

Creativity and schizophrenia: a literature review of the problem

Nataliia Zaviazkina, Oleksandra Balashevych

Abstract

Aim of the Study: This study aims to examine the correlation between creativity and schizophrenia through a comprehensive review of contemporary research, focusing on the unique aspects of creative expressions in individuals diagnosed with schizophrenia.

Subject or Material and Methods: The study encompasses a literature review conducted across multiple databases, including PubMed, Web of Science, Google Scholar, and Scopus. The search strategy involved specific keywords related to creativity and schizophrenia, identifying two main categories: “Creativity and schizophrenia” and “Creative products of schizophrenia patients,” with relevant subcategories. Literature that did not investigate these subcategories or had more up-to-date analogues been excluded.

Results: The findings indicate that schizophrenia affects various cognitive processes crucial for creativity, such as working memory, cognitive flexibility, mental processes, and executive functions. Generally, schizophrenia results in diminished creative abilities compared to other mental disorders. However, the symptoms can have a dual impact on creative thinking, either enhancing or impeding it based on their severity and influence on cognitive processes. Art created by individuals with schizophrenia displays distinct features, including deviations in values, reduced complexity, and unique color choices.

Conclusions: This literature review highlights the complex relationship between schizophrenia and creativity. While schizophrenia generally impairs creative abilities, its impact on creativity is multifaceted and merits further exploration to enhance treatment approaches for patients with mental disorders. The study suggests that creativity can play a significant role in the therapeutic process, improving overall well-being and providing deeper insights into the cognitive and emotional experiences of individuals with schizophrenia.

creativity; cognitive functions; schizophrenia; psychodiagnostics; creative thinking.

PROBLEM STATEMENT

Examining the correlation between creativity and schizophrenia is considered an impor-

tant aspect from a clinical point of view. This research holds the potential to enhance methods of treatment through its ability to offer a more comprehensive understanding of cognitive impairment in individuals diagnosed with schizophrenia [1]. Cultural convictions have played a significant role in shaping the historical comprehension of the association between creativity and schizophrenia. The perception and interpretation of creativity in individuals with schiz-

Nataliia Zaviazkina¹, Oleksandra Balashevych^{1,2}: ¹Kyiv Institute of Modern Psychology and Psychotherapy, Kyiv, Ukraine ²Department of Clinical Psychology and Psychodiagnostics, Faculty of Psychology, Taras Shevchenko National University of Kyiv, Ukraine

Correspondence address: alexbalashevich@ukr.net

ophrenia serve to challenge the popular stigmas surrounding mental illness [2].

Several studies have proposed a potential association between the unique form of expression observed in individuals with schizophrenia and their creative thinking, which may be attributed to the integration of symbols and signs [3]. Art serves as a tool for understanding human nature as well as a means of symbolic expression and communication. Many people with schizophrenia occasionally struggle to articulate their true identities to others as well as to themselves [4]. Overall, despite extensive studies conducted on the correlation between schizophrenia and creativity, a definitive consensus about the presence of repeating patterns or symbols in the artistic output of individuals with schizophrenia remains elusive.

The **objective** of this article is to examine the relation between creativity and the distinctive characteristics of schizophrenia through the review and systematization of scholarly sources. Additionally, the study aims to highlight the unique aspects of creativity exhibited by individuals diagnosed with schizophrenia.

Materials and methods: A comprehensive search was conducted across multiple databases including PubMed, Web of Science, Google Scholar, and Scopus. The search strategy incorporated a combination of keywords and terms related to creativity and schizophrenia. We identified two main categories and their subcategories and used respective keywords for the search. The "Creativity and schizophrenia" category included "Historical understanding of creativity and schizophrenia", "Evolutionary theories", "Neurocognitive, social, and cognitive factors, clinical symptoms", "Schizophrenia and divergent thinking", and "Creativity and schizophrenia in comparison with other diseases" subcategories. The "Creative products of schizophrenia patients" included "Analysis of creative products of patients with schizophrenia", "Analysis of artistic products", "Analysis of creativity of patients with schizophrenia in comparison with other diseases", "Analysis of the products of written creativity", "Schizotypy (definition)" and "Schizotypy and its relation with creativity" subcategories. Literature that showed no investigation of those subcategories and that had more out-to-date analogues was excluded and the analogues

were included instead. Within-study filters were used to find the needed information. References used in each subcategory are presented in Table 1. Information from them went through the process of synthesis to provide a comprehensive understanding of modern knowledge about the connection between schizophrenia and creativity.

LITERATURE REVIEW

Despite the negative effects on physical well-being and a decrease in reproductive function, schizophrenia exhibits a consistent prevalence rate [5]. Numerous scholars argue that the enduring nature of schizophrenia may be associated with certain advantages exhibited by relatives of individuals diagnosed with schizophrenia [6–8]. As a result, these relatives may possess a distinct advantage when compared to the broader population. Karlsson [8] even argues that, in a heterozygous state, the dominant principal gene linked to schizophrenia may stimulate the brain and improve giftedness and creative thinking. However, the link between genetics, schizophrenia, and creativity requires further investigation.

