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Social cognition and alexithymia in severe mental disorders

ABSTRACT

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The dissertation work has been discussed and directed for defense by the Department of Social, Organizational, Clinical, and Pedagogical Psychology at the Faculty of Philosophy of Sofia University "St. Kliment Ohridski".

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Introduction	4
Theoretical frame	7
1.1. General concepts: severe mental disorders, schizophrenia, social cognition, alexithymia	7
1.2. Clinical picture of schizophrenic disorder	8
1.3. Social cognition and schizophrenia	9
1.4. The construct alexithymia	11
1.5. The relationship between social cognition and alexithymia in schizophrenia: The role of emotional regulation.	13
Organization of the empirical research	17
1. Aim, tasks and hypotheses	17
2. Sample	18
3. Inclusion and exclusion criteria	19
4. Measurement	19
Results, discussion, and conclusions from the empirical study.	22
1.1. Interrelationships between scales for social cognition, subjective emotional experiences, and levels of depression, anxiety, and stress.	22
1.2. Analysis of differences in subjective emotional experiences and social cognition in patients with paranoid schizophrenia and healthy controls.	23
1.3. Analysis of the differences between the levels of alexithymia, negative emotional experiences, emotional regulation strategies, and life satisfaction.	24
1.4. Relationships between social cognition, alexithymia, and emotional suppression	24
1.5. Relationship between levels of alexithymia, emotional regulation strategies, and levels of depression, anxiety, and stress.	25
1.6. Influences of the studied phenomena on the levels of depression in patients	26
1.7. Influence of alexithymia on social cognition in patients with paranoid schizophrenia	29
1.8. Gender differences	28
1.9. Attitudes towards health specialists	28
Summary and discussion	29

Introduction

Severe mental disorders are associated with significant suffering for diagnosed patients. Individuals with severe mental disorders experience between two to three times higher mortality rates compared to the general population, resulting in a reduced life expectancy of 10 to 20 years (World Health Organization, 2018, p.4). Schizophrenia is one of the most commonly diagnosed severe mental disorders, with an estimated 24 million people or 1 in 300 individuals (0.32%) suffering from the condition (WHO). Schizophrenia is a mental disorder often linked with high distress and disruptions in social, personal, educational, occupational, and other areas of the patient's life. The development of theories regarding the etiology of schizophrenia has a long history, with current understanding acknowledging its heterogeneous nature and various factors contributing to vulnerability and disease onset. In the ICD-10, schizophrenia encompasses different subtypes, with paranoid schizophrenia being one of the most diagnosed, characterized by predominant symptoms of paranoia, delusions, and hallucinations (WHO, 1992, p.5). Over decades, the long-term consequences of the illness and the extent to which remission is possible have been central focuses in various theories explaining the etiology of schizophrenia. Despite advancements in neuroimaging technologies, improvements in pharmacotherapy, and the development of psychosocial rehabilitation, schizophrenia remains a disorder with a relatively poor prognosis. Throughout time, numerous therapeutic interventions with varying effectiveness have been developed. While researchers have long focused on neurocognitive deficits, in recent years, new areas of study such as disturbances in social cognition and alexithymia have emerged, proving to be better prognostic factors for patients' quality of life, social isolation, and interpersonal relationship difficulties. Studies reveal that disturbances in social cognition correlate with higher levels of negative symptomatology and lower levels of social functioning, serving as better predictors of patients' quality of life. Social cognition refers to the way we process information about the social world as a whole. A number of studies have found significant disruptions in social cognition among patients with schizophrenia, manifested in deficits in recognizing and interpreting others' emotional states, as well as impaired theory of mind. These deficits manifest not only in understanding others' emotional experiences but also in one's own. The term used in clinical practice to define difficulties in understanding one's own emotional experiences is "alexithymia." In literal translation, the term means "lack of words for emotions," and in recent decades, many studies have focused on its investigation and assessment in clinical and non-clinical samples. There are numerous studies that find associations between levels of alexithymia and other mental disorders, although studies in clinical samples with severe mental disorders are less numerous.

Recent studies have found a link between alexithymic traits, deficits in processing others' emotions, and understanding others' mental states in both healthy controls and clinical populations (Di Tella et al., 2020). However, the results of these studies are conflicting, indicating that the relationship between symptoms of schizophrenia, alexithymia, and social cognition is complex

and intricate. The limited number of studies and the inconsistency of data on a global scale necessitate a deeper theoretical and empirical analysis of the relationship between social cognition and alexithymia, as well as affective dysregulation in patients with paranoid schizophrenia. In this sense, investigating deficits in social cognition and the affective sphere is particularly relevant and will provide opportunities for improving psychosocial interventions and enhancing the overall quality of life of patients. The topic is pertinent as it is associated with central difficulties in one of the most severe mental disorders, characterized by therapeutic resistance, resilience to deficits, and impaired quality of life. These deficits directly affect patients' overall level of functioning, their attitudes towards treatment, and their social inclusion in society. In Bulgarian literature, the topic has not been extensively addressed so far, with only some aspects being studied, but not comprehensively in a unified work. From a practical standpoint, the data can be utilized in planning psychosocial interventions for working with patients with schizophrenia but also in the general population.

For this reason, the current dissertation aims to investigate the relationship between social cognition and alexithymia in paranoid schizophrenia. The object of the current dissertation is the deficits in social cognition and alexithymia in patients with paranoid schizophrenia. The subject of the study is the relationship between impaired social cognition, levels of alexithymia, and strategies for emotional regulation in therapeutically improved post-psychotic patients. Additionally, the attitude towards healthcare professionals and its relationship with alexithymic traits and maladaptive emotional regulation strategies are investigated. Due to the presence of numerous studies demonstrating deficits in understanding basic emotions in patients with paranoid schizophrenia, the present study employs a circular dimensional approach to assess emotional experiences, aiming to test its reliability for application as a tool for studying positive and negative symptomatology.

The structure and content of the dissertation

The current dissertation work is divided into three main chapters. The first chapter covers theoretical approaches to the issue. The fundamental concepts - schizophrenia, social cognition, and alexithymia are examined. The subsequent part of the chapter explores the specifics of schizophrenia, the clinical manifestations of the disease, its course, and the issue of disability. Next, the main etiological theories explaining the disease, which remain relevant to this day, are discussed. Various studies on disturbances in social cognition and schizophrenia, neurobiological theories, and affective neuroscience are examined. Some methodologies for studying social cognition and basic theoretical models of emotions are presented. The dimensional model of emotions, which is applied in the present dissertation, is discussed. The next part of the chapter discusses the concept of alexithymia, basic theories, and the neuropsychological basis of the disorder. Main instruments for studying alexithymia and research on the relationship between social cognition and alexithymia in schizophrenia are described. The disturbances in emotional regulation in schizophrenia and their relationship with alexithymia are also discussed. The second

chapter describes the organization of the empirical study. The objectives, tasks, and hypotheses are defined. The sample, including inclusion and exclusion criteria, as well as the research instruments and procedures, are described. The third chapter includes all the results from the statistical analyses conducted to assess the differences between social cognition, subjective emotional experiences, levels of alexithymia, strategies for emotional regulation, and life satisfaction, as well as correlational analyses for the interrelationship between the constructs. The psychometric characteristics of the applied methodologies are also analyzed. The results are summarized and discussed. The development concludes with conclusions and contributions.

Theoretical frame

1.1. General concepts: severe mental disorders, schizophrenia, social cognition, alexithymia

The primary hallmark of mental disorders is that they lead to a deterioration in the individual's quality of life, associated with significant distress, and interfere with adaptive functioning. The term "disorder" is used rather than "disease" or "illness" because the focus is on the impact that symptoms have on the personality; specifically, to diagnose a "mental disorder," the individual must suffer and be affected in some way. Severe mental disorders include conditions such as moderate and severe depressive disorders, schizophrenia, bipolar affective disorder, and other psychotic disorders. According to the World Health Organization, patients with severe mental disorders are at greater risk of suicide, abuse, and homicide, as well as being more likely to engage in behavior that puts them at risk. This group of people is considered particularly vulnerable in countries with poor socio-demographic conditions, limited resources, lack of access to quality mental health services, and limited prevention and screening for mental disorders.

