of ability to work, the bureau of medical and social examination assesses the individuals according to the following criteria:

Disability group I is defined by the presence of social insufficiency, requiring social protection and assistance. These are provided in Russia for people with health disorders that cause persistent and pronounced disorders of bodily function, leading to significant limitations of their ability to live independently (i.e., self-care, movement, orientation, communication, control over their behaviour).

Disability group II is defined by a persistent disorder of bodily functions, leading to limitation of one or several abilities of life, but to a lesser degree of severity than in disability group I. This can include the ability to work and learn.

Disability group III is defined by similar manifestations of social insufficiency due to persistent, minor to moderately pronounced disorders of bodily functions, accompanied by mild to moderate limitations in one category of the bodily functions, or both.

### **Objective**

Our research objective is to study the features of the psycho-social adaptation of patients that have a paranoid form of schizophrenia and suffer from a dependence on synthetic cannabinoids.

### **Hypothesis**

The psycho-social adaptation of schizophrenia patients with dependence on synthetic cannabinoids is characterized by a predominance of destructive and compensatory-adaptive psychological defenses that are addictive, antisocial, and criminal in nature.

## **MATERIALS AND METHODS**

The study was conducted in partnership with the hospitals of the Siberian Federal Scientific-Clinical Center of the Federal Medical and Biological Agency of Russia, Seversk Clinical Hospital (Seversk), Tomsk Clinical Psychiatric Hospital (Tomsk), the Mental Health Research Institute, Tomsk National Research Medical Center, the Russian Academy of Sciences (Tomsk), and the Emergency Medicine Station (Tomsk) between mid-2018 and the beginning of 2021.

Criteria for inclusion in the study comprised: (1) informed consent to participate in the study, (2) age between 18 and 50 years, and (3) a diagnosis of PS associated with SC dependence. Criteria for exclusion were significant cognitive decline or unreliable results of psychological testing (e.g., revealing lies when passing tests, attempts to mislead the researcher).

All patients gave informed consent for examination and hospitalization upon admission to hospital. The study was carried out after the psychotic symptoms that lead to hospitalization were resolved. The assessments were administered to patients independently and in the presence of a medical doctor. The patients were informed that their participation would not shorten or increase the length of their hospital stay.

The study sample included 120 men with both paranoid schizophrenia and a dependence on synthetic cannabinoids, with an average age of  $30.3 \pm 0.63$  years. The average period they had been suffering from PS was  $3.5 \pm 1.32$  years, and the average duration of their dependence on SC was  $4.5 \pm 2.32$  years. Among this group, 95 subjects were single (79.2%), 15 were married (12.5%), and 10 were divorced (8.3%). For education, 61 subjects had completed comprehensive education (50.8%), 37 had secondary special education (30.8%), 16 had

not completed any higher education (13.3%), and 6 had a higher education (5%). In terms of disability status, 78 patients (65%) were in non-working disability group II, 24 (20%) were in working group II, and 18 (15%) were in working group III.

At the outset of the study, the patients were assessed for Kandinsky-Clerambo syndrome. The course of the disease is continuous-progressive in nature, and remissions are short-term (1 to 2 months). Drug use of 1-7 days can trigger recurrence of positive symptoms of PS. Typical antipsychotics were used to relieve psychotic symptoms, and combinations of atypical and prolonged medications were used for long-term therapy. In remission, “non-severe” phenomena of hypopathia and hypobulia were observed, and positive symptoms are reduced independently.

- Participants were assessed by collecting a family history, and administering a battery of psychometric evaluations, including:
- The State Trait Anxiety Inventory (STAI; Spielberger et al, 1983).
- The Test of Personal Adjustment (TPA; Rogers & Dymond, 1954).
- The Minnesota Multiphasic Personality Inventory (MMPI; McKinley, Hathaway & Meehl, 1948) to evaluate personality traits, with its subsequent interpretation using the standardized multifactor method of personality research (SMMPR; Sobchik, 2007).
- The Life Style Index (LSI) for the diagnosis of various mechanisms of psychological defense (Plutchik, Kellerman, & Conte, 1979).
- A. N. Oryol’s methodology for diagnosing “propensity to deviant behaviour” (Fetiskin, 2002) to measure inclination to engage in various forms of deviant behaviour.