The concept of creativity is characterized by its multidimensional nature and is the subject of several definitions. According to scholarly sources such as [9] and [10], creativity can be defined as the act of generating new and valuable ideas or artifacts. Additionally, it is considered a dynamic process [11] that can form and impact the environment and produce a tangible outcome in the final stage [12]. According to [13], creativity may be observed across all areas of life and can be classified into two distinct categories: exceptional creativity, which results in significant and noteworthy creations, and daily creativity, which encompasses a certain level of originality in routine tasks and activities. In broad terms, while there may be variations in the conceptualization of creativity, Schubert's (2021) definition is widely acknowledged [9,13,14]. In the context of this article, creativity may be conceptualized as the cognitive capacity to generate novel ideas or artifacts derived from individualized subjective experience.

The impact of schizophrenia on creativity, as well as their relationship, is observed in contemporary publications from different angles (Table 1).

Table 1. Systematization of studies on the relationship between creativity and schizophrenia, as well as on the study of creativity of mentally ill people

Research topics	Main studies
Creativity and schizophrenia	
<i>Exploring the relationship between creativity and schizophrenia</i>	Abraham et al., 2007; Acar et al., 2018; Braak et al., 2022; Carson et al. 2003; Del Missier et al., 2022; Karlsson, 1970; Kucwaj et al., 2023; Kyaga, 2011; Moe et al., 2016; Nelson et al. 2010; Nemoto & Mizuno, 2011; Nemoto et al., 2005; Nemoto et al., 2009; Reddy et al., 2018; Rubinstein, 2008; Rybakowski et al., 2008; Sampedro et al., 2020a/b; Son et al., 2015; Spann et al., 2022; Takeshi et al., 2010; Wang et al., 2017
<i>Evolutionary theories</i>	Karlsson, 1970; Reddy et al., 2018;
<i>Neurocognitive, social, and cognitive factors, clinical symptoms</i>	Abraham et al., 2007; Acar et al., 2018; Braak et al., 2022; Sampedro et al., 2020a/b; Sampedro et al., 2021; Son et al., 2015; Spann et al., 2022
<i>Schizophrenia and divergent thinking</i>	Acar et al., 2018; Del Missier et al., 2022; Kucwaj e al., 2023; Moe et al., 2016; Nemoto & Mizuno, 2011; Nemoto et al., 2005; Nemoto et al., 2009; Takeshi et al., 2010
<i>Creativity and schizophrenia in comparison with other diseases</i>	Abraham et al., 2007; Del Missier et al., 2022; Kyaga, 2011; Rubinstein, 2008; Rybakowski et al., 2008; Wang et al., 2017
<i>Creative products of schizophrenia patients</i>	Buck et al., 1977; Elvevåg et al., 2011; Graham & Meng, 2011; Henemann et al., 2017; Jo et al., 2023; Junginger, 1992; Klavora, 2008; Rubin et al., 1979; Salomé et al, 2002; Sandsten et al., 2018; Sass, 2001; Seeman, 2017; Shen et al., 2021; Trémeau et al., 2005; Vachnadze, 1972; Vachnadze, 1979; Wadeson et al., 1976; Yamey, 2002; Zaviazkina et. al., 2023
Analysis of creative products of patients with schizophrenia	
<i>Analysis of artistic products</i>	Buck et al., 1977; Rubin et al., 1979; Sass, 2001; Elvevåg et al., 2011; Graham & Meng, 2011; Henemann et al., 2017; Klavora, 2008; Rustin, 2008; Sandsten et al., 2018; Seeman, 2017; Vachnadze, 1972; Vachnadze, 1979; Wadeson et al., 1976; Yamey, 2002; Zaviazkina et. al., 2023
<i>Analysis of creativity of patients with schizophrenia in comparison with other diseases</i>	Bediou et al., 2005; Trémeau et al., 2005; Wadeson et al., 1976
<i>Analysis of the products of written creativity</i>	Henemann et al., 2017; Jo et al., 2023; Junginger, 1992; Salomé et al, 2002; Shen et al., 2021
<i>Schyzotypy and its relation with creativity</i>	Burch et al. (2006); Fink et al., 2014; Holt, 2019; Polner et al., 2018; Webb et al., 2017

Schizophrenia’s neurocognitive, social, and cognitive aspects, together with clinical symptoms, have an impact on creativity in individuals diagnosed with it. Sampedro et al., (2020) found that in relation to the sub-dimensions of creativity, individuals with schizophrenia obtained higher scores in information processing speed, which pertains to the velocity at which the brain processes, comprehends, and reacts to information, as well as the theory of mind, which refers to the capacity to deduce and comprehend the mental state of another individual and employ this knowledge to elucidate and anticipate hu-

man behavior, exhibited a greater tendency for figural elaboration. Only negative clinical symptoms had a negative correlation with creativity. In one of the tests, participants showed high abstractness of the titles they gave to pictures they drew. It can be attributed to the elevated levels of theory of mind, working memory, and information processing speed. According to a different study, people who exhibit social anhedonia, a characteristic linked to schizophrenia, fared better on a convergent thinking task, which is essential to creative thought [16]. Additionally, another research project discovered that creativ-