Schizophrenia is among the most commonly diagnosed severe mental disorders and is associated with a high degree of disability. Schizophrenic disorders "are generally characterized by fundamental and characteristic deviations in thinking and perception, and by affect that is inappropriate, or out of proportion to the circumstances" (ICD-10, p. 376). According to the International Classification of Diseases, schizophrenia is included in the category F20-29 "Schizophrenia, schizotypal, and delusional disorders," with symptoms present for a minimum of one month and including some of the primary symptoms such as persistent delusions, persistent hallucinations, thought disorders, negative symptoms, etc. One of the areas significantly affected in patients with schizophrenia is the area of communication with others, which is most commonly associated with misinterpreting social information, such as significant deficits in perceiving and recognizing emotions from facial expressions (Tolev, 2016; Corcoran et al., 2015). Studies find specific impairments in the area of social cognition. Social cognition is "the way we interpret, analyze, and remember information about the social world" (Baron and Byrne, 1997). This definition encompasses several key concepts. Firstly, the information we receive about others is interpreted, meaning that we assign a certain meaning to the information based on our experiences, knowledge, and social context. Secondly, the information is analyzed, which means it can be altered, developed, or rejected. Thirdly, the information is stored in memory, from where it can be retrieved when needed. It's important to note that by "social world," it refers not only to others but also to oneself (Pennington, 2012). The theory and research in the field of social cognition can involve both others and the subjective world of the individual, including the interaction between the individual and others. There are other definitions of "social cognition," but they generally

define it as a set of mental operations that underlie social interaction, including perception and interpretation of others' intentions, attitudes, and behaviors, and generating responses to their behavior towards us (Green et al., 2008). Patients with schizophrenia demonstrate significant and persistent impairments in various areas of social cognition, including affective processing, social perception, attributions, and theory of mind. Social cognition is associated with the ability to process information about the intentions and emotional states of others. Good skills related to social cognition allow individuals to construct mental representations of the relationships between themselves and others and to flexibly use these representations to engage in adequate social interactions with them (Di Tella et al., 2020). These skills include both the capacity to represent the intentions and beliefs of others (theory of mind) and the ability to share and recognize the emotions of others (Di Tella et al., 2020). Therefore, understanding others is closely linked to processing emotions as well as understanding one's own emotional states. The term "alexithymia" originates from Greek and literally translates to "lack of words for emotions." In psychology, the construct is associated with difficulties in identifying, describing, and communicating emotional states (Sifneos, 1973).

Alexithymia is a cognitive-affective deficit characterized by (1) difficulties in identifying one's own emotional experiences; (2) difficulties in describing and verbalizing subjective emotional experiences; (3) difficulties in distinguishing between emotions and bodily sensations; (4) limited imagination; and (5) an externally oriented thinking style or a tendency to focus on external, objective facts and events rather than internal subjective experiences (Nemiah, Freyberger, & Sifneos, 1976). It is believed that one of the conditions that hinders the effective application of emotion regulation strategies due to a lack of understanding or awareness of emotions is the presence of high levels of alexithymia (Gross and Jazaieri, 2014), with several studies finding a tendency for this emotional characteristic to be present in schizophrenia (Cedro et al., 2001; Kubota et al., 2011).

1.2. Clinical picture of schizophrenic disorder

According to current diagnostic criteria, the pathognomonic (characteristic, specific) manifestations of schizophrenia can be grouped into three groups of symptoms: (1) positive symptoms, which include hallucinations and delusions; (2) negative symptoms, which include flattened affect, alogia, anhedonia, and social deficits; and (3) cognitive symptoms, which are associated with disturbances in attention, memory, perception, and thinking. Schizophrenia is considered a chronic and severe neurodevelopmental disorder characterized by complex and heterogeneous perceptual, cognitive, and emotional deficits (Godar & Bortolato, 2014). A psychotic episode is necessary for diagnosis, although the disorder develops in stages. From a neurodevelopmental perspective, etiological and pathogenic factors are present long before the formal onset of the disease (probably during intrauterine development) and disrupt the formation of neural connections, leading to subtle changes in specific neurons and networks that are at risk and ultimately may lead to the onset of the disease (Lewis & Lieberman, 2000). The chronic course

of the disease is directly related to the degree of disability in patients. Quality of life can be defined as a general sense of well-being and subjective satisfaction with living conditions, as well as the individual's health status and access to resources (Katschnig, 1997). Overall, factors influencing the quality of life in severe mental disorders and schizophrenia in particular are not clearly defined. Studies have identified a range of factors such as social support, patient needs, and medication side effects (Galuppi et al., 2010). However, the majority of studies have focused on the role of psychiatric symptoms, with some studies finding weak to moderate correlations among them (Sim et al., 2004). In a study conducted across six European healthcare centers, it was found that the quality of life of patients was primarily predicted by levels of anxiety, depression, and overall functioning (Becker et al, 2005).

1.3. Social cognition and schizophrenia

The National Institute of Mental Health (NIMH) in the United States establishes research teams in cognitive neuroscience aiming to develop therapeutic interventions to improve cognition among patients with schizophrenia, attempting to bridge cognitive and social neuroscience. In the field of social-emotional processing theory, a fundamental hypothesis is that human social and emotional behaviors are strongly interconnected. Social cognitive neuroscience focuses on how individuals make inferences about the thoughts and emotions of others as a result of their interaction with them. Affective neuroscience is concerned with the emotional reactions of the individual, their capacity for emotional regulation, and their ability to identify emotional expressions. As the number of studies in the field increases, various specific deficits in social cognition in schizophrenia begin to emerge. Clinical results unequivocally demonstrate that patients with schizophrenia have impairments in social interaction associated with reduced capacity for effective communication (Sperber & Wilson, 2002). A study conducted by Kim and colleagues (Kim et al., 2020) aimed to compare performance on the Reading the Mind in the Eyes Test among individuals of the same age, divided into those with first-episode schizophrenia, those at risk for developing the disorder, and healthy controls. The study found that deficits in understanding complex emotions were present even in the group at risk for developing schizophrenia.

One of the most commonly applied methodologies for studying social cognition is understanding basic emotions from facial expressions. Numerous studies have found deficits in the ability to understand others' emotional states as well as one's own emotions in schizophrenia. These deficits primarily manifest in negative symptoms such as blunted affect, social withdrawal, lack of interest in the world, inability to experience and express pleasure or anhedonia, and other symptoms that tend to worsen as the illness progresses. A key aspect in Dr. Todor Tolev's (2016) dissertation is the identified deficits in the overall recognition of basic emotions from facial expressions in patients with schizophrenia compared to healthy controls. Difficulties were also found in recognizing neutral images, with patients taking longer to respond compared to healthy controls. For a long time, the dominant paradigm in affective neuroscience

has been the concept of basic emotions. Consequently, most studies use methodologies applying a categorical approach to emotions, qualitatively distinguishing them into discrete and independent categories, with specific brain structures and neural circuits responsible for different emotional states. Although this approach has many advantages for understanding emotions and has made significant scientific contributions, it fails to explain some important phenomena in the field of clinical psychology and psychiatry (Posner et al., 2005). A more comprehensive explanatory approach proves to be the dimensional model of emotions, according to which emotions share common neural circuits. In addition to distinguishing different types of emotions at a content level, researchers agree that emotions can be distinguished by possessing at least two common qualities: valence (hedonic valence in terms of pleasure-displeasure) and arousal. Although valence and arousal can be objectively measured, they are considered subjective evaluations (Russell et al., 1989). All specific emotions arise from patterns of activation of the two dimensions, along with cognitive interpretation and verbal labeling of these physiological experiences. Thus, emotions are the product of the complex interaction between cognitions arising from structures of the neocortex and neurophysiological changes in the two dimensions, primarily associated with subcortical structures such as the limbic system. A large number of studies in affective neuroscience have identified the role of the mesolimbic dopamine system in processing pleasure and reward. This system has projections from the ventral tegmental area to the nucleus accumbens, which has multiple connections with the prefrontal cortex, amygdala, and hippocampus (Posner et al., 2005). Disruptions in the mesolimbic system are also associated with positive symptoms in schizophrenia, suggesting deficits in the valence and arousal systems in schizophrenia. Links are also found between positive and negative emotions with asymmetry in activity in the frontal lobe, specifically the prefrontal cortex (Posner et al., 2005). Despite the negative symptoms, which manifest as blunted affect and a lack or inadequate expression of emotions in patients with schizophrenia, when studying the subjective experiences of these patients, it is found that they report experiencing intense emotions. This suggests the presence of some contradiction between the weak or almost absent expression of emotions and the fact that schizophrenic individuals share that they experience equivalent or even more intense emotions compared to the general population (Berenbaum & Oltmanns, 1992; Kring & Earnst, 1999). Bleuler (1950) emphasizes that disturbances in the emotional sphere are a key characteristic of schizophrenia, which is confirmed by numerous clinical observations. However, for a long time in psychiatry, the prevailing model was Kraepelin's dichotomous model, which considers schizophrenia as a non-affective disorder. The main paradigm for schizophrenia is the endogenous psychosis, which remains fundamental to this day. According to Bleuler, the brain's pathological process, characteristic of schizophrenia, not only leads to primary or fundamental deficit symptoms but also indirectly activates secondary mental defenses that underlie psychotic symptoms (Haralanov & Haralnova, 2022). So according to him, the leading symptoms are the deficit or negative symptoms, which result from the pathological brain process, while the psychotic production or positive symptoms are rather defenses of the psyche that are activated during the course of the illness. This is supported by the fact that the pathological symptoms of schizophrenia are present even before the onset of the first

psychotic episode, and that psychotic positive symptoms are not obligatory or may be absent in simple schizophrenia. A number of contemporary empirical studies confirm clinical observations of emotional disturbances among patients. They confirm the presence of reduced or absent positive or negative emotional expressions in response to emotional stimuli compared to healthy controls (Earnst & Kring, 1999). Emotional disturbances are directly related to negative symptoms. In their study, Haralanov and Haralanova (2017) aimed to investigate affectivity in paranoid schizophrenia by developing original methodologies for studying affective dysregulation in hospitalized psychotic patients. They provide a possible explanation for the affective mechanisms of paranoid psychotic symptom formation. They created an original methodology for studying subjective emotional experiences when perceiving neutral social scenes. The results show that patients have significantly higher subjective emotional activation compared to healthy controls. Additionally, both pleasure and displeasure emotional experiences towards neutral social stimuli are significantly more intense in individuals with schizophrenia. These findings align with the discovered emotional ambivalence in schizophrenia found in other studies (Cohen & Minor, 2010; Trémeau et al., 2016). This can be considered in the context of the development of the disease, where hyperaffectivity may occur early in the illness, while the decrease in emotional experiences may be associated with the chronic stage of the disease. It can be summarized that patients with schizophrenia have deficits in expressing emotional experiences and understanding their emotions, although they usually experience the same, and sometimes even higher intensity and valence of emotions. At the same time, they have deficits in recognizing others' emotional states, which contributes to the development of positive symptoms such as paranoid thoughts. The connection between reduced expression of emotional states, preserved or exaggerated internal subjective experience of emotions, and impaired understanding of others' emotions is still not entirely clear.

