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Prevalence of demographic correlates of paranoia-like thoughts in the non-clinical Polish population

Rozpowszechnienie demograficznych korelatów myśli paranoicznych w nieklinicznej populacji polskiej

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Abstract

Introduction and objective: Paranoia involves a set of situationally inadequate beliefs about the threat posed by others, perceived as a source of intentional harm. Research indicates that milder forms of paranoid-like thoughts also exist in the healthy population. Hence, paranoia can currently be understood as a phenomenon existing on a continuum, reflecting the distribution of paranoid thoughts in the general population. The purpose of the study was to analyse the prevalence and severity of paranoia-like thoughts in the non-clinical population. Furthermore, demographic variables, i.e. gender, age, occupational situation, education, as well as the presence of mental or psychiatric disorders during life and the use of marijuana and other psychoactive substances were examined as factors contributing to the severity of paranoia-like thoughts. **Materials and methods:** The subjects were obtained from eight studies conducted between 2020 and 2022. Data from 3,869 individuals (71% female) aged 16–77 years were analysed concerning metrics and outcomes obtained on the Revised Green et al. Paranoid Thoughts Scale (R-GPTS). **Results:** The mean R-GPTS score was 13.31 ($SD = 14.18$). Only 10% of respondents declared no paranoid thoughts. Age, education, and place of residence were significant correlates. A significantly higher intensity of paranoia-like thoughts was observed in those diagnosed with mental disorders and those who had used psychoactive substances in the past year. **Conclusions:** In line with findings from other countries, most individuals in Poland experience some degree of paranoia-like thoughts, with severity associated with certain demographic variables and the presence of mental disorders.

Keywords: paranoia, paranoia-like thoughts, R-GPTS

Streszczenie

Wprowadzenie i cel: Paranoja to zbiór nieadekwatnych sytuacyjnie przekonań dotyczących zagrożenia ze strony innych osób, które są postrzegane jako źródło zamierzonej krzywdy. Badania wskazują, że łagodniejsze formy myśli paranoicznych występują również w populacji nieklinicznej. W związku z tym paranoja może być obecnie rozumiana jako zjawisko istniejące na kontinuum, co wskazuje na ciągłość w dystrybucji myśli paranoicznych w populacji. Celem badania była analiza rozpowszechnienia i nasilenia myśli paranoicznych w populacji nieklinicznej. Ponadto uwzględniono zmienne demograficzne, takie jak płeć, wiek, sytuacja zawodowa i wykształcenie, a także obecność zaburzeń psychicznych lub psychiatrycznych w ciągu życia oraz używanie marihuany i innych substancji psychoaktywnych jako czynniki przyczyniające się do nasilenia myśli paranoicznych. **Materiał i metody:** Dane pochodziły z ośmiu różnych badań prowadzonych w latach 2020–2022. Analizowano informacje zebrane od 3869 osób (71% stanowiły kobiety) w wieku od 16 do 77 lat, dotyczące jedynie zmiennych demograficznych oraz wyników uzyskanych w Zrewidowanej Skali Myśli Paranoicznych (Revised Green et al. Paranoid Thoughts Scale, R-GPTS). **Wyniki:** Średni wynik w skali R-GPTS wyniósł 13,31 ($SD = 14,18$). Tylko 10% respondentów zadeklarowało brak myśli paranoicznych. Wiek, wykształcenie i miejsce zamieszkania okazały się istotnymi korelatami tych myśli. Istotnie wyższe nasilenie

myśli paranoicznych zaobserwowano u osób, u których zdiagnozowano zaburzenia psychiczne, oraz u tych, które używały substancji psychoaktywnych w ciągu ostatniego roku. **Wnioski:** Zgodnie z wynikami badań przeprowadzonych w innych krajach większość populacji w Polsce doświadcza pewnego stopnia myśli paranoicznych, a ich nasilenie jest związane z niektórymi zmiennymi demograficznymi i obecnością zaburzeń psychicznych.

