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RESEARCH ARTICLE

Sensory Integration Based Program Developed According to the Model of Creative Ability in an Individual with Schizophrenia: An Occupational Therapy Case Report

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Abstract

Schizophrenia is a serious brain disease that causes individuals to be unable to distinguish between real and unreal phenomena, preventing healthy thought flow, emotion control and normal behavior. Symptoms of schizophrenia that begin at an early age are accompanied by positive symptoms, negative symptoms, and cognitive symptoms. Understanding the neurological processes accompanying clinical symptoms in schizophrenia is of great importance in terms of defining, researching, and improving mental health disorders The aim of the present study was to examine the effect of a sensory-based occupational therapy intervention developed according to the Vona du Toit Model of Creative Ability on the clinical symptoms and sensory processing skills of an individual with schizophrenia. Creative ability level was evaluated with Model of Creative Ability, positive and negative symptoms as clinical symptoms were evaluated with Positive and Negative Symptom Scale, and cognitive symptoms as other clinical symptoms were evaluated with Mini Mental State Exemination, and sensory processing process were evaluated with Adolesan/ Adult Sensory Profile. Evaluations were applied twice, before and after the intervention. According to the results of the research, it was observed that the 8-week occupational therapy intervention applied to the patient with schizophrenia reduced clinical symptoms and improved sensory processing skills and creative abilities. This study showed that when an individual with schizophrenia is supported with a developmental occupational therapy program that includes sensory integration-based behaviors and abilities, sensory processing skills, positive and negative symptoms, cognitive symptoms, and creative ability levels improve.

Keywords
Schizophrenia, Sensory Integration, Creative Ability, Occupational Therapy

INTRODUCTION

Schizophrenia is a mental health disorder with a very old history, which limits the participation of individuals in daily life activities and affects well-being (McCutcheon et al., 2020). Schizophrenia is one of the most challenging neuropsychiatric diseases in which the individual's interpersonal communication and interaction skills deteriorate, the person moves away from the real world, and significant problems occur in emotions, thoughts and behaviors (Pettersson-Yeo et al., 2011).

Schizophrenia has a prevalence of 3/1000 people in the World (Simeone et al., 2015). Unlike the world prevalence, the prevalence of schizophrenia in Turkey was found to be 9/1000 people (Utz et al., 2019). Today, it is known that one out of every 250 people has schizophrenia, and it is expected that one of every 140 babies born in the 21st century will develop schizophrenia in the future (Barlati et al., 2019). Considering these high rates, protective and adaptive approaches to

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individuals with schizophrenia in the changing social structure are of great importance (Batalla-Martín et al., 2020).

Symptoms of schizophrenia that begin at an early age are accompanied by positive symptoms, negative symptoms and cognitive symptoms (Correll & Schooler, 2020; Galderisi et al., 2018). Positive symptoms include hallucinations, delusions, and disorganized thoughts and behaviors that are not present in other individuals and express an excess of normal functions. On the other hand, it appears as a lack of emotion, thought and verbal communication, which is seen as the absence of typical functions (Bighelli et al., 2018). Cognitive symptoms have started to take an important place in schizophrenia in recent years. Impaired attention, verbal fluency, and wakefulness-related impairment in executive functions are cognitive symptoms seen in schizophrenia (Tripathi et al., 2018). Understanding the neurological processes accompanying clinical symptoms in schizophrenia is of great importance in terms of defining, researching and improving mental health disorders. Sensory processing disorders are a neurobiological disorder characterized by the level of sensitivity to sensory stimuli. Understanding the neurobiological systems involved in sensory processing is important for developing appropriate intervention approaches (Kanchanatawan et al., 2018; Koola, 2018).

Research shows that people with schizophrenia have sensory processing problems. Sensory processing disorders aggravate the clinical symptoms (positive symptoms, negative symptoms and cognitive symptoms) caused by the disease in individuals with schizophrenia (Abaoğlu, 2022). This situation causes negative results in terms of symptomatic and functional aspects. It is known that the personal care of individuals, their participation in daily life activities and their quality of life are adversely affected. Therefore, until sensory processing disorders can be effectively treated, clinicians and caregivers need to be aware of individuals' ability to communicate effectively with the environment (Acevedo et al., 2018).