1.4. The construct alexithymia

The deficit in understanding one's own emotional experiences is defined by the concept of alexithymia. Similar to social cognition, alexithymia is considered a multidimensional construct, involving difficulties in describing and identifying one's own emotional experiences, distinguishing between emotions and bodily sensations prompted by emotional arousal, limited fantasy thinking, and an externally oriented thinking style (Sifneos, 1972). The concept of alexithymia initially emerged within the psychoanalytic paradigm while observing patients with psychosomatic disorders. As early as 1948, psychiatrist from Swiss origin, Ruesch, observed a specific characteristic among his patients who had various psychosomatic complaints, namely, a lack of imagination and difficulties with the symbolic expression of different emotions. Gradually, alexithymia begins to be considered in various contexts. Sifneos and Nemiah (1970) propose a deficit model to explain alexithymia, suggesting that it results from insufficient psychological development. This model views alexithymia as a consequence of the formation of a dysfunctional mature personality that struggles with difficulties in cognitively integrating emotional experiences and cannot effectively regulate and modulate emotions. French psychoanalysts Marty and de

M'Uzan (1963) describe a specific thinking style and a lack of ability to fantasize, attributing these deficits to deficiencies in personality organization rather than neurotic defenses. They refer to this specific cognitive style as "operational thinking" (Krystal, 2006).

Gradually, alexithymia extends beyond psychosomatic theory and begins to be studied among the general population, as well as in various clinical samples. It is found that the deficit is also associated with areas such as emotional self-regulation and self-awareness (Taylor et al., 1999). On behavioral level, clinically high levels of alexithymia manifest as avoidance of discussing one's own emotions, a preference for discussing behavior and the logic of experiences at a rational level. Patients may complain of physical symptoms but cannot identify being anxious or depressed. They often have a poor fantasy life, may exhibit symptoms without physiological explanation, and have difficulties in their interpersonal relationships (Taylor, 1984). Due to the difficulties in understanding their own emotional states, alexithymia is considered a metacognitive deficit (Dimaggio et al., 2009). Contemporary researchers are beginning to focus on studying the connections between alexithymia, manifested as a stable personality trait in some patients, and various medical and psychiatric conditions. Gradually, interest in the construct is increasing, with studies finding links between alexithymia and various disorders such as depression, schizophrenia, autism spectrum disorder, substance abuse, eating disorders, and chronic pain (Tella et al., 2020). Within the general population, alexithymia exists as a continuum with varying degrees of severity. Studies have found a link between levels of alexithymia and more protective and maladaptive coping strategies, acting out, and passive-aggressive styles of communication, dissociation, and lower quality of life (Teixeira et al., 2018). Today, the prevailing understanding is that the construct is a combination of personality and situational characteristics and depends on a number of additional factors. Typically, the deficit in understanding one's own emotional experiences is associated with higher psychological distress as well as the development of "functional" symptoms and higher levels of anxiety and depression (De Beradis et al., 2017). It turns out that this deficit is comorbid with various mental disorders. Typical manifestations associated with the presence of alexithymia in these disorders include the inability to integrate emotion and cognition and a tendency toward impulsive behavior (De Beradis et al., 2017). From the psychoanalytic perspective, which has been dominant for a long time, in recent years, researchers have gradually begun to view alexithymia as a deficit in processing emotional information rather than as a defense mechanism. This leads to increased interest in the neurobiological basis of the deficit. Neuropsychologists construct their work on the social-cognitive theory. Although alexithymia manifests as deficits in understanding one's own emotional experiences, research finds that it often coexists with deficits in understanding others' emotions, mentalizing ability, and empathy, which in combination lead to problems in social interactions (Wingbermhühle et al., 2012). Research on psychosocial functioning in psychiatric patients diagnosed with conditions such as schizophrenia and autism spectrum disorder shows a close association between the concept of alexithymia and social-cognitive constructs. Several studies have found higher levels of alexithymia among patients with schizophrenia (Cedro et al., 2001). In addition to difficulties in understanding their own emotional experiences, patients also have deficits in emotional perception and understanding

of others' perspectives (Derntl et al., 2009). Studies support the understanding that the ability to understand one's own emotional experiences modulates empathy, suggesting that disruptions in either of these two areas may share common underlying functional deficits (Bird et al., 2010).

Bermond, (2004) examines alexithymia from a neuropsychological perspective and proposes a distinction between two main subtypes of alexithymia, linked to different neurological systems. The first subtype is associated with dysfunction in the right hemisphere of the brain cortex and is characterized by a lack of or impaired emotional experience, accompanied by a lack of or impaired cognition related to emotion. This would manifest as reduced emotional arousal. The second subtype is understood as dysfunction in the corpus callosum and is associated with a selective deficit in emotional cognition (i.e., in identifying, analyzing, and verbalizing emotions), but with preserved emotional experience and normal emotional arousal. According to the model of disrupted interhemispheric connection, emotional information processed by the right hemisphere cannot be transmitted to the left, leading to emotional arousal (activation) that cannot be regulated by cognitive strategies. In the first subtype, there is a disturbance in both the affective and cognitive aspects of emotional regulation, while in the second, affective experiences are not disturbed, but their cognitive regulation is. The subdivision of alexithymia subtypes proves useful in the study of schizophrenia, as patients exhibit specific cognitive impairments in the emotional regulation of emotions while simultaneously experiencing heightened emotional arousal (second subtype of alexithymia) (Wingbermhle et al., 2012).

The most widely used instrument for assessing alexithymia, especially in clinical samples, is the Toronto Alexithymia Scale (TAS-20) (Bagby et al., 1994). It was developed as a revised version of the earlier 26-item scale (Taylor, Ryan & Bagby, 1985). The validity of TAS-20 has been extensively investigated, with convergent analyses revealing a strong correlation between it and other scales for assessing alexithymia (Bagby et al., 1994a; Parker, Taylor & Bagby, 2003). Originally constructed in 1986, the scale has since been revised multiple times and adapted for use in various countries. TAS was developed to address the limitations of existing instruments up to that point.

1.5. The relationship between social cognition and alexithymia in schizophrenia: The role of emotional regulation.

While areas such as theory of mind and perception of others' emotions are widely researched, other areas receive less attention. One such area is how individuals with schizophrenia process and regulate their own emotional experiences and how this impacts their social functioning. Concurrently, affective neuroscience emphasizes that successful social functioning depends on good emotional awareness and emotional regulation (Kimhy et al., 2012). According to Green and Letmann (2008), this discrepancy between cognitive and affective neuroscience

poses a barrier to the development of research in the field of social cognition. Emotions play a crucial role in social functioning by providing information about the significance of a given social situation and guiding potential responses to those situations (Barrett et al., 2001). Since different emotions require the application of different coping strategies, the lack of awareness and understanding of emotional experiences can hinder an individual's ability to choose an appropriate coping strategy for the situation they are facing. This could potentially lead to social dysfunction (Barrett et al., 2001). Therefore, successful adaptation to continuously changing social situations stems from understanding one's own emotional experiences, which is associated with the term "emotional awareness" (Kimhy et al., 2012) which is the opposite construct of not understanding emotional experiences or alexithymia. Multiple studies seek to gain a better understanding of the presence of alexithymia among patients with schizophrenia, exploring its association with various pathological symptoms. Alexithymic manifestations closely resemble the characteristic symptoms of blunted affect, anhedonia (lack of pleasure), and alogia (poverty of speech), which are negative manifestations of the schizophrenic illness process. Examining the relationship between alexithymia and positive symptoms, Cedro et al. (2001) found that alexithymia is more common among patients with paranoid subtype schizophrenia than among healthy controls. However, other studies have yielded conflicting results regarding the relationship between alexithymia and both negative and positive symptoms. Todarello et al. (2005) found that alexithymic deficits persist after the reduction of negative symptoms within one year, without any association with positive symptoms, overall psychopathology, or levels of depression. Conversely, van der Meer et al. (2009) found a link between levels of alexithymia and depression among patients with schizophrenia. As a whole, researchers share the view that alexithymia is a separate construct, independent of negative symptomatology (Todarello et al., 2005). The adequate understanding of the relationship between one's own emotional experiences and cognitive processing determines the effectiveness of emotional regulation as a whole (Gross, 2015). A meta-analysis of eight studies on the relationship between schizophrenia and alexithymia reveals a moderate to large effect size (Hedges $g = -1.05$, 95% CI; -1.45 to -0.65), confirming deficits in emotional awareness in schizophrenia (O'Driscoll et al., 2014). Some authors hypothesize that disruptions in self-reflection, including emotional awareness, as well as cognitive biases, constitute a network of interconnected processes (Dimaggio et al., 2009). There is evidence that alexithymia can predict the level of psychosocial functioning in patients (Kimhy et al., 2012), as well as in individuals at risk for developing psychosis (Kimhy et al., 2016). Most studies do not find differences in levels of alexithymia between psychotic and non-psychotic mental disorders (Ospina et al., 2019; Karayağiz & Baştürk, 2016), but they find higher levels of alexithymia in schizophrenia, bipolar disorder, and other mental disorders compared to healthy controls (Herold et al., 2017). This suggests that alexithymia may be a nonspecific characteristic of some mental disorders, particularly psychiatric disorders characterized by deficits in cognitive processing and emotional regulation, such as schizophrenia and bipolar affective disorder. Furthermore, studies find that levels of alexithymia remain stable even during remission, both in affective disorders and

psychoses (Picardi et al., 2012), which suggests that the difficulties are more of a personality trait rather than a temporary state that resolves with symptom improvement.