Słowa kluczowe: paranoja, myśli podobne do paranoicznych, R-GPTS

INTRODUCTION

Paranoia involves a set of situationally inadequate beliefs about the threat posed by others, perceived as a source of intentional harm (Freeman et al., 2015). It is accompanied by a strong, unfounded fear of others, excessive distrust in social relationships, and a sense of persecution (Freeman et al., 2011). While often associated with mental disorders involving persecutory delusions, research indicates that milder paranoid-like thoughts also occur in the healthy population (Freeman, 2007), even in approximately 20% of individuals (Freeman, 2016). Hence, paranoia can currently be understood as a phenomenon existing on a continuum, according to the theoretical model (Freeman et al., 2002), reflecting the continuity in the distribution of paranoid thoughts across the population (van Os et al., 2009). Paranoia exists along a spectrum, ranging from mild paranoid-like thoughts to severe persecutory delusions, and is linked to an increased risk of developing psychosis. Individuals at ultra-high risk for psychosis (UHR) exhibit attenuated psychotic-like symptoms and cognitive biases, such as a tendency to jump to conclusions, bias against disconfirmatory evidence, bias against confirmatory evidence, and liberal acceptance bias (Kotowicz et al., 2022; Rek-Owodzin and Konopka, 2023), which have been found to be associated with both subclinical and clinical psychotic symptoms (Gawęda et al., 2024). The emergence of paranoia-like thoughts at the extreme end of the continuum results from an interaction between susceptibility (arising from genetic, social, psychological, and biological factors) and the environment (biological, psychological, or social) (Freeman et al., 2002). These thoughts are linked to heightened negative emotions, impaired psychosocial functioning, and co-occurrence with other experiences akin to psychotic symptoms (Freeman et al., 2015), making them a key area of research. Sometimes distrust of others can be adaptive, depending on political or social context (Freeman et al., 2011). Problems arise when these thoughts become excessive and unjustified, causing intense anxiety and disrupting daily functioning (Freeman et al., 2005). Studies involving healthy individuals (non-clinical group) indicate that intense paranoid-like thoughts are associated with experiencing sadness, powerlessness, and social isolation (Freeman et al., 2005, 2011). Consequently, these thoughts entail a range of negative mental health consequences, reflected in co-occurring mental disorders (Freeman et al., 2011). Most research focuses on anxiety and depressive disorders (Na et al., 2019), social phobia, post-traumatic stress disorder,

insomnia (Freeman et al., 2011), eating disorders (Catone et al., 2021), and obsessive-compulsive (OCD) symptoms (Hagen et al., 2017). Given the high prevalence of diagnosed mental disorders in the general population (Chekole and Abate, 2021), a further aim of this article is to assess the intensity of such thoughts among individuals reporting psychiatric conditions.

In the search for environmental factors, considerable attention has been paid to psychoactive substances, mainly cannabis, containing tetrahydrocannabinol (THC), which can cause transient symptoms, behaviours, and cognitive deficits (D'Souza et al., 2004). Experimental studies also suggest a link between cannabis consumption and paranoid thoughts (Freeman et al., 2015). The important role of psychoactive substances in increasing psychosis risk is further confirmed by recent reviews (Fiorentini et al., 2021).

The present study aims to analyse the frequency of individual paranoia-like thoughts using data extracted from the Revised Green et al. Paranoid Thoughts Scale (R-GPTS) (Freeman et al., 2021), which includes subscales measuring persecutory and referential thoughts. To our knowledge, there is a lack of research on such thoughts in large non-clinical samples. Previous studies focused on a small group, mainly students (Prochwicz and Gawęda, 2015). The primary objective of this article is therefore to describe the prevalence and intensity of such thoughts in the general population of healthy individuals, considering various demographic variables such as gender, age, occupational status, education, as well as their associations with the presence of psychiatric disorders and the use of marijuana and other psychoactive substances.

MATERIALS AND METHODS

The data analysed in this article comes from eight online surveys conducted by the Laboratory of Experimental Psychopathology at the Institute of Psychology of the Polish Academy of Sciences between 2020 and 2022. Although some findings from these datasets have been published previously (Bagrowska et al., 2022a, 2022b; Kowalski and Gawęda, 2022; Kowalski et al., 2020), these studies did not focus on the characteristics and prevalence of paranoia-like thoughts.

Participants

Participants were involved in one of eight online studies, recruited through advertisements on social media platforms, primarily Facebook, and by the snowball method. A total of

5,023 individuals participated in the studies, with data from 3,869 individuals (including 71% women) used for analysis. Participants who did not complete the entire survey or failed to fill out the R-GPTS questionnaire were excluded from the analysis. All participants provided informed consent, and all studies received approval from the Ethics Committee of the Institute of Psychology, Polish Academy of Sciences, in Warsaw, conducted in accordance with the latest version of the Helsinki Declaration.

Questionnaires

Demographics

Respondents were asked to provide information on their gender, education, age, lifetime diagnoses of mental disorders, lifetime use of mental health medications, lifetime and past-year use of psychoactive substances, and frequency of alcohol consumption in the last month. Some were also asked to report their current weight, height, and level of physical activity.

R-GPTS

R-GPTS (Freeman et al., 2021) is a questionnaire with 18 items that measure the level of severity of paranoia-like thoughts on two subscales – ideas of reference (Cronbach’s $\alpha = 0.90$) and ideas of persecution (Cronbach’s $\alpha = 0.93$). A Polish adaptation of this scale was used (Kowalski et al., 2020).

Procedure

The study was conducted online using a survey distributed through the Qualtrics platform. First, participants were asked to give informed consent to confirm that participation was voluntary, anonymous, and could be discontinued at any time. Failure to provide informed consent prevented participation in the study.