Occupational therapy models give occupational therapists the opportunity to apply assessment and intervention methods that require communication and interaction skills with the environment with a holistic perspective (O'Brien & Kuhaneck, 2019; Larsson-Lund & Nyman, 2017; Güney Yılmaz et al., 2021). Vona du Toit Model of Creative Ability (VdTMoCA) provides occupational therapists with a developmental perspective, a frame of reference for the evaluation of personal, social and work-related recreational activity performance areas that emerge as a result of people's interaction with the environment (Van der Reyden et al., 2019). From a developmental perspective, each creative ability level consists of interrelated will, motivation, and action (behaviors, ability, and performance) (Sherwood, 2011). Ability levels may decline due to illness, trauma, injury or changing life demands. Creative abilities according to the model deals with four occupational performance areas: personal management (self care and management of one's belonging and finances), social ability (relating people), work ability (ability to be productive in relation to roles; dependent upon concept formation and task consept), and use of leisure (Casteleijn, 2014; Sherwood, 2011). VdTMoCA provides occupational therapists with guidance for intervention by determining treatment priorities in the light of assessments, establishing principles for treatment goals appropriate to the individual's level, and defining expectations for performance. VdTMoCA is also very suitable for studies with heterogeneous groups in terms of age, diagnosis and culture (de Witt, 2014; Casteleijn & de Vos, 2007).

The aim of the present study was to examine the effect of a sensory-based occupational therapy intervention developed according to the Vona du Toit Model of Creative Ability on the clinical symptoms of schizophrenia and sensory processing skills in an inpatient with schizophrenia in a psychiatric hospital.

MATERIALS AND METHODS

A man with schizophrenia who was treated as an inpatient at the Private Lape Hospital was included in our study. The 45-year-old patient was diagnosed with schizophrenia in 2007 and has been hospitalized four times since then. The last attack occurred in 2019 and he has been inpatient treatment in a psychiatric hospital for about three months. The case was referred to occupational therapy because of being closed to communication and interaction with the environment and unable to perform self-care activities. An informed consent form was obtained from the individual before the

study. Vona du Toit Model of Creative Ability was used to evaluate the case from a developmental perspective and to create an intervention program. Thus, based on the creative ability level of the case, an intervention program suitable for the developmental level was created.

Vona du Toit Model of Creative Ability (VdTMoCA)

The model developed by Vona du Toit in South Africa in 1960, provides a developmental frame of reference in occupational therapy practice (Casteleijn, 2014). VdTMoCA enables occupational therapists to evaluate individuals and determine their occupational performance, and to guide the intervention program through the using graded purposeful activities. According to the model, a graded intervention program should be used to eliminate the problems that arise in personal management, social ability, work ability and use of leisure, which are four occupational performance areas that show the behavior and abilities of individuals. This model is particularly suitable for evaluating individuals with mental health disorders and establishing a treatment program (Casteleijn, 2014; Sherwood, 2011).

Adolescent/Adult Sensory Profile (AASP)

AASP is a scale consisting of 60 items. Evaluates the response of 6 sensory models to different sensory stimuli. It is used in adolescents and adults aged 11 and over. The Sensory Profile has 60 items, divided equally into 15 items, divided into four categories, each belonging to a different sensory processing pattern: (1) Low Registration, (2) Sensory Seeking, (3) Sensory Sensitivity, and (4) Sensory Avoiding. Using a five-item Likert scale, participants are asked to rate how often they respond to the sensory event/experience described in each item. Scores in each category result in a range of 5 to 75 points. Each age group (11-18, 18-65 and 65 and over) has different norm values. The higher the score, the more traits the individual exhibits for sensory processing patterns. For example, the higher the individual's score in the "low registration" model, the stronger the individual's tendency to not register sensory stimuli (Engel-Yeger, 2012). Turkish adaptation of the test made by in 2015 (Aydın et al., 2015).

Positive and Negative Symptom Scale (PANSS)

PANSS was used to evaluate the positive and negative symptoms of the participants with schizophrenia in our study. This interview was developed by Kay et al to evaluate positive symptoms, negative symptoms and general psychopathology (Kay et al., 2012). The symptoms seen in the person in the last week are taken into account. The PANSS is scored between 1-7 points. The evaluation period takes 30-40 minutes on average. your scale. Turkish validity and reliability were done by Kostakoğlu et al. (1999).