ity mediated the relationship between negative symptoms and functional outcomes in schizophrenia and that creativity was related to social functioning [17]. Several studies have demonstrated that linguistic originality can be predicted by greater scores in social perception and lower levels of negative symptomatology. Verbal flexibility was shown to be explained by higher scores on theory of mind and information processing speed as well as lower scores on measures of negative symptomatology [18]. Moreover, it has been posited that executive processes, including cognitive flexibility and working memory, have a mediating role in the association between schizophrenia and creativity [17]. Overall, the findings of these researches indicate that schizophrenia has an impact on several cognitive processes that are closely associated with the trait of creativity. These processes include working memory, cognitive flexibility, mental processes, and executive functions.

There are correlations between schizophrenia and creativity that can be seen in verbal performance of schizophrenic people. Some studies have found that patients suffering from schizophrenia with a continuous course exhibit sub-optimal performance on tests measuring creative thinking and behavior regulation, save for their inclination to provide responses that deviate from stereotypical norms. These finding can be explained by poor frontal lobe function, that additionally impacts the pattern of verbal under-productivity in schizophrenic patients. Participants' performance on verbal creativity assessments exhibited a lower level of achievement compared to their performance on non-verbal assessments. The correlation between schizophrenia and creativity shows a notably heightened magnitude in schizophrenia with a continuous course, as opposed to those in acute and early stages [19]. According to Acar et al., (2018), individuals who experienced more pronounced impairment as a result of the disease and received treatment in a hospital exhibited lower scores on the creativity scale compared to those who did not have a significant deficiency and received outpatient treatment. Another study showed that phonological fluency showed a positive correlation with the intensity of delusions in the schizophrenia group, and that overall declines in verbal and idea fluency may be linked to detrimental

symptoms like speech poverty [21]. Phonological fluency is a neuropsychological test of language production in which participants form words that start with a given letter [22], verbal fluency is the ability to produce words or vocal responses within a particular category or set of restrictions, such as words that start with a specific letter or words that fall into a specific semantic category [23], and idea fluency is the capacity to come up with a variety of innovative solutions or ideas within a specific framework or problem-solving assignment [24]. Del Missier [25] conducted a study that revealed that individuals diagnosed with schizophrenia exhibit diminished levels of creativity, a phenomenon that may be attributed to impairments in both convergent and divergent thinking. The ability to logically infer and evaluate the validity of a single solution to a problem is a prerequisite for convergent thinking. It is distinguished by the process of reducing the number of options in order to identify the optimal one, and it is frequently linked to analytical reasoning. Divergent thinking, on the other hand, is the capacity to come up with a variety of ideas and exercise creativity in problem-solving by considering several options. This way of thinking is linked to adaptability, creativity, and the development of novel and successful behavioral, emotional, and cognitive techniques [26]. Therefore, even though the high intensity of delusions predicts higher phonological fluency, the severity of schizophrenia's symptoms is often a reason behind low creativity.

Schizophrenia symptoms can also alter the ability to generate new ideas. A study conducted by Moe et al. (2016) focused on assessing the idea density in the life stories of individuals with schizophrenia compared to a control group. Researchers used computerized language assessment methods to measure the complexity of language used in the narratives. The results indicated that individuals with schizophrenia had lower idea density compared to controls.

Burch et al. (2006) [28] have reported a correlation between psychotic traits and creativity. Carson et al. (2003) and Nelson et al. (2010) [29,30] suggest that the traits associated with psychosis form a better creativity predictor than the psychosis itself.

Several studies have found a deficit in divergent thinking. Patients with schizophrenia dem-

onstrate impairments in the speed of presentation, the number of ideas in a given time period, and their generation when performing divergent thinking tasks [27,31–33]. In the study of Nemoto [32], seventeen stable schizophrenia outpatients were randomly assigned to either a divergent thinking training program or a control program focused on convergent thinking. After eight weeks of training, the participants in the divergent thinking program showed significant improvements in fluency, a decrease in negative symptoms, and interpersonal relationships compared to those in the control program. These initial findings suggest that targeting divergent thinking in schizophrenia patients could potentially enhance their social functioning and overall quality of life.

Other studies support the thesis that schizophrenia alters divergent thinking. Deficits in generating high-quality responses to divergent thinking tasks have been associated with social dysfunction in patients with schizophrenia. Reduced activation in the prefrontal cortex was also observed during free idea-generation tasks in patients with schizophrenia [33]. However, semantic-categorical tasks and verbal creativity tasks were more closely associated with schizophrenia than divergent thinking tasks or associative measures. The higher severity of schizophrenia symptoms is the reason for lower scores on these tests [20]. When fluid intelligence is taken into consideration, individuals with schizophrenia perform creative problem-solving tasks on par with healthy controls [34]. Another finding is that individuals diagnosed with schizophrenia frequently exhibit deficits in verbal fluency, an indicator of divergent thinking [32]. This distinction is important because tests of divergent thinking are often used to measure creativity, whereas tests of semantic-categorical thinking or writing speed are not so common.