Emotional regulation is considered a multidimensional construct with transdiagnostic significance across various mental disorders, yet the direction of the relationship between psychopathology and emotional dysregulation is not fully understood. Meta-analyses find that while patients may not report a reduction in positive experiences or activation toward emotionally significant pleasurable stimuli, they do report experiencing more negative emotions in response to neutral and positive stimuli (Cohen & Minor, 2010). Leading researchers in this field (Gratz & Roemer, 2004) define emotional regulation as a multidimensional construct that includes: (1) awareness, understanding, and acceptance of emotional experiences; (2) the ability to engage in goal-directed behavior and suppress impulsive behavior when experiencing negative emotions; (3) flexible application of situationally appropriate strategies to modulate the intensity and/or direction of the emotional response; and (4) willingness to experience negative emotions and lack of avoidance of them to achieve important and desired goals. Within this model, it is considered that deficits in any of the four domains represent emotional dysregulation or disruption in emotional regulation. According to a study by Strauss and colleagues (Strauss et al., 2013), patients with schizophrenia fail to apply the strategy of cognitive reappraisal when exposed to negative stimuli, leading them to report experiencing negative emotions more frequently. Studies find that individuals with schizophrenia more frequently employ the strategy of emotional suppression to regulate their emotions and less frequently use cognitive reappraisal (van der Meer et al., 2009). Additionally, patients are less likely to engage in pleasure-seeking behaviors (Strauss et al., 2013). Several studies have found a link between deficits in emotional regulation and high levels of alexithymia (Aspinwall & Taylor, 1997; Connelly & Denney, 2007), but there are not as many studies on this relationship in patients with schizophrenia. Researchers believe that the inability to identify the emotion experienced by schizophrenic patients may lead to a disruption in its reappraisal.

In summary, emotion regulation requires cognitive resources, and there are various strategies for emotional regulation described as effective or ineffective, although their effectiveness also depends on the context in which they are applied. Links are found between the ability for emotional regulation and alexithymia, as awareness of emotions is a necessary step for applying a given strategy, and it also influences the type of strategy that will be used. Most studies find emotional dysregulation in schizophrenia, although there are some conflicting data. The deficits identified are in the area of emotion regulation at a neural level and the application of ineffective regulation strategies. Recent data increasingly reinforce interest and support the notion that there is less strict differentiation between affective and non-affective psychoses, which share common mechanisms. The difficulties in processing emotional experiences are a key component of schizophrenia and are linked to the functional difficulties experienced by patients (Kimhy et al., 2012). Accumulated data indicate that difficulties in emotional awareness are present even before the first psychotic episode, as they are found among individuals at high risk for psychosis (Kimhy & Corcoran, 2008). Overall, studying affective deficits can support early diagnosis and preventive

treatment of schizophrenia before the onset of the first psychotic episode, which some theorists view more as a mental decompensation due to underlying brain deficits.

Organization of the empirical research

1. Aim, tasks and hypotheses

The aim of this dissertation is the theoretical and empirical investigation of the relationships between the understanding of one's own and others' emotional states from neutral (ambivalent) social scenes and the levels of alexithymia in patients with paranoid schizophrenia, with results being compared with healthy controls. Additionally, the relationship of the studied phenomena with attitudes towards healthcare professionals is examined.

To achieve the aim of the study, the following main objectives have been set:

1. To investigate whether the methodology for studying social cognition with neutral social scenes can be used as a diagnostic tool with a projective nature to examine positive and negative symptoms in paranoid schizophrenia.
2. To examine the factor structure of the questionnaire for emotional regulation strategies, which is being applied for the first time in a Bulgarian socio-cultural context.
3. To examine the factor structure and psychometric characteristics of the Toronto Alexithymia Scale. To investigate impairments in social cognition in the form of assessing the perception of threat, pleasure, and displeasure when perceiving neutral social scenes in patients with paranoid schizophrenia compared to healthy controls.
4. To investigate differences in levels of alexithymia and emotional regulation strategies in patients with paranoid schizophrenia and healthy controls.
5. To explore differences in levels of subjective emotional experiences, levels of depression, anxiety, and stress, and life satisfaction in patients with schizophrenia compared to healthy controls.
6. To examine the relationships between impaired social cognition, levels of alexithymia, emotional regulation strategies, and levels of life satisfaction in patients with paranoid schizophrenia and healthy controls.
7. To investigate factors that may predict impaired social cognition in paranoid schizophrenia.
8. To examine factors associated with the attitudes of patients with paranoid schizophrenia towards healthcare professionals.

The main hypotheses of the study are:

1. It is assumed that there is a significant relationship between disruptions in the assessment of alien dissatisfaction and levels of alexithymia, but there is no significant relationship between the assessment of alien threat perception in neutral social scenes and alexithymia in patients with paranoid schizophrenia. Additionally, it is assumed that patients with paranoid schizophrenia will rate the degree of threat perception and dissatisfaction higher in neutral social scenes, as well as have higher levels of alexithymia compared to healthy controls.
2. It is assumed that patients with paranoid schizophrenia will have higher values for the application of the emotional suppression strategy and higher levels of negative emotional experiences compared to healthy controls. It is assumed that there will be a significant relationship between levels of alexithymia, depression, anxiety, stress, and subjective emotional experiences and emotional suppression among patients. Additionally, alexithymia will significantly predict the strategy of emotional suppression.
3. It is assumed that high levels of alexithymia and negative emotional experiences will be significant predictors of impaired social cognition when assessing neutral (ambivalent) social scenes and subjective emotional experiences.
4. It is assumed that patients with paranoid schizophrenia will have lower levels of life satisfaction and more negative attitudes towards healthcare professionals compared to healthy controls.
5. It is assumed that there will be significant gender differences in levels of alexithymia and emotional suppression.

2. Sample

The sample examined for the current study was collected during the period 2021-2023. Data collection was conducted in two stages. In the first stage, a pilot study was conducted with 272 participants (255 healthy controls and 17 patients). The pilot study aimed to assess the psychometric properties of the Toronto Alexithymia Scale and the Emotional Regulation Scale. Of the participants, 247 were female and 25 were male. The age ranged from 18 to 67 years old, with a mean age of 36 years ($M=36.33$; $SD=10.13$). The main study involved an experimental group consisting of 49 patients diagnosed with severe mental disorder - Paranoid Schizophrenia F.20.0, and 51 healthy controls. Among the patients, 35 had received inpatient treatment at the First Psychiatric Clinic of the University Hospital "St. Naum" and 14 patients at the Center for Mental Health "Prof. Shipkovenski". Of the patients, 34 were male and 15 were female. Among the healthy controls, 38 were female and 13 were male. The age of the participants ranged from 20 to 65 years, with a mean age of 38 years ($M=38.19$; $SD=12.65$). The individuals from the

experimental group ranged in age from 20 to 65 years, with a mean age of 44 years (M=44.1; SD=11.83). The individuals from the control group ranged in age from 20 to 58 years, with a mean age of 32 years (M=32.33; SD=10.58).

3. Inclusion and exclusion criteria

To be included in the study, the patient had to meet the following criteria: to have a diagnosis of F.20 Paranoid Schizophrenia, based on information from available medical documentation, a reasoned opinion from the treating physician, and data from a semi-structured interview assessing the presence of relevant diagnostic criteria. Patients were not to be in active psychosis, as they would not have the capacity to participate in the study, but they could have residual positive symptoms. Patients and healthy controls aged between 18 and 65 years were selected. The lower age limit was chosen based on the legal age of majority in Bulgaria. The upper age limit was chosen due to the onset of potential age-related changes after 65 years (taking into account the retirement age in Bulgaria). Patients were required to provide informed consent to participate in order to comply with the requirements of the Helsinki Convention on Human Rights. The presence of clinically significant disease symptoms (positive, negative, and disorganization) at the time of the study, reported as at least "mild" according to the assessment of the treating psychiatrist, was required. The level of intelligence should be within the normal range. Regarding healthy controls, they should have no current or past psychiatric (psychotic) disorders.

Exclusion criteria included: a history of previous head trauma and/or infectious diseases affecting the brain structures of the study participants; a history of degenerative brain and/or vestibular diseases; evidence of current substance abuse and/or dependence on substances, familial burden of mental illnesses (for the healthy control group), or refusal to sign the "Informed Consent for Participation" by patients or healthy controls.