Statistical analyses

Statistical analyses were performed using SPSS 27. Spearman correlation analyses were conducted to determine relationships between variables. Student’s *t*-tests were used to examine gender differences in the intensity of paranoia-like thoughts, assess variations in the intensity of paranoid thoughts between individuals with and without a diagnosis of mental disorders, and identify differences in the intensity of paranoid thoughts between substance users and non-users – both over a lifetime and in the past year. To explore differences between individuals using only cannabis and those using multiple psychoactive substances, a one-way analysis of variance (ANOVA) was conducted.

RESULTS

The characteristics of the subjects are shown in Tab. 1. Scores on the R-GPTS scale suggest that the severity of paranoia-like thoughts is at an “average” level for both

	<i>n</i> (%)		<i>M</i> (<i>SD</i>)	Range
Sex: • Female • Male • Other	2,748 (71) 1,033 (26.7) 88 (2.3)	Age	31.05 (10.43)	16–77
		Body mass index	24.56 (5.66)	12.4–56.46
		R-GPTS (paranoia)	13.31 (14.175)	0–72
		Reference	8.46 (7.60)	0–32
Education: • Primary • Vocational • Secondary • Higher	80 (2.1) 32 (0.8) 1,328 (34.3) 2,429 (62.8)	Persecution	4.85 (7.66)	0–40
Professional situation: • Employed • Unemployed • Retired • Student	2,501 (64.6) 345 (8.9) 95 (2.5) 1,371 (35.4)			
Place of residence • Village • City with less than 100,000 inhabitants • City of 100,000 to 499,000 inhabitants • City with more than 500,000 inhabitants	443 (11.4) 691 (17.9) 670 (17.3) 2,065 (53.4)			
Psychiatric diagnosis: • Anxiety disorder • Depression • Bipolar disorder • Schizophrenia • Obsessive compulsive disorder • Addictions • Eating disorder • Personality disorder • Other	1,596 (41.3) 845 (21.8) 1,181 (30.5) 103 (2.7) 21 (0.5) 116 (3.0) 78 (2.0) 190 (4.9) 283 (7.3) 159 (4.1)			
Medication use: • Antidepressants • Anti-anxiety drugs • Antipsychotics • Sleeping pills • Other	1,757 (45.4) 1,485 (38.4) 876 (22.6) 142 (3.7) 458 (11.8) 240 (6.2)			
Substance use: • Cannabis/hashish • (Meta)amphetamine • MDMA (ecstasy) • Cocaine • Heroin • LSD • Psilocybin • Legal highs • Other	2,292 (59.2) 1,521 (39.3) 426 (11.0) 468 (12.1) 244 (6.3) 25 (0.6) 335 (8.7) 270 (7.0) 180 (4.7) 129 (3.3)			

Tab. 1. Demographics of participants (N = 3,869)

Category	Reference	n (%)	Persecution	n (%)
	Range		Range	
Average	0–9	2,467 (63.8)	0–5	2,788 (72.1)
Elevated	10–15	704 (18.2)	6–10	465 (12.0)
Moderately severe	16–20	333 (8.6)	11–17	290 (7.5)
Severe	21–24	183 (4.7)	18–27	207 (5.4)
Very severe	25+	182 (4.7)	28+	119 (3.1)

Tab. 2. Prevalence of paranoid thoughts by severity (N = 3,869)

subscales. Only 10% of all respondents scored “0”. The number of individuals who experience elevated or severe levels of paranoid thoughts is shown in Tab. 2. Cutoff points were based on the study by Freeman et al. (2021). We also examined the prevalence of individual paranoid thoughts (Fig. 1) extracted from the R-GPTS scale (Freeman et al., 2021).

Demographic variables and paranoia-like thoughts

Further, an analysis of demographic correlates was conducted in the context of the severity of paranoid thoughts. Among women, the mean score on the paranoid thoughts scale was $M = 13.40$, $SD = 14.24$; among men, $M = 12.45$, $SD = 13.21$ ($p > 0.05$). There were also no differences between men and women on any particular subscale. Significant gender differences were observed between the items: “I spent time thinking

about my friends gossiping about me” $t(2033.202) = 3.178$, $p = 0.002$, $d = 0.11$ (women $M = 0.88$, $SD = 1.18$, men $M = 0.75$, $SD = 1.07$); “I have been upset by friends and colleagues judging me critically” $t(1897.845) = 3.06$, $p = 0.002$, $d = 0.11$ (women $M = 1.37$, $SD = 1.33$, men $M = 1.23$, $SD = 1.30$); “People talking about me behind my back upset me” $t(1993.887) = 2.63$, $p = 0.009$, $d = 0.09$ (women $M = 1.10$, $SD = 1.40$, men $M = 0.97$, $SD = 1.30$); “I was sure that someone wanted to hurt me” $t(2053.068) = 2.16$, $p = 0.03$, $d = 0.08$ (women $M = 0.46$, $SD = 1.01$, men $M = 0.38$, $SD = 0.900$); “I couldn’t stop thinking about people wanting to confuse me” $t(2127.671) = 3.80$, $p < 0.001$, $d = 0.13$ (women $M = 0.65$, $SD = 1.13$, men $M = 0.50$, $SD = 0.98$); and “It was difficult to stop thinking about people wanting to make me feel bad” $t(2139.978) = 5.012$, $p < 0.001$, $d = 0.17$ (women $M = 0.72$, $SD = 1.20$, men $M = 0.52$, $SD = 1.03$). Correlations were observed between paranoid thoughts and education ($r = -0.21$; $p < 0.001$), age ($r = -0.25$; $p < 0.001$),