The examination of the correlation between creativity and schizophrenia in relation to other psychiatric conditions is also a topic of notable interest. Rubinstein (2008) discovered that individuals diagnosed with schizophrenia exhibit diminished levels of creativity in comparison to those diagnosed with major depressive illness, anxiety disorder, or personality disorders. However, there were no significant differences in creativity among the three groups when it came to

originality. In a study conducted by Wang et al. (2017), it was shown that examines the relationship between schizophrenia and creativity, specifically focusing on the cognitive processes involved in creativity tests. Each participant completed tasks that measured divergent thinking, convergent thinking, and a combination of both. The results showed that the group with schizophrenia performed similarly to the group with schizotypal personality in divergent thinking, convergent thinking, and combined creative thinking tasks. However, they did not exhibit originality in figure completion and tangram construction tasks. Other research shows that the creative process is linked to certain psychological features found in affective disorders like bipolar disorder or unipolar depression and psychosis-like thought abnormalities. People with bipolar disorder and their family members exhibit similar traits to creative individuals, including elevated creativity scores and temperament traits such as cyclothymia, neuroticism, and openness [37].

Similar to creativity, which is a cognitive process and an individual characteristic, its products have distinct characteristics in individuals diagnosed with schizophrenia. The examination of the artistic abilities exhibited by individuals diagnosed with mental diseases, such as schizophrenia, has been the subject of investigation by various researchers [38–43]. If we analyze the changing interest in this subject within its historical framework, the subsequent distinctions can be pointed out. In the year 1922, Hans Prinzhorn authored a publication titled “Art of the Mentally Ill,” wherein he dedicated his efforts to the examination of the assorted plastic artworks produced by individuals with mental illnesses. The collection curated by Prinzhorn serves as a visual representation of the interplay between creativity and psychopathology within the realm of cultural discourse [44]. Cultural factors also contribute to the manner in which creativity and psychiatric illness are defined and measured within the artistic domain. The historical correlation between exceptional intellectual ability and mental illness has significantly influenced the comprehension of the connection between inventiveness and psychosis [45,46]. In 1950 an exhibition of the First World Congress of Psychiatrists was held in Paris. This event prominent-

ly displayed over two thousand paintings created by individuals suffering from mental illness, with a majority of the artworks originating from patients diagnosed with schizophrenia [47].

This particular interest facilitated the examination and elucidation of many characteristics inherent to the illustrations produced by individuals diagnosed with schizophrenia. In a recent study conducted by Henemann et al. (2017), an analysis was performed on artworks from the Prinzthorne collection. The study revealed that artworks created by artists diagnosed with schizophrenia exhibit deviations from the range of values observed in the works of a control group consisting of healthy individuals. Specifically, a notable prevalence of a particular edge orientation was observed among the patients. Consequently, this preference for certain edge orientations resulted in a diminished level of complexity or randomness in the distribution of edge orientations within their images. Additionally, the study found that patients with schizophrenia tend to incorporate a greater number of fine details in their artworks, relative to the inclusion of more general shapes and forms.

E. O. Vachnadze conducted comprehensive investigations on the peculiarities of creativity exhibited by individuals with mental illness. In his works, the scholar delineated a set of distinctive attributes observed in drawings created by individuals diagnosed with schizophrenia. These attributes encompass stereotyping, serialization of drawings, overload, disruption of spatial relations, distorted perception of time and movement, spiritualization of images/objects, compositional disorganization, and deceptive visualization of the drawings' content. Another aspect that was taken into consideration was the notion that the subject matter and content of a drawing were significantly influenced by the individual's own experiences [48,49]. All of those aspects have their peculiarities:

- The serialization of drawings is characterized by chaotic reproduction, duplication, and a lack of figurative connection, which is evident in the compositions. Typically observed in this artistic context are notable recurring patterns of motifs centered around certain themes, such as animals, monsters, clusters of lines, and circles, among others. Additionally, a characteristic feature involves the rapid creation of works that remain incomplete.
- According to Vachnadze's observations, stereotyping is a prominent attribute observed in the artistic expressions of individuals diagnosed with schizophrenia. This phenomenon is evident in their drawings, which exhibit distinct qualities that may be identified as manifestations of stereotyping.
- The phenomenon of drawing overload is characterized by a proclivity to fill up the space of the paper sheet with various elements, often including disorganized and uninterrupted content. The examples provided encompass various aspects of typography, including font elements, neophorisms adhering to the principles of agglutination, the representation, and recognition of pictures through symbolization, as well as the utilization of schematism and geometricism.
- Patients diagnosed with schizophrenia frequently exhibit static and immobility in their artistic creations, a phenomenon that aligns with their altered perception of time and motion. The aforementioned phenomenon is exemplified through the stratified utilization of pigmentation, accentuating the affective resonance and engendering the impression of immobility within the entirety of the visual representation. The intensity of the static may escalate in correlation with the duration of the illness.
- Stylization and alteration of aesthetic canons: a distinguishing attribute observed in drawings produced by individuals diagnosed with schizophrenia is the tendency to simplify shapes and employ layered color techniques. The aesthetic canons of images can be compromised, resulting in the distortion of objects, their incompatible arrangement, and a disordered composition.
- The content of an image depicted in these drawings tends sometimes to mirror the subjective experiences of an individual who has undergone path-

ological changes due to the condition. These visuals possess an inherent ability to conceal profound personal significance, hence creating a sense of deception. The substance and subject matter of the image are significantly influenced by the patient's individual experiences, encompassing factors such as occupation, educational attainment, social standing, and personal hobbies [48,49].