The data were organized into a database and statistically analyzed using the R programming language (version 3.2.4). Statistical methods included descriptive statistics and correlation analysis (Spearman Rank Order). The normality of the distribution of the data was assessed using the Kolmogorov-Smirnov criterion. The differences between the samples were evaluated for statistical significance using Student's *t*-test at an alpha level of  $\alpha = 0.05$ . The dependent variables were presented as arithmetic means (M) and arithmetic mean errors (SEM).

## RESULTS AND DISCUSSION

For the duration of the study, patients were in in-patient wards to ensure the reliability of the results. Analysis of the MMPI of patients in the study group revealed indicators of the scales (1,2,4,6,8,9 / -3,5,7,0) that were outside the normal range, including: hypochondria, depression, psychopathy, paranoia, psychasthenia, schizophrenia and hypomania (Table 1).

**Table 1***MMPI scores in the study group (n = 120)*

Scale MMPI	Indicators. T-points. M±SEM
L - Lie	53.01±0.93
F - Infrequency	76.85±1.71
K - Defensiveness	53.41±0.82
1. Hs - Hypochondriasis	62.24±1.42
2. De - Depression	65.55±1.47
3. Hy - Hysteria	56.06±1.17
4. Pd - Psychopathic Deviate	70.68±1.17
5. Mf - Masculinity/Femininity	57.47±0.88
6. Pa - Paranoia	67.41±1.25
7. Pt - Psychasthenia	62.50±1.38
8. Sch - Schizophrenia	76.50±1.87
9. Ma - Hypomania	69.21±1.12
0. Si - Social Introversion	56.13±0.85

The anxiety inventory indicated that patients had a high level of personal anxiety ( $46.15 \pm 0.86$ ) and a moderate level of reactive anxiety ( $42.35 \pm 0.84$ ). Correlation analysis found a strong relationship between personal and situational anxiety,  $\rho = .79$ ,  $p < 0.05$ . Stress provoked an increase in anxiety, causing a persistent tendency to perceive the current situation as threatening.

On the TPA, the indices of “adaptability” ( $142.87 \pm 2.49$ ), “self-acceptance” ( $47.76 \pm 1.27$ ), and “internal control” ( $55.91 \pm 0.90$ ) were above the norm. The indices of “accepting others” ( $25.73 \pm 0.66$ ), “emotional comfort” ( $25.3 \pm 0.53$ ), “statements” ( $19.49 \pm 0.70$ ), and “escapism” ( $13.60 \pm 0.59$ ) were within normal limits.

On the LSI, a strong general intensity of psychological defenses was revealed ( $75.23\% \pm 0.23$ ). The systems of psychological defenses, ranked from the most to least intense, were: (1) Intellectualization, (2) Denial, (3) Repression, (4) Rationalization, (5) Substitution, (6) Regression, (7) Compensation, and (8) Projection (Table 2).

**Table 2***Indicators of the tension of psychological defenses (n = 120)*

Life Style Index Subscale	Indicators, %, M±SEM
A. Denial	82.96±1.90
B. Repression, Isolation, Introjection	81.03±2.01
C. Regression	62.87±2.85
D. Compensation, Identification, Fantasy	61.65±2.37
E. Projection	58.50±2.90
F. Displacement	72.19±2.42
G. Intellectualization, Sublimation, Undoing	88.40±1.64
H. Rationalization, Reactive formation	79.57±1.59

For this group, increased anxiety provoked a reaction to stress with destructive psychological defenses (substitution, projection, compensation, regression, and repression), as evidenced by the average correlation coefficients (Table 3). Conversely, the tension of defenses such as denial and intellectualization decreased with increasing anxiety.

**Table 3***Correlation coefficients between indicators of anxiety and the intensity of psychological defenses (n=120)*

Variable	Spearman Rank Order Correlations (PS+SC 120)	
	Trait anxiety (Personal anxiety)	State anxiety (Situational anxiety)
Denial	<b>-0.234</b>	<b>-0.210</b>
Repression	<b>0.258</b>	<b>0.192</b>
Regression	<b>0.370</b>	<b>0.352</b>
Compensation	<b>0.279</b>	<b>0.323</b>
Projection	<b>0.461</b>	<b>0.352</b>
Displacement	<b>0.574</b>	<b>0.580</b>
Intellectualization	<b>-0.184</b>	<b>-0.260</b>
Rationalization	0.093	0.057

*Note.* Significant indicators are highlighted in bold ( $p < 0.05$ ). Missing data deleted pairwise.