Mini Mental State Exemination (MMSE)

MMSE is a scale used to evaluate the cognitive status of individuals. Test; It evaluates verbal responses including attention, orientation and memory, ability to obey verbal and written orders, write spontaneous sentences, and copy a complex drawing. The cut-off value of this scale, which consists of a total of 30 points, is 24 points. Values below 24 indicate deterioration in cognitive status. The reliability and validity studies of the Turkish version of the MMDT were performed by Güngen et al. in 2002 (Lewis, 1994; Güngen et al., 2002).

Intervention Goals

According to the results of the initial evaluation of the case, the level of action determined by VdTMoCA was determined in accordance with the level of "destructive action" (Table 1).

Configuring the Intervention Program

The intervention program was created for the solution of the problem areas identified according to the evaluation tests and VdTMoCA. The intervention program was developed according to the occupational therapy practice model, VdTMoCA. The intervention program was carried out in short sessions of 10-20 minutes, twice a week for 2 months. The sessions were held in the hospital room and in the familiar environment inside the hospital. The sessions were repeated twice a day. Multi Model Sensory Stimulation Programs were used in the intervention program (Table 2). This program is a sensory-based approach developed to stimulate the seven senses (visual, hearing, tactile, taste, smell, vestibular and proprioceptive senses).

Table 1: Intervention goals set for the case.

Occupational Performance Area	Goals
Personal Management	Stimulating brain functions by increasing awareness of the senses Development of gross motor skills Stimulate body awareness Stimulate cognitive functions
Social Ability	Stimulating place, time and person orientation Stimulate memory Appease restless behavior Focused attention for a short time
Work ability and use of leisure	To interact constructively with objects and materials for a short period of time Since the person does not have the concept of leisure at this level, after gaining personal management abilities and social abilities, the focus will be on performance in this area.

Table 2: Sample activities for the multi-model sensory stimulation program.

Sense-Based Approach Example	Stimulated Sensory System
The use of all materials to be used during the session was demonstrated at the beginning of the session.	Proprioceptive, Visual
The scent of the room was changed with comforting room fragrances such as lavender	Smell
Sessions requiring physical activity were supported with rhythmic music.	Hearing, Vestibular
It was made to touch objects of different textures (soft/hard fabrics, cotton, and cloths, etc.)	Tactile
Activities for the development of gross motor skills were planned (walking in familiar surroundings (hospital corridor).	Vestibular, Proprioceptive
Tooth brushing activity was studied with a mint flavored toothpaste.	Taste and smell

RESULTS

Findings of Creative Abilities

Determining the creative ability level takes place in three steps: (1) Evaluating behavior and abilities, (2) determining the action level, and (3) determining the motivation level.

Step 1 - Evaluation of behavior and abilities: According to the results of clinical observations and interviews with the patient's doctor and nurse within the scope of VdTMoCA, the behavior and abilities are as follows in the initial assessment:

When the individual's personal management abilities are examined, it is seen that he has not yet been able to perform self-care activities on his own. For example, during the toothbrushing activity, the person comes into contact with toothpaste, toothbrush and water; however, even if the toothpaste tastes bad, he may try to eat it. Therefore, self-care needs are met by the caregiver.

When the social abilities of the individual are examined, they can distinguish their caregivers, therapist, and doctor. However, this distinction is in the form of familiar and unfamiliar person. They can take simple commands such as "sit", "stand up", "do". His speech is still negligible; however, when he is disturbed, he gives reactions such as grunts. Therefore, yes-no papers and smiley-sad face expression papers are used to communicate.

When the individual's working abilities and leisure use are examined, the ability to use objects has not yet developed, so it is not possible to work in a paid or unpaid job. The concept of leisure does not yet exist.

Steps 2 and 3 - Determining the level of action and motivation: According to the VdTMoCA, the motivation level of the individual with schizophrenia was "Self Differentiation-Person Oriented Phase" before the intervention, but "Passive Participation-Transition Phase" after the intervention, according to the results of the creative ability level evaluation of the individual with schizophrenia.