It is noteworthy that these criteria, although significant, may exhibit variability in specific instances, contingent upon a multitude of internal and external elements, including the patient's individual experiences, the extent of pathological personality alterations, and the duration and severity of the illness. One of the examples in which the above features of drawings of schizophrenic patients are expressed is presented in the work devoted to the perception of nonverbal stimuli by patients with schizophrenia conducted by Zaviazkina et al. (2023).

Research has indicated that when compared to healthy controls, people with schizophrenia typically use fewer colors and different brushstrokes. This implies that their choice of color may be a reflection of their altered worldview [51]. In addition, symbolism that represents the inner experiences and emotions of schizophrenia patients is frequently found in their artwork. Patients use art as a way to communicate feelings of alienation, rejection, loss, and loneliness that they encounter on a daily basis. They are able to convey these nuanced feelings in a visual and symbolic way through the use of symbolism [52]. In addition, the artwork created by individuals diagnosed with schizophrenia may exhibit distinct image characteristics that differ from those of control artworks, suggesting a personal portrayal of their internal experiences [41].

In terms of spatial frequencies, that are periodic distributions of light and dark in an image, paintings by schizophrenic artists have noticeably steeper amplitude spectrum slopes. Amplitude spectrum slopes are greater relative amplitude in low spatial frequencies, meaning more differences across periodic distribution of light and dark global shapes. In the context of paintings by schizophrenic artists, a steeper amplitude spectrum slope indicates that these paint-

ings tend to have greater emphasis on the larger, more global features compared to the finer details. This is interpreted as having greater relative amplitude in low spatial frequencies, meaning the paintings are dominated more by the large-scale variations (like general shapes and contrasts) rather than the intricate, smaller details. A different analysis of the artwork of a single artist with schizoaffective disorder supported these conclusions and revealed that the type of medication had no bearing on the amplitude spectrum slope [42]. Therefore, in addition to Vachnadze's characteristics there are other distinctive features of art created by patients with schizophrenia, and all of them should be included in treatment methodologies.

Peculiarities of artistic expression of patients with schizophrenia may vary from those with other mental disorders. In a study conducted in 1976, Wadeson & Carpenter, (1976) examined the artistic expression of individuals diagnosed with schizophrenia, unipolar depression, and bipolar affective disorder. The researchers observed significant variability within each diagnostic group as well as similarities across different groups, particularly in relation to the graphic characteristics of artwork created by individuals with mental disorders. The researcher discovered that there was no strong correlation between visual traits and a particular diagnosis. There are discernible distinctions in the manner in which artistic expression manifests in individuals diagnosed with schizophrenia and depression. But at the same time, patients with schizophrenia are closer in their artistic features to the drawings of patients with bipolar affective disorder: their drawings are characterized by bright colors and complete forms. According to a study conducted by Trémeau et al. (2005), it was shown that depressive patients had a reduced frequency of spontaneous emotional expressions, excluding happiness, compared to patients diagnosed with schizophrenia. There were no noticeable differences between the fifteen patients with schizophrenia who were examined with and without typical or atypical antipsychotic drugs. These peculiarities of emotional expression may have some impact on the art of mentally ill people.

Compared to patients with depression, those with schizophrenia display distinct artistic ex-

pressions. Schizophrenia patients frequently use their impaired ability to recognize facial expressions, especially those of fear and disgust, in their artistic expressions. They might also struggle to process facial features that change [55]. However, depressed patients might find it easier to express themselves through painting than through speaking. They might utilize painting as a way to communicate their suppressed emotions and concepts of sin, affect, and suicide ideation [56]. Furthermore, a greater frequency of neurological soft signs, such as impaired motor, sensory, or inhibitory function, is observed in patients diagnosed with schizophrenia and bipolar disorder, while patients with depression do not demonstrate such symptoms [57]. It can be concluded, that those neurological impairments that influence movement could be the reason behind some differences between patients with schizophrenia and bipolar disorder and other mental illnesses. Those differences could include brush strokes, clearness of forms and their edges, and intentionality of some particularities of the drawings, paintings, or sculptures. However, despite all of those findings the area of artistic expression of patients with schizophrenia compared to those with other mental disorders is still highly underresearched [58].