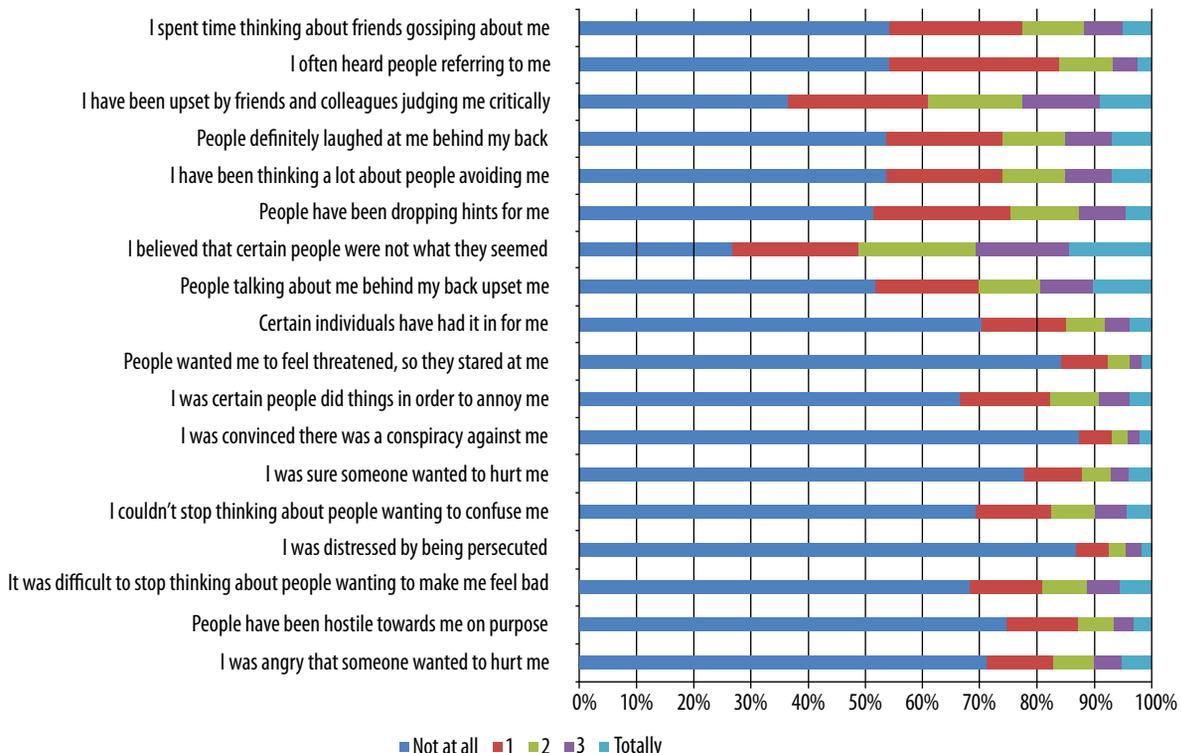


Fig. 1. Prevalence of individual paranoid thoughts (R-GPTS) (N = 3,869)