Findings on Sensory Processing Skills

According to the AASP results, when the pre-intervention and post-intervention sensory processing skills were compared, it was observed that there were improvements. While there was a possible difference before the intervention in the low registration, sensory sensitivity and sensory avoidance quadrants, the post-intervention case showed typical performance. In sensory seeking, both pre-intervention and post-intervention cases showed typical performance. Changes in sensory processing processes after sensory-based occupational therapy intervention are given in Table 3.

Table 3: Change in sensory processing skills.

	Pre-Intervention	Post Intervention	Typical Performance
Low Registration	36	31	24-35
Sensory Seeking	45	52	43-56
Sensory Sensitivity	42	38	26-41
Sensory Avoiding	44	35	27-41

Findings Regarding Positive and Negative Symptoms

According to the PANSS results, when the patient's positive symptom, negative symptom and general psychopathology scores, which are the clinical symptoms of schizophrenia before and after the intervention, were compared, improvements were observed (Table 4).

Table 4: Change in positive and negative symptoms.

	Pre-Intervention	Post Intervention
Positive Symptoms	12	10
Negative Symptoms	18	13
General Psychopathology	30	26
PANSS Total	60	49

PANSS: Positive and Negative Symptom Scale

Findings on Cognitive Symptoms

When the pre-intervention and post-intervention cognitive functions were compared according to the MMSE results, it was observed that there were improvements in all areas. Changes in cognitive symptoms after sensory-based occupational therapy intervention are given in Table 5.

Table 5: Change in cognitive symptoms

	Pre-Intervention	Post Intervention
Orientation	2	5
Registration Memory	1	2
Attention and Calculation	1	2
Recall	1	2
Language	3	5
MMSE Total	8	16

MMSE: Mini Mental State Exemination

DISCUSSION

In our study, the effect of sensory-based occupational therapy intervention on clinical symptoms of schizophrenia (positive symptom, negative symptom and cognitive symptom), sensory processing skills and creative ability level in an individual with schizophrenia was investigated. At the end of two months, it was observed that there were positive and significant improvements in the creative ability level, sensory processing skills and clinical symptoms of the individual with schizophrenia.

According to our study results, it was observed that the creative ability level, which is an indicator of behavior and abilities, improved with the occupational therapy intervention program based on sensory integrity. When the literature was reviewed, occupational therapists used VdTMoCA to assess creative ability. Samsonraj et al. (2012) measured the effectiveness of the interventions of occupational therapists working in mental health with assessment measures such as Canadian Activity Performance Measurement and VdTMoCA. In another study using VdTMoCA, Silaule (2017) evaluated the activity participation of 64 people who received mental health services and were hospitalized. In the study, the changes in the creative ability levels of the people were determined by evaluating the behaviors and abilities. When the literature is examined, it is seen that VdTMoCA is used as a tool to evaluate creative abilities. Creative ability level is a result and measurement of behavior and abilities and is difficult to evaluate (Ratelle et al., 2004). However, no evidence-based study has been found that examines the creative ability level of individuals with schizophrenia. We think that the result of this research will guide the intervention programs to be prepared for individuals with schizophrenia.

Although it is known that sensory integrity approaches improve sensory processing disorders; this study showed that sensory-based occupational therapy approaches to reduce clinical symptoms and sensory processing disorders reduce the sensory problems of individuals with schizophrenia.When the literature is examined, it is seen that individuals with schizophrenia have disorders in their sensory processing skills (Brown et al., 2002; Meredith et al., 2020; Engel-Yeger, 2011; Zengin & Huri, 2020). Brown et al. (2002), in their study comparing the sensory processing processes of individuals with schizophrenia and healthy individuals, found that the sensory seeking scores of individuals with schizophrenia were worse than those of healthy individuals. Meredith et al. (2020), alcohol, drugs, cigarettes, etc. In the study in which 223 people who use drugs examined the relationship between their sensory sensitivity and insecure attachment, it was observed that individuals with substance use disorder experienced sensory sensitivity problems. In his study, Engel-Yeger (2011) compared the sensory processing processes of 145 individuals with substance use disorder who had been under treatment for at least 3 months with healthy individuals, and found that the sensory sensitivity and sensory avoidance areas of individuals with substance use disorder were weaker than healthy individuals. Rieke and Anersen (2009), in their study comparing the sensory processing processes of individuals with obsessive compulsive disorder and healthy individuals, again identified problems in the areas of sensory sensitivity and sensory avoidance.