4. Measurement

For the investigation of social cognition, the developed original methodology by Haralanova and Haralanov (2016) was used, consisting of 8 computerized tests for exploring affective experiences. The stimulus material was provided with the kind assistance of Prof. Haralanov. The stimuli are color pictures displayed on a computer depicting non-affective neutral scenes. The scenes include people engaging in various everyday activities such as eating, working, and sports. They were selected from the International Affective Picture System (IAPS), widely used for studying affective dysregulation in psychiatric patients (Jayaro et al., 2008), and the Munich Affective Picture System (MAPS), developed with the participation of Haralanova and Haralanov. The

dimensional approach with the two main dimensions: emotional activation (EA) and emotional valence (EV) from the circumplex dimensional model of subjective affectivity is applied. In the current dissertation, only emotional valence is included, with participants assessing the degree of pleasure and displeasure of neutral social scenes. The scales for evaluating the scenes were created by analogy with the well-known instrument for measuring emotional experiences: the Self-Assessment Manikin (Haralanova & Haralanov, 2016) from 1 to 9. With 1 representing a low degree and 9 representing a high degree, the scales developed by Prof. Haralanov are viewed as unipolar, and each is evaluated separately. Due to the nature of the subjects under investigation – patients with paranoid schizophrenia, a Threat Perception scale was added. Additionally, before each test, the participant is asked to assess their current emotional state using the same dimensions.

For the examination of alexithymia levels, the most widely used instrument for clinical samples was employed - the Bulgarian version of the Toronto Alexithymia Scale (TAS-20). The original scale demonstrates a three-factor structure - Difficulty Identifying Feelings, Difficulty Describing Feelings, and Externally Oriented Thinking, which together define the theoretical construct of alexithymia (Bagby et al., 1994). TAS-20 exhibits good convergent and discriminant validity across various samples, comprising 20 items assessed on a 5-point Likert scale. For the purposes of this study, the version by Popov et al. (2016) was used, proposing a two-factor structure of the scale. Through exploratory factor analyses using principal axis factoring with varimax rotation, the two-factor structure was confirmed as more appropriate for explaining the data. Items with loadings above 0.3 were selected from the initial factor analysis to form subscales, with no items having lower loadings. In the two-factor solution, the explained variance coefficient was 42.81%, with the first factor explaining 30.82% of the variance, and the second factor explaining 11.99%. The two identified factors are: Difficulty Identifying or Describing Emotions and Externally Oriented Thinking. The reliability coefficient of the first factor is high ($\alpha = 0.884$), with item-total correlations ranging from $R = 0.577$ to $R = 0.242$. The reliability coefficient of the second factor is acceptable ($\alpha = 0.751$), with item-total correlations ranging from $R = 0.427$ to $R = 0.043$. Removing items from both factors decreases reliability; therefore, all 20 statements were included. A total alexithymia scale, comprising all items, was also included, with high reliability ($\alpha = 0.869$).

The Emotion Regulation Questionnaire (ERQ) (Gross & John, 2003) was used to assess emotional regulation. For the purposes of this study, forward and backward translation was conducted, along with a separate examination of the psychometric characteristics. The scale comprises 10 items, rated on a 7-point Likert scale. Through exploratory factor analyses using principal axis factoring with varimax rotation, the two-factor structure of the original methodology was confirmed. Two factors were extracted based on eigenvalues (>1), corresponding to the original methodology. The two factors explained 58.37% of the total variance, indicating good structural validity. The first factor

explained a larger percentage of variance (37.42%), while the second explained 20.95% of the total variance. The reliability coefficient of the first factor was very high ($\alpha = 0.872$), with item-total correlations ranging from $R = 0.74$ to $R = 0.47$. Based on the content of individual items, this factor was labeled Cognitive Reappraisal. The reliability coefficient of the second factor was acceptable ($\alpha = 0.73$), with item-total correlations ranging from $R = 0.361$ to $R = 0.275$. This factor was labeled Emotional Suppression.

The Depression, Anxiety, and Stress Scale (DASS-21) developed by Lovibond and Lovibond in 1995 was utilized to measure negative emotional states associated with depressive symptoms, anxiety, and stress. The scale has been adapted and standardized for the Bulgarian socio-cultural context by Ivanova, Mitev, and Karabeliova in 2016. It consists of three subscales, each comprising 7 items related to the symptoms of the respective condition. The rating scale is a 4-point Likert scale.

The Satisfaction with Life Scale (SWLS) developed by W. Pavot and E. Diener in 1993 measures the aspect of life satisfaction in subjective well-being. It consists of five items reflecting satisfaction with the way one lives life and with life itself. The scale has been adapted and standardized for the Bulgarian socio-cultural context and demonstrates good psychometric properties (Ivanova, 2013). The rating scale is a 5-point Likert scale. Additionally, questions assessing attitudes toward healthcare specialists were constructed for the study, evaluating the attitudes of the participants toward psychologists and psychiatrists, as well as the effectiveness of pharmacological treatment.

Results, discussion, and conclusions from the empirical study.

1.1. Interrelationships between scales for social cognition, subjective emotional experiences, and levels of depression, anxiety, and stress.

To test the reliability of the methodology for neutral social scenes, correlations between the scales were examined among patients and healthy controls. Among patients, a significant negative correlation was found between subjective displeasure and subjective pleasure ($r = -0.5$, $p < 0.01$), and a weak positive correlation was found between subjective displeasure and subjective sense of threat ($r = 0.28$, $p < 0.01$), consistent with the dimensional model of emotions. Among healthy controls, a moderate negative correlation was found between subjective pleasure and subjective displeasure ($r = -0.36$, $p < 0.05$), and no correlation was found between subjective sense of threat and displeasure, explained by the specifics of healthy controls who lack a sense of threat. Positive moderate correlations were also found between subjective sense of threat and the perception of threat in neutral social scenes among patients with paranoid schizophrenia ($r = 0.5$, $p < 0.01$), but not among healthy controls, as well as a positive moderate correlation between subjective sense of displeasure and the assessment of the degree of displeasure in neutral social scenes among patients with paranoid schizophrenia ($r = 0.48$, $p < 0.05$) (see Table 1).

Table 1. Relationship between subjective emotional experiences and assessments of neutral social scenes in patients with paranoid schizophrenia

	Sense of threat neutral social scenes	Unpleasure in neutral social scenes	Pleasure in neutral social scenes
Subjective sense of threat	0.45**	0.3*	0.16
Subjective unpleasure	0.05	0.48*	-0.12
Subjective pleasure	0.1	0.09	0.38*

** $p < 0.01$; * $p < 0.05$

Additionally, to assess the reliability of the methodology, a correlation analysis was conducted on the entire sample to examine the relationships between subjective emotional experiences and neutral social scenes with the scale for negative emotional experiences (DASS). A significant moderate negative correlation was found between subjective pleasure and levels of depression ($r = -0.39$, $p < 0.01$); a moderate negative correlation between subjective displeasure and

levels of depression ($r= 0.31, p<0.01$), with levels of stress ($r= 0.29, p<0.01$), and with levels of anxiety ($r= 0.29, p<0.01$). A significant moderate positive correlation was found between subjective sense of threat and levels of depression ($r= 0.38, p<0.01$), with levels of stress ($r= 0.35, p<0.01$), and with levels of anxiety ($r= 0.33, p<0.01$). Similar correlations were found between the assessment of neutral social scenes and levels of depression and stress (see Table 2).

Table 2. Relationships between subjective scales, assessment of neutral scenes, and levels of depression, anxiety, and stress

	Levels of depression	Levels of stress	Levels of anxiety
Subjective pleasure	-0.39**	-0.17	-0.13
Subjective unpleasure	0.31**	0.29**	0.29**
Subjective sense of threat	0.38**	0.35**	0.33**
Pleasure in neutral social scenes	-0.27*	-0.007	-0.13
Unpleasure in neutral social scenes	0.24*	0.23*	0,14

** $p<0.01$; * $p<0.05$

1.2. Analysis of differences in subjective emotional experiences and social cognition in patients with paranoid schizophrenia and healthy controls.

To investigate the differences, independent samples t-tests were conducted between the patients and the healthy controls. No significant differences were found in the scales for subjective dissatisfaction and pleasure. Differences were found in the perception of threat, with patients experiencing a more intense sense of threat ($M=2.64$) compared to healthy controls ($M=1.51$), $t(98) = 2.78, p < 0.01$. Additionally, patients rated the perception of threat in neutral scenes higher ($M=3.52$) than healthy controls ($M=2.71$), $t(98) = 3.705, p < 0.01$, but not in the assessment of pleasure and displeasure in neutral social scenes.

1.3. Analysis of the differences between the levels of alexithymia, negative emotional experiences, emotional regulation strategies, and life satisfaction.