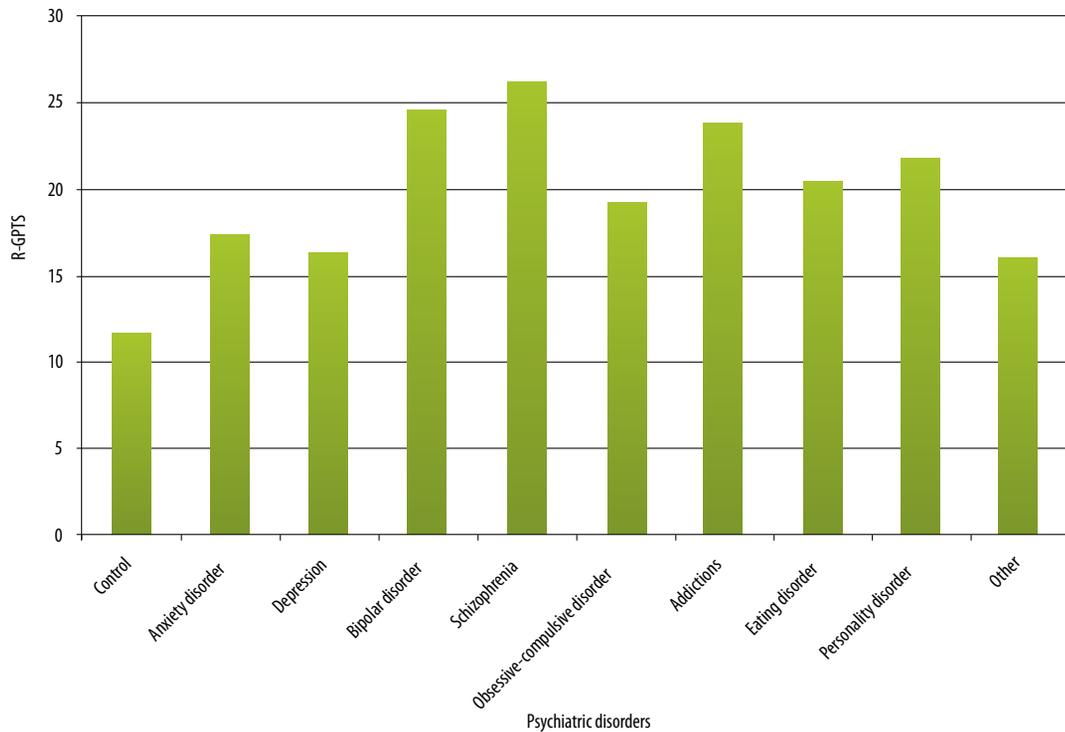


Fig. 2. Paranoid thoughts in specific psychiatric disorders (N = 3,869)

physical activity ($r = -0.07$; $p = 0.012$), and place of residence ($r = -0.06$; $p < 0.001$). However, no significant correlations were found between paranoid thoughts and the frequency of alcohol consumption in the last month and body mass index.

Mental disorders and paranoid thoughts

Fig. 2 shows the mean scores on R-GPTS scale in each category of mental disorders.

The results indicate significant differences in the intensity of paranoia-like thoughts between individuals without and with a psychiatric disorder diagnosis, $t(3023.751) = 8.592$; $p < 0.001$, $d = 0.312$. The mean score in the group without a psychiatric disorder was $M = 11.632$ ($SD = 12.91$), while in the group with a psychiatric diagnosis, it was $M = 15.696$ ($SD = 15.5$).

Psychoactive substances and paranoid thoughts

Fig. 3 shows the mean scores on the R-GPTS scale in the context of psychoactive substance use.

There were no statistically significant differences in the severity of paranoid-like thoughts between those who declared having used any psychoactive substances during their lifetime and those who had never used any psychoactive substances.

Some studies also included an additional question about drug use within the previous year ($n = 1194$). Here, statistically significant differences in the intensity of paranoid thoughts were observed between those who reported using psychoactive substances in the past year ($n = 648$) and

those who declared that they had not used such substances in the past year – $t(1186.738) = 4.113$, $p < 0.001$, $d = 0.239$. The mean score among past-year users was $M = 16.51$ ($SD = 15.97$), while in non-users of psychoactive substances, it was $M = 12.90$ ($SD = 14.38$).

A one-way ANOVA was conducted to examine differences in the experience of paranoid thoughts between cannabis-only users, users of substances other than cannabis, users of multiple psychoactive substances, and non-users. The results showed significant differences between the groups $F(3,3865) = 3.24$, $p = 0.021$. Post hoc tests indicated statistically significant ($p < 0.024$) differences between non-users – $M = 12.80$ ($SD = 13.78$) – and users of multiple psychoactive substances – $M = 14.50$ ($SD = 15.15$). Because of unequal group sizes, non-parametric tests (Kruskal–Wallis test) were performed to confirm the obtained results. The outcome also indicated significant intergroup differences; thus, the results of the one-way ANOVA analysis are reported.

DISCUSSION

This study aimed to examine the prevalence of paranoia-like thoughts in a non-clinical population and to determine their associations with demographic variables, self-reported diagnoses of psychiatric disorders, and psychoactive substance use. Moreover, specific items related to referential and paranoid thoughts extracted from the R-GPTS scale (Freeman et al., 2021) were analysed. The dataset allowed for a detailed analysis of the frequency of paranoia-like thoughts and their primary correlates.