Occupational therapists use behavioral strategies to reduce the positive and negative symptoms of individuals with schizophrenia. In addition, there are very few studies showing a relationship between positive and negative symptoms and sensory functions. While positive symptoms occur as deviations in normal functions such as delusions and hallucinations, negative symptoms are seen as decreases in the content of emotions and thoughts, and it is clearly stated in the literature that positive and negative symptoms are frequently seen in individuals with schizophrenia (Öztürk & Uluşahin, 2014). Mason and Brady (2009) stated that when individuals prone to psychosis are deprived of sensory input even for a short time, their hallucinations and paranoia increase, and even those who are not prone to psychosis have deterioration in their thinking. Positive symptoms include hallucinations and hallucinations (Mason & Brady, 2009). When the literature is examined, the results of the research show that even mentally healthy individuals have difficulty in distinguishing internal thoughts and external events when they are deprived of sensory input, thus abnormal perceptual experiences such as hallucinations and delusions occur (Scheewe et al., 2013). In another study, it is shown that individuals with

schizophrenia who are deprived of sensory input display abnormal behaviors and negative symptoms such as slowing down in their energy and speech occur (Robinowitz et al., 2012). In our study, it was observed that the sensory-based approach to improve sensory processing processes in schizophrenia also reduced positive and negative symptoms. This may be due to the fact that sensory processing processes are associated with positive and negative symptoms. However, evidence-based studies are needed in this regard.

In our study, reductions in cognitive symptoms were observed with sensory-based occupational therapy intervention in individuals with schizophrenia. It is known that one of the clinical symptoms seen in individuals with schizophrenia is cognitive symptoms (Correll & Schooler, 2020). Cognitive symptoms seen in individuals with schizophrenia are seen as a range of perceptual problems, including problems with memory problem solving and processing auditory and visual stimuli. The perception process emerges with the integration of the sensory stimuli we receive from the environment and our body in the brain (Shiraishi & Reilly, 2009). This explains the reduction of cognitive symptoms with sensory integration-based occupational therapy intervention.

CONCLUSION

The purpose of sensory integration programs developed by occupational therapists is to get better the behavior and abilities of individuals. This study showed that when an individual with schizophrenia is supported with a developmental occupational therapy program that includes sensory integration-based behaviors and abilities, sensory processing skills, positive and negative symptoms, cognitive symptoms, and creative ability levels improve. Randomized controlled studies with large sample groups are recommended to increase the level of evidence and to support the dissemination of developmental frame of reference-based rehabilitation programs such as VdTMoCA in individuals with schizophrenia by occupational therapists.

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Conflict of interests

The authors have no conflict of interests to declare. No financial support was received for this study.

Informed Consent Form

Verbal and written informed consent was obtained from the caregiver of the male inpatient and himself who is 45 years of age.

Author Contributions

Study Design, GZ; Data Collection, GZ, MRY; Data Interpretation, MRY, MH; Manuscript Preparation, GZ, MRY, MH; Literature Search, GZ, MRY, MH. All authors have read and agreed to the published version of the manuscript.

REFERENCES

Abaoğlu, H. (2022). *Occupational Therapy in Schizophrenia*. Hipokrat Kitabevi. ISBN: 978-625-7399-34-0.

Acevedo, B., Aron, E., Pospos, S., & Jessen, D. (2018). The functional highly sensitive brain: a review of the brain circuits underlying sensory processing sensitivity and seemingly related disorders. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *373*(1744), 20170161.

Barlati, S., Deste, G., Gregorelli, M., & Vita, A. (2019). Autistic traits in a sample of adult patients with schizophrenia: prevalence and correlates. *Psychological Medicine*, *49*(1), 140-148.

Batalla-Martín, D., Belzunegui-Eraso, A., Miralles Garijo, E., Martínez Martín, E., Romaní Garcia, R., Heras, J.S.M., & Martorell-Poveda, M.A. (2020). Insomnia in schizophrenia patients: Prevalence and quality of life. *International journal of environmental research and public health*, *17*(4), 1350.