Patients have higher levels of difficulties in identifying or describing emotions ($M=2.46$) compared to healthy controls ($M=2.9$), $t(98) = 2.734$, $p < 0.01$; higher levels of externally oriented thinking ($M=2.79$) than healthy controls ($M=2.3$), ($M=2.71$), $t(98) = 3.652$, $p < 0.001$, and higher levels of overall alexithymia ($M=2.85$) than healthy controls ($M=2.39$), ($M=2.71$), $t(98) = 3.568$, $p < 0.01$. Patients also have higher levels of applying the emotional suppression strategy ($M=4.49$) compared to healthy controls ($M=3.69$), ($M=2.71$), $t(93) = 3.423$, $p < 0.01$, and higher levels of depression ($M=1.04$) than healthy controls ($M=0.68$), $t(98) = -3.505$, $p < 0.05$. No statistically significant differences are found in the levels of anxiety and stress. Statistically significant differences are found regarding life satisfaction. Patients have lower levels of life satisfaction ($M=2.94$) than healthy controls ($M=3.56$), ($M=2.71$), $t(98) = -3.505$, $p < 0.01$.

1.4. Relationships between social cognition, alexithymia, and emotional suppression

No significant correlations were found between ratings of threat perception in neutral social scenes and levels of alexithymia. A statistically significant weak positive correlation was found between difficulties in identifying and describing emotions and ratings of discomfort in people in neutral social scenes among patients ($r=0.22$, $p<0.05$). No statistically significant correlations were found among healthy controls. A statistically significant moderate positive correlation was found between ratings of threat perception in neutral social scenes and the emotional suppression strategy ($r=0.3$, $p<0.01$), as well as a weak positive correlation between ratings of discomfort in neutral social scenes and the emotional suppression strategy ($r=0.2$, $p<0.05$) among patients, but not among healthy controls (see Table 3).

Table 3. Relationships between social cognition, alexithymia, and emotional suppression in the experimental group (EG)

	Difficulties in identifying and describing feelings	Emotional suppression
Unpleasure in neutral social scenes	0.22**	0.2*
Threat in neutral social scenes	0.13	0.3**

** p<0.01; *p<0.05

1.5. Relationship between levels of alexithymia, emotional regulation strategies, and levels of depression, anxiety, and stress.

The conducted Pearson correlation analysis found a significant positive correlation between depression and difficulties in identifying and describing emotions ($r=0.5$, $p<0.01$); a moderate positive correlation between depression and overall levels of alexithymia ($r=0.44$, $p<0.01$); a moderate correlation between anxiety and difficulties in identifying and describing emotions ($r=0.32$, $p<0.05$); a moderate correlation between stress and difficulties in identifying and describing emotions ($r=0.35$, $p<0.05$); a significant correlation between emotional suppression and difficulties in identifying and describing emotions ($r=0.6$, $p<0.01$); a moderate correlation between emotional suppression and external oriented thinking ($r=0.37$, $p<0.05$); and a significant positive correlation between emotional suppression and overall levels of alexithymia ($r=0.6$, $p<0.01$) (see Table 4).

Table 4. Relationships between alexithymia, negative emotional experiences, and emotional regulation strategies

	Difficulties in identifying and describing feelings	External oriented thinking	General alexithymia levels
Levels of depression	0.5**	0.1	0.44**
Levels of anxiety	0.32*	-0.09	0.2
Stress	0.35*	-0.06	0.25
Cognitive reappraisal	0.12	-0.16	0.04
Emotional suppression	0.6**	0.37**	-0.6**

** p<0.01; *p<0.05

1.6. Influences of the studied phenomena on the levels of depression in patients

A stepwise regression analysis was conducted, revealing that subjective dissatisfaction, difficulties in identifying and describing emotions, and overall levels of alexithymia account for 45% of the total variation in depression. Subjective dissatisfaction predicts 31% of the variation ($F_{1,36} = 17.91$, $p < .001$, $R^2 = 0.31$). Difficulties in identifying and describing emotions add an additional 8% predictive power ($F_{2,35} = 13.10$, $p < .001$, $R^2 = 0.35$). Overall levels of alexithymia contribute another 6% predictive power ($F_{3,34} = 10.91$, $p < .001$, $R^2 = 0.35$) (see Figure 1).

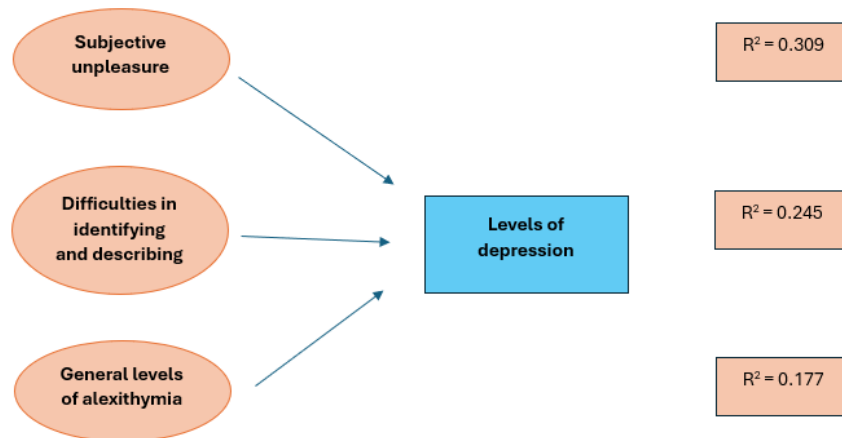


Figure 1. Effects of subjective dissatisfaction and levels of alexithymia on depression (patients)

1.7. Influence of alexithymia levels on emotional regulation strategies

A linear regression was conducted. It was found that the overall levels of alexithymia explain 35% of the variation in emotional suppression strategy for the entire sample ($F_{2,35} = 6.08$, $p < .001$, $R^2 = 0.35$). From the correlation plot (Figure 2), we can conclude that the linear regression model is adequate for explaining the relationship between overall alexithymia levels and emotional suppression.

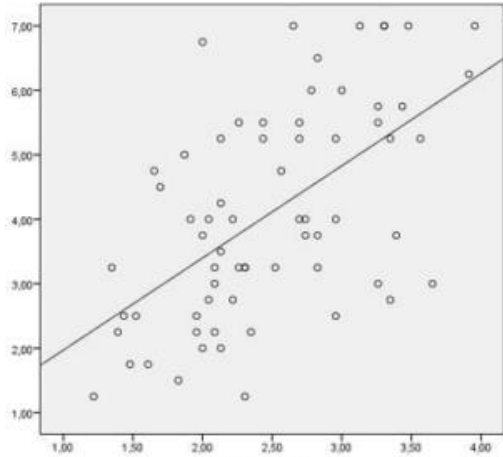


Figure 2. Correlogram - Emotional Suppression and Overall Alexithymia (Patients)

1.7. Influence of alexithymia on social cognition in patients with paranoid schizophrenia.

Multiple linear regression was conducted, revealing that the combination of difficulties in understanding and describing emotions, subjective dissatisfaction, and subjective sense of threat in patients with paranoid schizophrenia predicts only 16% of the variance in patients' ratings of the degree of dissatisfaction experienced with themselves or others in neutral social scenes ($F_{3,36} = 3.53$, $p < .05$, $R^2 = 0.16$). Difficulties in identifying and describing emotions explain the largest portion, 13% ($F_{1,38} = 6.82$, $p < .05$, $R^2 = 0.13$). Subjective dissatisfaction does not significantly predict. However, the subjective sense of threat predicts 7.6% of the variation ($F_{3,36} = 4.2$, $p < .05$, $R^2 = 0.076$). The correlation plot of alexithymia levels with dissatisfaction ratings in social scenes shows a positive relationship, indicating that the linear regression model is adequate (see Fig. 3).

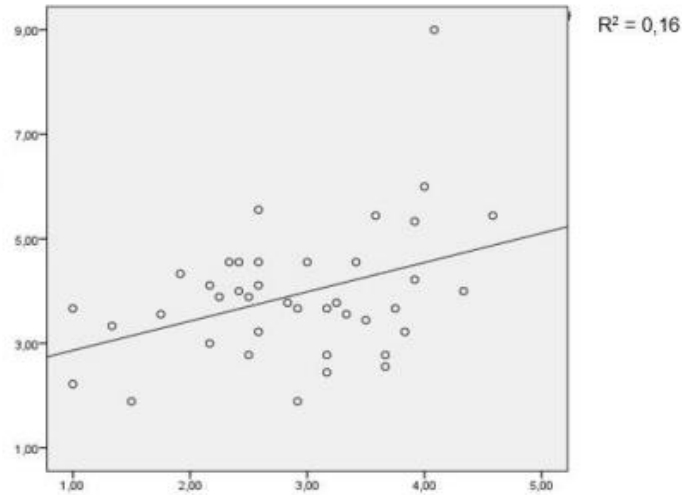


Figure 3. Correlogram – Alexithymia and Social Cognition (Patients)

1.8. Gender differences

According to the conducted t-test regarding gender, statistically significant differences are observed. Men have higher values on the scale of difficulties in identifying or describing emotions and sensations ($M = 2.99$) compared to women ($M = 2.39$), $t(98) = 3.88$, $p < 0.001$. Men also have higher values on the scale of outward-oriented thinking ($M = 2.84$) compared to women ($M = 2.29$), $t(98) = 4.29$, $p < 0.001$. Men have higher values on the scale of overall alexithymia ($M = 2.93$) compared to women ($M = 2.35$), $t(98) = 4.73$, $p < 0.001$, and higher values on the scale of emotional suppression ($M = 4.91$) than women ($M = 3.61$), $t(98) = 4.15$, $p < 0.001$. Women have higher values on the scale of subjective well-being ($M = 3.55$) compared to men ($M = 2.91$), $t(98) = -3.68$, $p < 0.001$.