The plots produced by individuals with schizophrenia differ too. They often exhibit recurring patterns, such as bizarre interpretations of events, a heightened focus on trivial details, a preference for unconventional linguistic structures, distinctive wordplay, the utilization of abbreviations and emphasizing expressions, the omission of crucial information, a lack of coherence in narrative development, and emotional deficiencies [3,40,59]. The aforementioned themes are indicative of the cognitive and linguistic impairments observed in individuals diagnosed with schizophrenia. Furthermore, it has been shown that individuals diagnosed with schizophrenia exhibit comparatively less impairment in their written language abilities as compared to their spoken language abilities [60]. Overall, creativity has been shown to play a role of a mediator for the functional outcome in schizophrenia, suggesting potential prospects for clinical applications[61]

CONCLUSION

This literature review examines the association between creativity and schizophrenia, focusing on recent scientific research. It emphasizes the unique aspects of creativity observed in individuals diagnosed with schizophrenia. Schizophrenia has an impact on various cognitive processes associated with creativity, such as working memory, cognitive flexibility, mental processes, and executive functions. In general, schizophrenia results in worse creative skills, even if compared to other mental disorders including major depressive illness, anxiety disorder, and personality disorders. However, the impact of symptoms associated with schizophrenia on creative thinking should be taken into considerations, since it can be equivocal and have the potential to either enhance or impede creativity, contingent upon the severity of the symptoms and their influence on cognitive processes.

Thus, the issues discussed in this article raise several promising areas for further research. Further investigation into the functional ramifications of creative engagement among individuals diagnosed with schizophrenia is merited, given the demonstrated potential for creativity to enhance patients' overall well-being. Such research contributes to a better understanding of the impact of the schizophrenic process on creativity, which in turn makes it more effective to develop methods of treatment and rehabilitation of patients with mental disorders in general. Also relevant are studies of the peculiarities of the creativity of patients with schizophrenia, in particular, the study of the mechanisms of projection of their own experiences of the disease and their reflection in their work.

LIMITATION

A note should be made on the limitations of this review. First and foremost, we acknowledge that the selected inclusion criteria for the research articles may have led to some relevant research not being included. Additionally, we note that the quality and integrity assessment of the referenced articles, as well as the analysis of potential bias were not in scope of this review.

Conflict of interests.

The authors declare no conflicts of interest.

Fundings.