Bighelli, I., Salanti, G., Huhn, M., Schneider Thoma, J., Krause, M., Reitmeir, C., & Leucht, S. (2018). Psychological interventions to reduce positive symptoms in schizophrenia: Systematic review and network meta-analysis. *World psychiatry*, *17*(3), 316-329.

Brown, C., Cromwell, R. L., Filion, D., Dunn, W., & Tollefson, N. (2002). Sensory processing in schizophrenia: Missing and avoiding information. *Schizophrenia research*, *55*(1-2), 187-195.

Camp, A. L. (2015). The responsiveness and relevance of the activity participation

outcome measure in patients with traumatic brain injury in an acute neurological rehabilitation setting. *Johannesburg: University of the Witwatersrand*.

Casteleijn, D. (2014). Using measurement principles to confirm the levels of creative ability as described in the Vona du Toit Model of Creative Ability. *South African Journal of Occupational Therapy*, *44*(1), 14-19.

Casteleijn, D., & de Vos, H. (2007). The model of creative ability in vocational rehabilitation. *Work*, *29*(1), 55-61.

Correll, C. U., & Schooler, N. R. (2020). Negative symptoms in schizophrenia: A review and clinical guide for recognition, assessment, and treatment. *Neuropsychiatric disease and treatment*.

de Witt, P. (2014). Creative ability: A model for individual and group occupational therapy for clients with psychosocial dysfunction. *Occupational therapy in psychiatry and mental health*, 3-32.

Engel-Yeger, B. (2012). Validating the Adolescent/Adult Sensory Profile and examining its ability to screen sensory processing difficulties among Israeli people. *British Journal of Occupational Therapy*, *75*(7), 321-329.

Engel-Yeger, B., & Ziv-On, D. (2011). The relationship between sensory processing difficulties and leisure activity preference of children with different types of ADHD. *Research in developmental disabilities*, *32*(3), 1154-1162.

Galderisi, S., Mucci, A., Buchanan, R. W., & Arango, C. (2018). Negative symptoms of schizophrenia: new developments and unanswered research questions. *The Lancet Psychiatry*, *5*(8), 664-677.

Güney Yılmaz, G., Zengin, G., Temuçin, K., Aygün, D., & Akı, E. (2021). How the occupational balance of healthcare professionals changed in the COVID-19 pandemic: A mixed design study. *Australian Occupational Therapy Journal*, *68*(6), 520-534.

Güngen, C., Ertan, T., Eker, E., Yaşar, R., & Engin, F. (2002). Reliability and validity of the standardized Mini Mental State Examination in the diagnosis of mild dementia in Turkish population. *Turkish Journal of Psychiatry*,*13*(4), 273-281.

Kanchanatawan, B., Thika, S., Anderson, G., Galecki, P., & Maes, M. (2018). Affective symptoms in schizophrenia are strongly associated with neurocognitive deficits indicating disorders in executive functions, visual memory, attention and social cognition. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *80*, 168-176.

Kay, S. R., Fiszbein, A., & Opler, L. A. (2012). Positive and negative syndrome scale (PANSS). MHS.

Koola, M. M. (2018). Potential role of antipsychotic-galantamine-memantine combination in the treatment of positive, cognitive, and negative symptoms of schizophrenia. *Complex Psychiatry*, *4*(3), 134-148.

Kostakoğlu AE, Batur S, Tiryaki A. (1999). Pozitif ve negatif sendrom ölçeğinin (PANSS) Türkçe uyarlamasının geçerlik ve güvenirliği. *Türk Psikoloji Dergisi, 14*, 23-32.

Larsson-Lund, M., & Nyman, A. (2017). Participation and occupation in occupational therapy models of practice: A discussion of possibilities and challenges. *Scandinavian journal of occupational therapy*, *24*(6), 393-397.

Lewis, C.B.& Bottomley, J. M. (1994). *Geriatric physical therapy: A clinical approach*. Norwalk: Appleton and Lange.

Mason, O. J., & Brady, F. (2009). The psychotomimetic effects of short-term sensory deprivation. *The Journal of nervous and mental disease*, *197*(10), 783-785.