Destructive psychological defenses had a strong influence on each other. Strong correlations ( $\rho > 0.5$ ) were found between the following psychological defenses: denial with intellectualization; regression with compensation, projection, and displacement; compensation with projection and displacement; and projection with displacement. Stress caused tension in all destructive psychological defenses. An increase in the tension of one destructive psychological defense was associated with an increase in the tension of all destructive psychological defenses, and the tension stress of constructive psychological defenses also provoked an increase in the tension of destructive defenses (Table 4).

**Table 4**

*Correlation coefficients between the intensity of psychological defenses (n=120)*

Variable	Spearman Rank Order Correlations (PS+SC 120)							
	Denial	Repression	Regression	Compensation	Projection	Displacement	Intellectualization	Rationalization
Denial	1.000	0.007	-0.112	-0.126	0.091	-0.089	<b>0.501</b>	<b>0.210</b>
Repression	0.007	1.000	<b>0.202</b>	0.133	<b>0.298</b>	<b>0.210</b>	0.155	0.146
Regression	-0.112	<b>0.202</b>	1.000	<b>0.701</b>	<b>0.538</b>	<b>0.576</b>	0.063	<b>0.361</b>
Compensation	-0.126	0.133	<b>0.701</b>	1.000	<b>0.622</b>	<b>0.544</b>	0.016	<b>0.277</b>
Projection	0.091	<b>0.299</b>	<b>0.538</b>	<b>0.622</b>	1.000	<b>0.720</b>	<b>0.233</b>	<b>0.293</b>
Displacement	-0.089	<b>0.210</b>	<b>0.576</b>	<b>0.544</b>	<b>0.720</b>	1.000	0.124	0.099
Intellectualization	<b>0.501</b>	0.155	0.063	0.016	<b>0.233</b>	0.124	1.000	0.149
Rationalization	<b>0.210</b>	0.146	<b>0.361</b>	<b>0.277</b>	<b>0.293</b>	0.099	0.149	1.000

*Note.* Significant indicators are highlighted in bold ( $p < 0.05$ ). Missing data deleted pairwise.

Analysis of the data from Oryol's diagnostic technique for the "propensity to deviant behaviour" showed that the following indicators were more pronounced than the norm (considering the descending hierarchy of abnormal behaviour): (1) attitudes toward socially desirable

responses ( $60.28 \pm 0.99$ ), (2) tendency to addiction ( $54.15 \pm 0.64$ ), (3) tendency to overcome the norms ( $53.31 \pm 0.84$ ), and (4) tendency to delinquent behaviour ( $52.88 \pm 0.70$ ). The indicator of “propensity for aggression and violence” was within the normal range ( $45.96 \pm 0.99$ ), while the indicators of “volitional control of emotional reactions” ( $47.15 \pm 1.18$ ) and “propensity to self-destructive behaviour” ( $47.02 \pm 0.90$ ) were below normal. Spearman correlation analysis revealed a relationship between all propensities for a particular deviant behaviour,  $\rho = 0.52 \pm 0.52, p < 0.05$ .

Correlation analysis between anxiety measures and deviant behaviours showed weak to moderate relationships between anxiety state and (1) a tendency to addictive behaviour, (2) self-destructive behaviour, and (3) aggression and violence, as well as a strong correlation with tendency to volitional control of emotional reactions. For trait anxiety, there was a weak correlation with propensity for aggression and violence, and strong correlation with volitional control of emotional reactions (Table 5).

**Table 5**

*Correlation coefficients between indices of anxiety and tendency to deviant behavior (n=120)*

Variable	Spearman Rank Order Correlations (PS+SC 120)	
	Trait anxiety (Personal anxiety)	State anxiety (Situational anxiety)
Installation on socially desirable answers	<b>-0.382</b>	<b>-0.314</b>
Propensity to overcome rules and regulations	-0.095	-0.035
Propensity for addictive behaviour	0.045	<b>0.188</b>
Tendency to self-destructive behaviour	0.054	<b>0.206</b>
Tendency to aggression and violence	<b>0.223</b>	<b>0.340</b>
Tendency to volitional control of emotional reactions	<b>0.499</b>	<b>0.562</b>
Propensity for delinquent behaviour	0.039	0.160

*Note.* Significant indicators are highlighted in bold ( $p < 0.05$ ). Missing data deleted pairwise.