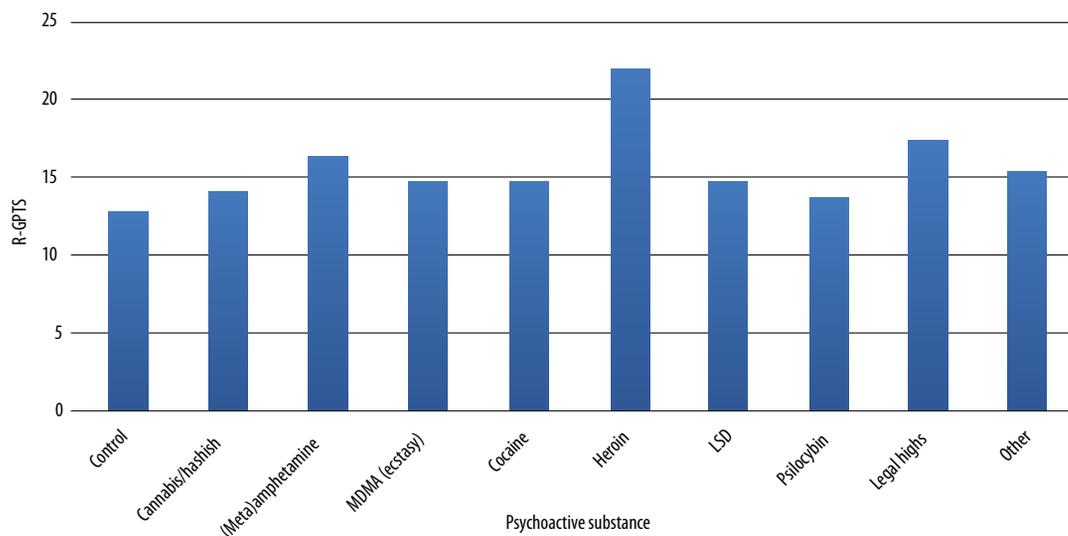


Fig. 3. Paranoid thoughts in relation to the psychoactive substance used (N = 3,869)

The findings showed that only 10% of subjects had not experienced any paranoia-like thoughts in the past month. An elevated score of experienced paranoid thoughts on the R-GPTS scale occurred in 12–18.2% of subjects. This is consistent with previous results (Freeman et al., 2005), where approximately one-third of British participants reported similar thoughts. These findings suggest that the percentage of individuals with such thoughts remains relatively consistent across different countries. Among those reporting paranoid thoughts, a significant 73% believed that some individuals were not as they appeared. This proportion is comparable, albeit slightly higher, than a previous study (Prochwicz and Gawęda, 2015), where 58% of participants experienced such thoughts.

An important goal of the study was to verify the association between paranoid thoughts and demographic factors to identify groups more prone to such thoughts. Previous studies have indicated a correlation between these thoughts and gender, age, education, and place of residence (Freeman et al., 2011). Paranoia-like thoughts were more intense in males, younger individuals, those with less education, and those living in smaller towns. Indeed, adolescence is a time of increased social processing and hypersensitivity to peer rejection (Blakemore and Mills, 2014; Sebastian et al., 2010). Moreover, individuals with lower education may feel socially trapped and helpless (Araya et al., 2003), contributing to the development of mental disorders, according to some authors. According to the hierarchy of paranoid thought development (Freeman et al., 2005), increased susceptibility to injury (e.g. from experiences of rejection or helplessness) may be a significant context for the emergence of paranoid thoughts.

In the current study, no significant gender differences were observed in the overall scores or on specific subscales of paranoid thoughts. However, analysis of particular items

showed that some thoughts were significantly more frequent in women. While prior research suggested a higher intensity of paranoid thoughts among men (Freeman et al., 2011), our results surprisingly showed significant differences among specific items, where women scored higher. Although gender differences were insignificant in the total score, we noticed a change in the trend, as the average intensity of such thoughts was higher in women. The results also indicated a relationship between paranoid thoughts and place of residence, with lower intensity of paranoid thoughts correlating with an increase in the population size, contradicting previous findings (Freeman et al., 2011). Despite the statistical significance of this relationship, it was very weak, potentially due to the lack of a representative sample; therefore, these results should be interpreted with caution.

Another factor studied was the occurrence of paranoid thoughts in psychiatric disorders. Despite targeting non-clinical individuals, a surprising 41.3% declared a diagnosis of psychiatric disorders. This indicates a high prevalence of psychiatric disorders in the population, consistent with the latest meta-analysis (Chekole and Abate, 2021), reporting rates of 33.59% for anxiety disorders and 29.98% for depression. The high percentage of individuals reporting a psychiatric diagnosis may stem from the method of recruiting participants, which was done online by posting announcements on the main social media profile of the Laboratory of Experimental Psychopathology, which is more frequently viewed by those interested in mental health. These results, however, provided valuable insights. As expected, the level of paranoid thoughts was higher in individuals with a history of psychiatric disorders than in those declaring no diagnosis of any disorders (Freeman et al., 2011). Furthermore, individuals diagnosed with schizophrenia or bipolar affective disorder scored highest on the paranoid thoughts scale,

while those with depression scored the lowest, though still higher than individuals without any diagnosis. These analyses are exploratory, as all diagnoses were based on self-report. Therefore, caution is warranted when interpreting these results due to substantial variations in the number of individuals declaring a diagnosis of a specific disorder. Current literature lacks extensive research on the co-occurrence of paranoid thoughts with neurodevelopmental disorders (Misiak et al., 2023), eating disorders other than anorexia and bulimia, and multiple concurrent psychiatric disorders, which could represent an interesting and needed direction for future research.