McCutcheon, R. A., Marques, T. R., & Howes, O. D. (2020). Schizophrenia—an overview. *JAMA psychiatry*, *77*(2), 201-210.

Meredith, P., Moyle, R., & Kerley, L. (2020). Substance use: links with sensory sensitivity, attachment insecurity, and distress in young

adults. *Substance Use & Misuse*, *55*(11), 1817-1824.

O'Brien, J., & Kuhaneck, H. (2019). Using occupational therapy models and frames of reference with children and youth. *Case-Smith's Occupational Therapy for Children and Adolescents-E-Book*, 18.

Öztürk, M. O., & Uluşahin, A. (2014). *Ruh sağlığı ve bozuklukları*. Nobel Tıp Kitabevleri.

Pettersson-Yeo, W., Allen, P., Benetti, S., McGuire, P., & Mechelli, A. (2011). Dysconnectivity in schizophrenia: where are we now?. *Neuroscience & Biobehavioral Reviews*, *35*(5), 1110-1124.

Rabinowitz, J., Levine, S. Z., Garibaldi, G., Bugarski-Kirola, D., Berardo, C. G., & Kapur, S. (2012). Negative symptoms have greater impact on functioning than positive symptoms in schizophrenia: analysis of CATIE data. *Schizophrenia research*, *137*(1-3), 147-150.

Ratelle, C. F., Vallerand, R. J., Chantal, Y., & Provencher, P. (2004). Cognitive adaptation and mental health: A motivational analysis. *European Journal of Social Psychology*, *34*(4), 459-476.

Rieke, E. F., & Anderson, D. (2009). Adolescent/Adult Sensory Profile and obsessive–compulsive disorder. *The American Journal of Occupational Therapy*, *63*(2), 138-145.

Samsonraj, R. S., Loughran, M. F., & Secker, J. (2012). Evaluating outcomes of therapies offered by occupational therapists in adult mental health. *Journal of Mental Health*, *21*(6), 531-538.

Scheewe, T. W., Backx, F. J. G., Takken, T., Jörg, F., Van Strater, A. C. P., Kroes, A. 1., ... & Cahn, W. (2013). Exercise therapy improves mental and physical health in schizophrenia: a randomised controlled trial. *Acta Psychiatrica Scandinavica*, *127*(6), 464-473.

Sherwood, W. (2011). An introduction to the Vona du Toit model of creative ability. *Revista electrónica de terapia ocupacional Galicia, TOG*, (14), 12.

Shiraishi, N., & Reilly, J. (2019). Positive and negative impacts of schizophrenia on family caregivers: a systematic review and qualitative meta-summary. *Social psychiatry and psychiatric epidemiology*, *54*(3), 277-290.

Silaule, O. (2017). Routine measurement of outcomes for mental health care users attending occupational therapy in an acute mental health care unit within a rural context. *Faculty of Health Sciences, School of Therapeutic Sciences. University of the Witwatersrand. Johannesburg*.

Simeone, J. C., Ward, A. J., Rotella, P., Collins, J., & Windisch, R. (2015). An evaluation of variation in published estimates of schizophrenia prevalence from 1990─ 2013: a systematic literature review. *BMC psychiatry*, *15*(1), 1-14.

Tripathi, A., Kar, S. K., & Shukla, R. (2018). Cognitive deficits in schizophrenia: understanding the biological correlates and remediation strategies. *Clinical Psychopharmacology and Neuroscience*, *16*(1), 7.

Utz, F., Böge, K., Hahn, E., Fuchs, L., Schomerus, G., Angermeyer, M., & von Lersner, U. (2019). Public attitudes towards depression and schizophrenia in an urban Turkish sample. *Asian Journal of Psychiatry*, *45*, 1-6.

Van der Reyden, D., Casteleijn, D., Sherwood, W., & De Witt, P. (2019). *The Vona du Toit Model of Creative Ability: Origins, Constructs, Principles and Application in Occupational Therapy*. Vona and Marie du Toit Foundation.

Zengin, G., & Huri, M. (2022). The sensory processing patterns of individuals with schizophrenia with comorbid substance use disorder. *Journal of Substance Use*, 1-9.

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