The authors received no specific funding for this work

REFERENCES

1. Jones MT, Harvey PD. Major Neuropsychological Impairments in Schizophrenia Patients: Clinical Implications. *Curr Psychiatry Rep.* 2020 Nov 4;22(11):59.
2. Silvia PJ, Kaufman JC. Creativity and Mental Illness. Cambridge: Cambridge University Press. ; 2010. 381–394 p.
3. Ellevåg B, Wynn R, Covington MA. Meaningful confusions and confusing meanings in communication in schizophrenia. *Psychiatry Res.* 2011 Apr;186(2–3):461–4.
4. Seeman M V. Identity and schizophrenia: Who do I want to be? *World J Psychiatry.* 2017;7(1):1.
5. Giotakos O. Persistence of psychosis in the population: The cost and the price for humanity. *Psychiatriki.* 2019 Jan 1;29(4):316–26.
6. Post F. Creativity and Psychopathology a Study of 291 World-Famous Men. *British Journal of Psychiatry.* 1994 Jul 2;165(1):22–34.
7. Reddy IR, Ukrani J, Indla V, Ukrani V. Creativity and psychopathology: Two sides of the same coin? *Indian J Psychiatry.* 2018;60(2):168–74.
8. KARLSSON JL. Genetic association of giftedness and creativity with schizophrenia. *Hereditas.* 1970 Sep 2;66(2):177–81.
9. Fasnacht PH. Creativity: a refinement of the concept for nursing practice. *J Adv Nurs.* 2003 Jan 10;41(2):195–202.
10. Schubert E. Creativity Is Optimal Novelty and Maximal Positive Affect: A New Definition Based on the Spreading Activation Model. *Front Neurosci.* 2021 May 25;15.
11. Corazza GE, Agnoli S, Mastria S. The Dynamic Creativity Framework. *Eur Psychol.* 2022 Jul;27(3):191–206.
12. Huang Z, Sindakis S, Aggarwal S, Thomas L. The role of leadership in collective creativity and innovation: Examining academic research and development environments. *Front Psychol.* 2022 Dec 22;13.
13. Richards R. Everyday Creativity and the Arts. *World Futures.* 2007 Oct 15;63(7):500–25.
14. Huang F, Song Y, Jiang Y, Zhao Q, Luo J. Where and How Are Original and Valuable Ideas Generated? tDCS of the Generation-Related Posterior Temporal Lobe and the Executive Control-Related Prefrontal Cortex. *Cerebral Cortex.* 2022 Feb 19;32(5):1004–13.
15. Sampedro A, Peña J, Ibarretxe-Bilbao N, Sánchez P, Iriarte-Yoller N, Pavón C, et al. Neurocognitive, social cognitive, and clinical predictors of creativity in schizophrenia. *J Psychiatr Res.* 2020 Oct;129:206–13.
16. Spann DJ, Straub KT, Hua JPY, Pellegrini AM, Kerns JG. Examining associations between social anhedonia and convergent thinking using the Remote Associates Test. *Cogn Neuropsychiatry.* 2022 Nov 2;27(6):458–70.
17. Sampedro A, Peña J, Ibarretxe-Bilbao N, Sánchez P, Iriarte-Yoller N, Ledesma-González S, et al. Mediating role of cognition and social cognition on creativity among patients with schizophrenia and healthy controls: Revisiting the Shared Vulnerability Model. *Psychiatry Clin Neurosci.* 2020 Feb 4;74(2):149–55.
18. Braak S, Su T, Krudop W, Pijnenburg YAL, Reus LM, van der Wee N, et al. Theory of Mind and social functioning among neuropsychiatric disorders: A transdiagnostic study. *European Neuropsychopharmacology.* 2022 Nov;64:19–29.
19. Abraham A, Windmann S, McKenna P, Güntürkün O. Creative thinking in schizophrenia: The role of executive dysfunction and symptom severity. *Cogn Neuropsychiatry.* 2007 May;12(3):235–58.
20. Acar S, Chen X, Cayirdag N. Schizophrenia and creativity: A meta-analytic review. *Schizophr Res.* 2018 May;195:23–31.
21. Son S, Kubota M, Miyata J, Fukuyama H, Aso T, Urayama S ichi, et al. Creativity and positive symptoms in schizophrenia revisited: Structural connectivity analysis with diffusion tensor imaging. *Schizophr Res.* 2015 May;164(1–3):221–6.
22. Fu CHY, McIntosh AR, Kim J, Chau W, Bullmore ET, Williams SCR, et al. Modulation of effective connectivity by cognitive demand in phonological verbal fluency. *Neuroimage.* 2006 Mar;30(1):266–71.
23. Shirdel S, Esmaeeli S, Alavi K, Ghaemmaghami P, Shariat SV. Verbal Fluency Performance in Normal Adult Population in Iran: Norms and Effects of Age, Education, and Gender. *Basic and Clinical Neuroscience Journal.* 2022 Jan 1;13(1):129–38.
24. Dumas D, Dong Y, Grajzel K, Forthmann B, Doherty M. Understanding ideational fluency as a survival process. *Br J Educ Psychol.* 2022 Jun;92(2):e12469.
25. Del Missier F, Stragà M, Galfano G, Venerus E, Ferrara D, Penolazzi B. Creativity in Schizophrenia: Evidence Beyond Anecdotes. *Creat Res J.* 2022 Oct 2;34(4):445–59.
26. Webb ME, Little DR, Cropper SJ, Roze K. The contributions of convergent thinking, divergent thinking, and schizotypy to solving insight and non-insight problems. *Think Reason.* 2017 Jul 3;23(3):235–58.
27. Moe AM, Breitborde NJK, Shakeel MK, Gallagher CJ, Doherty NM. Idea density in the life-stories of people with schizophrenia: Associations with narrative qualities and psychiatric symptoms. *Schizophr Res.* 2016 Apr;172(1–3):201–5.
28. Burch GSJ, Pavelis C, Hemsley DR, Corr PJ. Schizotypy and creativity in visual artists. *British Journal of Psychology.* 2006 May 24;97(2):177–90.
29. Carson SH, Peterson JB, Higgins DM. Decreased Latent Inhibition Is Associated With Increased Creative Achievement in High-Functioning Individuals. *J Pers Soc Psychol.* 2003;85(3):499–506.