Paranoia-like thoughts were also considered in the context of psychoactive substance use. While the nature of the relationship is challenging to determine, the association is well-documented (Gobbi et al., 2019). Research indicates that the use of THC/marijuana increases the risk of both experiences similar to psychotic symptoms (Barkus et al., 2006) and psychotic symptoms themselves (Marconi et al., 2016). Some studies also suggest that discontinuing THC use may be beneficial in reducing psychotic experiences (van Gastel et al., 2014). In the current study, no significant differences in the prevalence of paranoia-like thoughts were found between individuals declaring the use of psychoactive substances “ever” and those who did not consume them. However, concerning the question of consuming psychoactive substances “within the last year”, significant differences were observed. This may suggest a link between active drug use and the emergence of psychotic symptoms, unlike substance use “ever”, which may imply the absence of sustained symptoms caused by substance use in the longer term. The results also highlight significant differences between the group of individuals never consuming psychoactive substances and those using more than one substance. This outcome may suggest that individuals using cannabis and other psychoactive substances face a higher risk of developing paranoid thoughts. To verify this hypothesis, further research on the phenomenon of polydrug use (simultaneous consumption of multiple psychoactive substances) in the context of paranoid thoughts is needed. The route of administration (Hindley et al., 2020), dosage, and age of onset of use (Gan et al., 2018), and, in the case of marijuana, THC content (Fiorentini et al., 2021) play a crucial role. Overall, most results are consistent, showing a linear relationship, with the risk of psychosis increasing alongside greater use of cannabis (Marconi et al., 2016), methamphetamine (Gan et al., 2018), or cocaine (Vorspan et al., 2011).

Several considerations should be taken into account when interpreting the results. The recruitment method and reliance on self-report represent study limitations. However, the tools employed exhibit high psychometric properties, mitigating this constraint. The study primarily involved women (71%), individuals with higher education (62.8%), and residents of large cities (53.4%), limiting the generalisability of results to the overall population. Additionally, some intergroup comparisons were conducted with uneven

sample sizes, which, though providing valuable insights for further research, should be interpreted cautiously.

This study is part of the most extensive investigation into the prevalence and correlates of paranoid thoughts in Poland. Similar to previous international studies, the results suggest a high prevalence of thoughts with lesser clinical significance and less frequent occurrence of thoughts closer to clinical states. Notably, essential demographic variables allow for the differentiation of paranoid thoughts.

CONCLUSIONS

1. Paranoia-like thoughts are present in most individuals in the non-clinical Polish population, as only 10% of all respondents did not experience such thoughts during the past month.
2. Age, education, and place of residence are identified among significant demographic correlates.
3. Individuals with a diagnosis of a psychiatric disorder have a higher intensity of paranoia-like thoughts.
4. Those with a higher severity of paranoia-like thoughts are more likely to use marijuana and other psychoactive substances.

Conflict of interest

The authors do not report any financial or personal connections with other persons or organisations which might negatively affect the content of this publication and/or claim authorship rights to this publication.

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Author contribution

Original concept of study: JP. Collection, recording and/or compilation of data: PB, JK, RPU. Analysis and interpretation of data: JP, PB. Writing of manuscript: JP, PB, ŁG. Critical review of manuscript: JK, ŁG. Final approval of manuscript: ŁG.