1.9. Attitudes towards health specialists

The data show that a small percentage of the surveyed patients (13%) regularly visit a psychologist, and a large portion of them do not differentiate between a psychologist and a psychiatrist. Conversely, a much higher percentage (49%) of healthy controls regularly visit a psychologist. However, a significant percentage of patients (23% very important and 45% moderately important) believe it is important to see a psychologist when needed, although there is a significant difference in favor of healthy controls, among whom almost 80% consider it very important to see a psychologist. A large percentage of patients (17%) believe that working with a psychologist has not helped them at all, whereas a significant percentage of healthy controls (69%) rate psychological therapy as beneficial. Regarding attitudes towards psychiatrists, the majority of

patients (nearly 70%) believe that medications have helped them and that working with a psychiatrist is very important. Negative correlations were found between high levels of alexithymia, emotional suppression, and the assessment of the importance of visiting a psychologist and the usefulness of psychological therapy, confirming the findings of studies on therapeutic resistance in alexithymic patients. The positive correlation between life satisfaction and the assessment of the importance of visiting a psychologist and the effectiveness of pharmacotherapy indicates that a combination of pharmacotherapy and psychological therapy may be associated with higher overall life satisfaction. An interesting result is the positive correlation found between levels of alexithymia and the subjective evaluation of pharmacotherapy, suggesting that patients with higher levels of alexithymia rate the positive effects of medication more highly. This could be theoretically explained by the fact that pharmacotherapy is aimed at reducing positive symptoms but has no effect on negative symptoms, although further research is needed. Additionally, people with higher levels of alexithymia tend to prefer treatments with rapid effects rather than investing in long-term self-work.

Summary and discussion

Following the analysis of the utilized methodologies, we found that the Toronto Alexithymia Scale (TAS-20) and the Emotion Regulation Questionnaire (ERQ) exhibit good psychometric characteristics. In the analysis of the TAS-20, a two-factor solution was chosen as the better fit for the data from the current sample, which coincides with the study by Popov and colleagues (2016). However, the factor analysis we conducted identified four factors, with items theoretically belonging to other factors in the first two factors, and the third factor, Outward Thinking, split into two factors, showing lower reliability. Despite its widespread use, the TAS-20 has been criticized for its internal structure, reliability, and validity (Schroeders et al., 2022), as its original factor structure is not reproduced in all samples (Bozgunov, 2017). Further studies on the psychometric properties of the Toronto Alexithymia Scale are needed, and future studies should include more participants, both healthy controls and clinical samples. Additionally, further standardization of instruments measuring levels of alexithymia is recommended for investigating the validity of the questionnaire. In the study of the Emotion Regulation Questionnaire, the original two-factor structure of the questionnaire with two types of strategies (Gross & John, 2003) was confirmed. The questionnaire demonstrates good internal consistency and reliability, allowing for high applicability of the instrument in the Bulgarian socio-cultural context; however, further research on its standardization is needed. Regarding the identified correlations between the scales for subjective emotional valence (pleasure-displeasure) and subjective sense of threat, as expected, the results show a significant negative correlation between the scale for subjective pleasure and displeasure and moderate among healthy controls, which is in line with the dimensional approach to emotional valence: pleasure-displeasure. In patients with paranoid schizophrenia, subjective levels of displeasure positively correlate with subjective sense of threat, suggesting that the paranoid state is experienced as distressing by patients and is associated with negative emotional

valence, which is expected at a theoretical level - threat is a negatively valenced emotion. When applying the scale for negative emotional experiences (DASS), the identified negative correlations between subjective pleasure, pleasure in neutral social scenes, and levels of depression suggest that if a person experiences positive subjective experiences, they are more likely to positively evaluate neutral stimuli. Conversely, the positive correlations between subjective displeasure and displeasure in neutral social scenes with levels of depression, anxiety, and stress suggest that when a person is depressed or experiences higher levels of stress, they are more likely to interpret neutral stimuli negatively and assume that others will experience the same. The lack of correlation between the assessment of threat perception in neutral social scenes and levels of depression, anxiety, and stress theoretically corresponds to the paranoia model, suggesting that the perception of threat manifested as paranoid delusions in paranoid schizophrenia is a positive symptom with different biological mechanisms from negative symptoms. Overall, the methodology can be applied, as it has particular diagnostic value in a clinical sample. However, for greater reliability, it is recommended to combine it with other methodologies and diagnostic tools.

Our first hypothesis was confirmed – a significant association was found between disturbances in assessing alien displeasure and levels of alexithymia, and there was no significant association between assessing alien threat perception in neutral social scenes and alexithymia in patients with paranoid schizophrenia. The assumption that patients with paranoid schizophrenia would rate the degree of threat perception and displeasure higher in neutral social scenes, as well as have higher levels of alexithymia compared to healthy controls, was also confirmed. These results align with the findings of Haralanova and Haralanov (2017) and with the clinical manifestation of the disease, where patients perceive themselves as threatened by others and perceive neutral individuals as threatening, likely associated with a higher subjective experience of threat. Therefore, disturbances in social cognition regarding assessing threat in a given social situation are associated with the positive symptoms and paranoia characteristic of paranoid schizophrenia. Patients with higher subjective threat perception rate the degree of threat perception of others higher in neutral scenes. The key role of the neutral content (ambivalence) of the social scenes used in the study is consistent with findings from other studies on the abnormal attribution of emotional significance to affectively neutral stimuli in actively psychotic and prodromal patients (Haralanova and Haralanov, 2016; Cohen & 35 Minor, 2010). This explains why patients misinterpret social stimuli as threatening due to their affective response. The lack of correlation can be explained by the fact that although there is a link between positive and negative symptoms, the production of the sense of threat in paranoid schizophrenia towards others is unrelated to deficits in emotional processing and alexithymia. At a biological level, it is associated with hyperdopaminergia in the mesolimbic system and clinically manifests as emotional hyperactivation in paranoid schizophrenia, meaning it is an independent construct. Additionally, paranoia as a symptom and delusion decreases or is absent during remission after exiting the psychotic episode, under the influence of pharmacotherapy, so it can be seen as a state, while theoretically and based on the results of several studies, levels of alexithymia are a stable deficit and are rather considered a trait, also present in patients at risk for psychosis.

The results showing a statistically significant weak positive correlation between difficulties in identifying and describing emotions and the assessment of displeasure in neutral social scenes among patients, but not among healthy controls, are consistent with findings from other studies (Di Tella et al., 2018; Grynberg et al., 2012). But it should be noted that they apply a different methodology for studying social cognition, while there are no other studies that apply the methodology of neutral social scenes. Therefore, the current interpretation is highly conditional, and further research is needed, applying the methodology to a larger clinical and non-clinical sample. The results can be theoretically explained by the fact that several studies find higher levels of misunderstanding of one's own emotional experiences in schizophrenic patients, as well as that patients with schizophrenia spectrum disorders have more deficits in recognizing negative emotional experiences (Romero- Ferreiro et al., 2016). Since neutral social scenes can be considered a type of projective technique, this association is likely more related to the mechanisms of projecting the misunderstanding of one's own negative emotional experiences outward, which may lead to the misinterpretation of social stimuli. However, the results from various studies are contradictory, as some do not find differences between coping with socio-cognitive tasks and levels of alexithymia (Di Tella et al., 2018). There are few studies that focus on this association among patients with schizophrenia to empirically validate it. However, the results from the current study confirm the theoretical concept that paranoia, which is a positive symptom, is a qualitatively different condition from the negative symptoms of schizophrenia and that there are some common mechanisms between alexithymia and social cognition.

The second hypothesis, that patients with paranoid schizophrenia will have higher scores in the application of emotional suppression strategy and higher levels of negative emotional experiences compared to healthy controls, and that there will be a significant relationship between emotional suppression, alexithymia, and negative emotional experiences, was confirmed. In recent years, increasing evidence has been found that alexithymia may predict the level of psychosocial functioning in patients (Kimhy et al., 2012), including in individuals who are at risk of developing psychosis (Kimhy et al., 2016). Clinical observation shows that individuals with high levels of alexithymia tend to avoid talking about their emotions, preferring to focus on their behavior and thoughts (Ospina et al., 2019). Therefore, the current results may guide specialists to focus on addressing high levels of alexithymia among patients with schizophrenia in therapeutic interventions. This is because these levels may influence how patients share their symptoms and complaints, and there may be a risk of not sharing some critically important ones. Studies indicate that using emotional suppression instead of the more adaptive strategy of cognitive reappraisal may lead to discrepancies between internal states and outwardly expressed behavior (Higgins, 1987). The preference for the emotional suppression strategy among schizophrenic patients may explain why they can exhibit blunted affect despite their subjective emotional experiences being similar to those of healthy controls. This explains the emotional paradox in schizophrenia, where patients experience strong positive or negative subjective emotional experiences (Haralanova & Haralanov, 2016; Gur et al., 2006), but are unable to express themselves and demonstrate blunted affect (van der Meer et al., 2009).

The higher levels of depression found in patients with paranoid schizophrenia confirm the results of other studies that have found elevated levels of depression, especially in the post-psychotic phase (Candido & Romney, 2002). The results can also be explained by data from other studies indicating that patients with paranoid schizophrenia are at risk of developing depressive symptoms, which may be associated with a higher risk of suicide (Knight & Valner, 1993).