30. Nelson B, Rawlings D. Relating Schizotypy and Personality to the Phenomenology of Creativity. *Schizophr Bull.* 2010 Mar 1;36(2):388–99.
31. Nemoto T, Mizuno M. [Improvements in spontaneity and social functioning in patients with schizophrenia after cognitive training]. *Seishin Shinkeigaku Zasshi.* 2011;113(4):374–9.
32. Nemoto T, Mizuno M, Kashima H. Qualitative Evaluation of Divergent Thinking in Patients with Schizophrenia. *Behavioural Neurology.* 2005;16(4):217–24.
33. Takeshi K, Nemoto T, Fumoto M, Arita H, Mizuno M. Reduced prefrontal cortex activation during divergent thinking in schizophrenia: A multi-channel NIRS study. *Prog Neuropsychopharmacol Biol Psychiatry.* 2010 Oct;34(7):1327–32.
34. Kucwaj H, Gajewski Z, Chuderski A. Schizophrenia patients perform as well as healthy controls on creative problem solving when fluid intelligence is accounted for. *Cogn Neuropsychiatry.* 2023 Jul 4;28(4):253–68.
35. Rubinstein G. Are schizophrenic patients necessarily creative? A comparative study between three groups of psychiatric inpatients. *Pers Individ Dif.* 2008 Dec;45(8):806–10.
36. Wang L, Xu X, Wang Q, Healey G, Su L, Pang W. Are Individuals with Schizophrenia or Schizotypy More Creative? Evidence from Multiple Tests of Creative Potential. *Creat Res J.* 2017 Apr 3;29(2):145–56.
37. Rybakowski J, Klonowska P, Patrzala A, Jaracz J. Psychopathology and creativity. *Archives of Psychiatry and Psychotherapy. Archives of Psychiatry and Psychotherapy.* 2008;1(1):37–47.
38. Rubin JA, Ragins N, Schachter J, Wimberly F. Drawings by schizophrenic and non-schizophrenic mothers and their children. *Art Psychotherapy.* 1979;6(2):163–75.
39. Sass LA. Schizophrenia, Modernism, and the “Creative Imagination”: On Creativity and Psychopathology. *Creat Res J.* 2001 Jan;13(1):55–74.
40. Jo YT, Lee JS, Park J, Lee J, Joo YH. Linguistic anomalies observed in the Sentence Completion Test in patients with schizophrenia. *Cogn Neuropsychiatry.* 2023 May 4;28(3):226–36.
41. Henemann GM, Brachmann A, Redies C. Statistical Image Properties in Works from the Prinzhorn Collection of Artists with Schizophrenia. *Front Psychiatry.* 2017 Dec 11;8.
42. Graham D, Meng M. Altered Spatial Frequency Content in Paintings by Artists with Schizophrenia. *Perception.* 2011 Jan 1;2(1):1–9.
43. Buck LA, Kramer A. Creative Potential in Schizophrenia. *Psychiatry.* 1977 May 20;40(2):146–62.
44. Yamey G. Art: Outsider Art. *BMJ.* 2002 May 18;324(7347):1222–1222.
45. Sandsten KE, Nordgaard J, Parnas J. Creativity and psychosis. *Ugeskr Laeger.* 2018;180(32).
46. Klavara VM. The history of artistic creativity in psychotic patients. *Psychiatr Danub.* 2008 Jun;20(2):115–22.
47. Duffin J, Mikelova L. *Confinia Psychiatrica : Patient Art and the Diagnosis of Mental Illness.* Canadian Journal of Health History. 2023 Apr 1;40(1):65–90.
48. Vachnadze EA. On some peculiarities of the art of the mentally ill and surrealist art.. *Mitsnireba.* 1979;
49. Vachnadze EA. Some peculiarities of drawing of the mentally ill. *Metsnireba.* 1972;
50. Zaviakina N V., Balashevych OK, Korotkevych YY. PECULIARITIES OF PERCEPTION OF NON-VERBAL STIMULI BY PATIENTS WITH SCHIZOPHRENIA: SUBJECTIVE UNDERSTANDING, INTEREST AND EMOTIONS. *Wiadomości Lekarskie.* 2023 Sep;76(9):1966–77.
51. Shen H, Wang SH, Zhang Y, Wang H, Li F, Lucas M V., et al. Color painting predicts clinical symptoms in chronic schizophrenia patients via deep learning. *BMC Psychiatry.* 2021 Dec 22;21(1):522.
52. Rustin TA. Using artwork to understand the experience of mental illness: Mainstream artists and Outsider artists. *Psychosoc Med.* 2008 Jul 8;5:Doc07.
53. Wadeson HS, Carpenter WT. A comparative study of art expression of schizophrenic, unipolar depressive, and bipolar manic-depressive patients.. *J Nerv Ment Dis.* 1976;162:334–44.
54. Trémeau F, Malaspina D, Duval F, Corrêa H, Hager-Budny M, Coin-Bariou L, et al. Facial Expressiveness in Patients With Schizophrenia Compared to Depressed Patients and Non-patient Comparison Subjects. *American Journal of Psychiatry.* 2005 Jan;162(1):92–101.
55. Bediou B, Krolak-Salmon P, Saoud M, Henaff MA, Burt M, Dalery J, et al. Facial Expression and Sex Recognition in Schizophrenia and Depression. *The Canadian Journal of Psychiatry.* 2005 Aug 1;50(9):525–33.
56. Assael M, Popovici-Wacks M. Artistic expression in spontaneous paintings of depressed patients. *Isr J Psychiatry Relat Sci.* 1989;26(4):223–43.
57. Zhao Q, Ma Y tao, Lui SSY, Liu W hua, Xu T, Yu X, et al. Neurological soft signs discriminate schizophrenia from major depression but not bipolar disorder. *Prog Neuropsychopharmacol Biol Psychiatry.* 2013 Jun;43:72–8.
58. Kyaga S, Landén M, Boman M, Hultman CM, Långström N, Lichtenstein P. Mental illness, suicide and creativity: 40-Year prospective total population study. *J Psychiatr Res.* 2013 Jan;47(1):83–90.
59. Junginger J, Barker S, Coe DA. Mood theme and bizarreness of delusions in schizophrenia and mood psychosis. *J Abnorm Psychol.* 1992 May;101(2):287–92.
60. Salomé F, Boyer P, Fayol M. Written but not oral verbal production is preserved in young schizophrenic patients. *Psychiatry Res.* 2002 Aug;111(2–3):137–45.
61. Sampedro A, Peña J, Sánchez P, Ibarretxe-Bilbao N, Iriarte-Yoller N, Pavón C, et al. The impact of creativity on functional outcome in schizophrenia: a mediational model. *NPJ Schizophr.* 2021 Feb 26;7(1):14.