References

- Araya R, Lewis G, Rojas G et al.: Education and income: which is more important for mental health? *J Epidemiol Community Health* 2003; 57: 501–505.
- Bagrowska P, Pionke-Ubych R, Gawęda Ł: Bridging the gap between body image and paranoia-like thoughts. *J Psychiatr Res* 2022a; 156: 660–667.
- Bagrowska P, Pionke-Ubych R, Majchrowicz K et al.: The mediating effect of negative emotions on the relationship between subjective sleep quality and paranoia-like thoughts. *J Psychiatr Res* 2022b; 145: 132–136.
- Barkus EJ, Stirling J, Hopkins RS et al.: Cannabis-induced psychosis-like experiences are associated with high schizotypy. *Psychopathology* 2006; 39: 175–178.
- Blakemore SJ, Mills KL: Is adolescence a sensitive period for sociocultural processing? *Annu Rev Psychol* 2014; 65: 187–207.
- Catone G, Salerno F, Muzzo G et al.: Association between anorexia nervosa and other specified eating or feeding disorders and paranoia in adolescents: what factors are involved? *Riv Psichiatr* 2021; 56: 100–106.
- Chekole YA, Abate SM: Global prevalence and determinants of mental health disorders during the COVID-19 pandemic: a systematic review and meta-analysis. *Ann Med Surg (Lond)* 2021; 68: 102634.
- D'Souza DC, Perry E, MacDougall L et al.: The psychotomimetic effects of intravenous delta-9-tetrahydrocannabinol in healthy individuals: implications for psychosis. *Neuropsychopharmacology* 2004; 29: 1558–1572.
- Fiorentini A, Cantù F, Crisanti C et al.: Substance-induced psychoses: an updated literature review. *Front Psychiatry* 2021; 12: 694863.
- Freeman D: Persecutory delusions: a cognitive perspective on understanding and treatment. *Lancet Psychiatry* 2016; 3: 685–692.
- Freeman D: Suspicious minds: the psychology of persecutory delusions. *Clin Psychol Rev* 2007; 27: 425–457.
- Freeman D, Dunn G, Murray RM et al.: How cannabis causes paranoia: using the intravenous administration of Δ^9 -tetrahydrocannabinol (THC) to identify key cognitive mechanisms leading to paranoia. *Schizophr Bull* 2015; 41: 391–399.
- Freeman D, Garety P, Kuipers EA et al.: A cognitive model of persecutory delusions. *Br J Clin Psychol* 2002; 41: 331–347.
- Freeman D, Garety PA, Bebbington PE et al.: Psychological investigation of the structure of paranoia in a non-clinical population. *Br J Psychiatry* 2005; 186: 427–435.
- Freeman D, Loe BS, Kingdon D et al.: The revised Green *et al.*, Paranoid Thoughts Scale (R-GPTS): psychometric properties, severity ranges, and clinical cut-offs. *Psychol Med* 2021; 51: 244–253.
- Freeman D, McManus S, Brugha T et al.: Concomitants of paranoia in the general population. *Psychol Med* 2011; 41: 923–936.
- Gan H, Zhao Y, Jiang H et al.: A research of methamphetamine induced psychosis in 1,430 individuals with methamphetamine use disorder: clinical features and possible risk factors. *Front Psychiatry* 2018; 9: 551.
- van Gastel WA, Vreeker A, Schubart CD et al.: Change in cannabis use in the general population: a longitudinal study on the impact on psychotic experiences. *Schizophr Res* 2014; 157: 266–270.
- Gawęda Ł, Kowalski J, Aleksandrowicz A et al.: A systematic review of performance-based assessment studies on cognitive biases in schizophrenia spectrum psychoses and clinical high-risk states: a summary of 40 years of research. *Clin Psychol Rev* 2024; 108: 102391.
- Gobbi G, Atkin T, Zytynski T et al.: Association of cannabis use in adolescence and risk of depression, anxiety, and suicidality in young adulthood: a systematic review and meta-analysis. *JAMA Psychiatry* 2019; 76: 426–434.
- Hagen K, Solem S, Opstad HB et al.: The role of metacognition and obsessive-compulsive symptoms in psychosis: an analogue study. *BMC Psychiatry* 2017; 17: 233.
- Hindley G, Beck K, Borgan F et al.: Psychiatric symptoms caused by cannabis constituents: a systematic review and meta-analysis. *Lancet Psychiatry* 2020; 7: 344–353.
- Kotowicz KD, Gawęda Ł, Misiak B et al.: The role of the cognitive biases along the psychosis continuum: from pathophysiology to treatment options. *Arch Psychiatr Psychother* 2022; 24: 49–53.
- Kowalski J, Gawęda Ł: Persecutory beliefs predict adherence to epidemiological safety guidelines over time – a longitudinal study. *Psychol Med* 2022; 52: 1393–1394.
- Kowalski J, Marchlewska M, Molenda Z et al.: Adherence to safety and self-isolation guidelines, conspiracy and paranoia-like beliefs during COVID-19 pandemic in Poland – associations and moderators. *Psychiatry Res* 2020; 294: 113540.
- Marconi A, Di Forti M, Lewis CM et al.: Meta-analysis of the association between the level of cannabis use and risk of psychosis. *Schizophr Bull* 2016; 42: 1262–1269.
- Misiak B, Samochowiec J, Gawęda Ł et al.: Association of sociodemographic, proximal, and distal clinical factors with current suicidal ideation: findings from a non-clinical sample of young adults. *Eur Psychiatry* 2023; 66: 1–30.
- Na EJ, Choi KW, Hong JP et al.: Paranoid ideation without psychosis is associated with depression, anxiety, and suicide attempts in general population. *J Nerv Ment Dis* 2019; 207: 826–831.
- van Os J, Linscott RJ, Myin-Germeys I et al.: A systematic review and meta-analysis of the psychosis continuum: evidence for a psychosis proneness-persistence-impairment model of psychotic disorder. *Psychol Med* 2009; 39: 179–195.
- Prochwicz K, Gawęda Ł: The Polish version of the Peters et al. Delusions Inventory: factor analysis, reliability and the prevalence of delusion-like experiences in the Polish population. *Psychiatr Pol* 2015; 49: 1203–1222.
- Rek-Owodziń KI, Konopka AM: Cognitive-behavioral therapy in ultra high risk states of psychosis (UHR). *Arch Psychiatr Psychother* 2023; 1: 7–13.
- Sebastian C, Viding E, Williams KD et al.: Social brain development and the affective consequences of ostracism in adolescence. *Brain Cogn* 2010; 72: 134–145.
- Vorspan F, Bloch V, Brousse G et al.: Prospective assessment of transient cocaine-induced psychotic symptoms in a clinical setting. *Am J Addict* 2011; 20: 535–537.