Correlation analysis between the intensity of psychological defenses and the tendency to deviant behaviour is summarized in Table 6. The analysis found weak to moderate relationships between the propensity for addictive behaviour and the psychological defenses of regression, compensation, and displacement. Tendency to self-



destructive behaviour was weakly to moderately correlated with the psychological defenses of compensation, projection, displacement, and intellectualization. Tendency to aggression and violence was moderately correlated with repression, regression, and projection, and strongly correlated with compensation and displacement. Volitional control of emotional reactions showed similar correlations, except those with regression and projection were strong rather than moderate. Finally, the analysis indicated weak to moderate relationships between the propensity for delinquent behaviour and the psychological defenses of regression, compensation, and displacement. The use of regression analysis to predict the main outcomes was impractical due to the small sample size.

**Table 6**

*Correlation coefficients between the intensity of psychological defenses and the tendency to deviant group behaviour (n = 120)*

Variable	Spearman Rank Order Correlations (PS+SC 120)							
	Denial	Repression	Regression	Compensation	Projection	Displacement	Intellectualization	Rationalization
Installation on socially desirable answers	<b>0.208</b>	-0.082	<b>-0.539</b>	<b>-0.507</b>	<b>-0.568</b>	<b>-0.474</b>	0.0365	-0.030
Propensity to overcome rules and regulations	0.162	-0.114	-0.064	-0.057	-0.075	0.100	0.082	<b>-0.223</b>
Propensity for addictive behaviour	-0.016	-0.026	<b>0.255</b>	<b>0.251</b>	0.172	<b>0.382</b>	0.143	0.053
Tendency to self-destructive behaviour	0.156	-0.113	0.095	<b>0.197</b>	<b>0.237</b>	<b>0.425</b>	<b>0.303</b>	-0.098
Tendency to aggression and violence	0.001	<b>0.229</b>	<b>0.360</b>	<b>0.501</b>	<b>0.351</b>	<b>0.651</b>	0.112	0.130
Tendency to volitional control of emotional reactions	-0.124	<b>0.236</b>	<b>0.673</b>	<b>0.617</b>	<b>0.580</b>	<b>0.705</b>	0.030	0.164
Propensity for delinquent behaviour	0.049	-0.078	<b>0.227</b>	<b>0.330</b>	0.101	<b>0.296</b>	0.058	0.049

*Note.* Significant indicators are highlighted in bold ( $p < 0.05$ ). Missing data deleted pairwise

## CONCLUSION

The psycho-social adaptation of participants was influenced by psychotic personality traits including hypochondria, impulsiveness, paranoia, psychasthenia, and schizophrenia. These traits led to reduced socialization, loss of contact with reality, paradoxical perceptions and behaviours based on delusions (triggered and intensified by drug use), and desire for addictive behaviours. Further, a direct positive correlation was established suggesting that an increase in anxiety can lead to increases in active negativism, conflict, aggressiveness, drug consumption, and the intensity of destructive psychological defenses.

We found that when patients broke the hospital rules of conduct, their action led to increased desire for addictive, non-normative, and delinquent behaviours. As a result, individuals were drawn to those who shared their anti-social attitudes and behaviours. While the increased interaction between patients who had a similar diagnosis reduced their aggressiveness, it led to the development of hospitalism—a lack of desire to be discharged from the hospital. The psychiatric hospital's rules of conduct helped patients to restrain their urges to use drugs and follow the rules of conduct. Changes in the environment and patterns of behaviour caused patients to develop a negative view of self and have impaired communication, which led to prolonged hospitalization.

### **Conflict of Interest**

There is no conflict of interest.

### **Availability of data and materials**

Data will be made available upon reasonable request.

### **Funding source**

None.

### **Ethics statement**

The work complies with the ethical standards of the Helsinki Declaration of the WMA (protocol of the meeting of the Ethics Committee of Mental Health Research Institute no. 114 of October 22, 2018; protocol of the meeting of the Ethics Committee of Mental Health Research Institute no. 133 of June 19, 2020 (no. 133/5. 2020))

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