It should be noted that the levels of depression are not necessarily linked to the clinical diagnosis of depression. The questionnaire used is not a diagnostic tool but rather focuses on the participants' internal subjective experiences, which is the focus of the current study. It is possible that the shared depressive symptoms reported by the patients are part of the negative symptomatology. Additionally, the suppression experienced by the participants may be related to their difficulty in understanding their own emotional experiences, considering that the levels of depression from the scale positively correlate with the levels of alexithymia.

The finding that levels of alexithymia have a positive effect on the application of emotional suppression strategy aligns with other studies, which also find that alexithymia significantly predicts the use of maladaptive strategies for emotional regulation, but not adaptive ones, although the studies are from different clinical samples (Sfärlea et al., 2019). This suggests that learning emotional regulation strategies is a key aspect of non-pharmacological interventions for paranoid schizophrenia and it is important to investigate them in different stages of the illness, as well as to what extent these deficits are resistant to therapeutic intervention in future studies. Therapeutic interventions should take into account the application of maladaptive strategies for emotional regulation in patients and should focus not only on reducing difficulties in understanding and describing emotional experiences, but also on teaching the application of more effective strategies for emotional regulation.

The third hypothesis, that high levels of alexithymia and negative emotional experiences would be significant predictors of impaired social cognition in assessing neutral (ambivalent) social scenes and subjective emotional experiences, was partially confirmed. Although regression analysis shows that difficulties in identifying and describing emotions and subjective feelings of threat significantly predict dissatisfaction ratings in neutral social scenes, the percentage of explained variance is low. However, this is expected, given that social cognition is a complex cognitive-affective construct that depends on multiple factors. Nevertheless, we may assume that if a person struggles to understand their subjective emotional experiences, this will have a negative effect on their ability to understand others. This corresponds to the theory of mind as well as the mentalization model, according to which understanding one's own experiences is crucial for understanding those of others. Furthermore, experiencing threat, characteristic of paranoid schizophrenia, also impairs performance in socio-cognitive tasks, especially when combined with alexithymia.

The fourth hypothesis, that patients with paranoid schizophrenia would have lower levels of life satisfaction and more negative attitudes towards healthcare professionals, was confirmed. The lower levels of life satisfaction among patients with paranoid schizophrenia compared to healthy controls align with the results of other studies that find significantly lower levels of life

satisfaction among schizophrenic patients compared to healthy controls and other mental disorders (Koivumaa-Honkanen et al., 1999). This once again underscores the need for psychological intervention with this group of patients and a thorough analysis of the factors that worsen patients' overall subjective sense of life satisfaction and quality of life. Numerous studies have found a link between low life satisfaction and increased suicide risk. Therefore, it is crucial to address these issues through psychological interventions aimed at improving the well-being and satisfaction of patients with paranoid schizophrenia (Ponizovsky & et al., 2003).

The current study also confirmed data from numerous studies indicating that women have lower levels of alexithymia compared to men, while men more frequently use the emotional suppression strategy. However, not all studies in the reviewed literature confirm this difference, so there may be variations depending on the specifics of the sample. In future research, it is necessary to have a better gender balance within the sample itself. Nonetheless, an advantage of the present study in the sample of patients with paranoid schizophrenia and healthy controls is that there is a good balance between men and women, considering that in most samples in other studies, one gender often prevails.

As seen from the literature analysis and the results of the current dissertation work, the relationship between social cognition and alexithymia in patients with paranoid schizophrenia and healthy controls is complex, but a deeper analysis may contribute to understanding the emotional deficits, social-cognitive deficits, and emotional dysregulation in patients with paranoid schizophrenia, which significantly predict patient functioning. The current study has its limitations. It is important to note that there are not many studies applying the dimensional approach of emotional experiences in combination with neutral social stimuli, which we can refer to, so future in-depth research on the methodology and its reliability and validity is necessary. Future studies may also include objective markers to investigate subjective emotional experiences and mechanisms for understanding neutral social stimuli. Additionally, it would be advisable to include more methodologies for studying social cognition that encompass understanding various aspects of it - such as understanding others' intentions, the task of understanding emotions from eyes, etc., to explore in greater depth the relationship between disruptions in social cognition in schizophrenia and their connection to understanding one's own emotional experiences. It is also important to consider the specifics of the applied methodology for social cognition assessment - evaluation of neutral (ambivalent) social scenes in combination with the circular dimensional model of emotions. We may assume that in clinical practice, this methodology has a projective nature, which can add diagnostic value to working with patients in various stages of the disorder, including at-risk groups, but further research is needed.

The higher levels of alexithymia we found in patients with paranoid schizophrenia confirm the emotional dysregulation characteristic of this severe mental disorder. However, it should be noted that similar to other studies, the analysis of the Toronto Alexithymia Scale (TAS-20) in the present study did not confirm the original version, which may be related to the small sample size, translation issues, cross-cultural differences, and other factors. Exploring the psychometric

properties of the scale suggests the need for further similar studies, as the factor structure of TAS-20 is crucial for the accuracy of the diagnostic tool.

The higher levels of emotional suppression strategy application observed in patients with paranoid schizophrenia compared to healthy controls confirm empirical findings from numerous studies indicating that patients utilize maladaptive strategies for emotional regulation. This further negatively affects their quality of life, interpersonal relationships, severity of negative symptoms, and therapeutic resistance to psychological interventions. However, the scale used in the current study to investigate emotional regulation strategies is not standardized and validated for the Bulgarian socio-cultural context, which is a significant limitation of the research. Although it demonstrates good psychometric properties, the sample size is too small, thus necessitating further studies to standardize the scale.

In future studies, it is advisable to include more scales to assess life satisfaction, encompassing various components. In the current study, we employed the most basic construct, which is a generalized assessment. Overall, future research should diversify patients with schizophrenia in terms of positive and negative symptoms, as a significant limitation of the current study is the lack of application of a diagnostic scale for symptom assessment (PANSS) to investigate differences among different disease manifestations. Another limitation of the present study is the relatively small number of patients examined.

The identified higher levels of depression among patients and the association with higher levels of alexithymia, application of emotional suppression, and life satisfaction need to be explored in greater depth. On one hand, patients with paranoid schizophrenia demonstrate higher levels of depression compared to other types of schizophrenia according to the theoretical review conducted, but the reasons for this are not yet fully understood. Simultaneously, this has important clinical significance due to its association with suicidal risk among patients with higher levels of depression and alexithymia. A limitation of the current study is that the scale used to measure levels of depression, anxiety, and stress is not clinical, so it is advisable for future research to include clinical scales.

Although investigating the relationships between the theoretical constructs studied and attitudes towards healthcare professionals has important practical value, the scales used to study these attitudes are not standardized but originally created for the purposes of the study. In future research, it is necessary to test their psychometric characteristics and whether they are reliable instruments by adding standardized methodologies. Future studies can also conduct a more in-depth analysis of the complexity of treatment attitudes and deficits in alexithymia levels among patients. It is necessary to further analyze the role of different types of motivators in initiating seeking psychological help, both among patients with severe mental disorders and healthy controls, and whether there are significant differences between clinical and non-clinical samples.

Attitudes towards healthcare professionals confirm that patients with paranoid schizophrenia are more resistant to therapeutic treatment, with levels of alexithymia being an additional complicating factor. Considering alexithymia as a personality characteristic may play a significant role in resistance to psychological interventions, as well as in the likelihood of patients

seeking psychological support. Simultaneously, it is crucial for the development of psychological interventions to focus on awareness of one's own emotions in general and learning more adaptive strategies for emotional regulation to enhance treatment effectiveness and improve overall quality of life for patients. There is a need for the creation of comprehensive approaches to working with schizophrenia, especially considering that pharmacological therapy alone is insufficient for addressing the social and affective difficulties associated with schizophrenia.

The scientific contributions of the present dissertation are as follows: Theoretical Contributions

1. The main theoretical contribution of this work is the complexity of the presented study on social cognition and alexithymia in paranoid schizophrenia and healthy controls. A similar theoretical review is lacking in both Bulgarian and international contexts.
2. A detailed review of various theories of schizophrenia has been conducted, both historically and within the context of contemporary theories.
3. For the first time in Bulgaria, a thorough analysis of the constructs of social cognition, alexithymia, and emotional regulation in schizophrenia has been conducted.
4. The dissertation contributes to a limited number of studies that apply the dimensional approach as a theoretical model for investigating affective experiences and social cognition in paranoid schizophrenia and healthy controls.
5. For the first time in Bulgarian research, we discover a statistically significant association between social cognition and alexithymia in paranoid schizophrenia.

Applied Contributions:

1. The results suggest that the methodology for studying neutral social scenes is a reliable tool for investigating emotional dysregulation and social cognition in schizophrenia.
2. Neutral social scenes allow for the exploration of the dynamics of positive and negative symptoms in patients with paranoid schizophrenia.
3. The psychometric characteristics of the scale for emotional regulation strategies enable its application in other studies.
4. The identified correlations between the studied phenomena provide opportunities for improving the planning of psychological interventions when working with paranoid schizophrenia.

Bibliography of publications related to the topic of the dissertation

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Participation in conferences

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Project participation

Project - 'Psychological aspects of reluctance to return to in-person education and work,' Sofia University 'St. Kliment Ohridski,' led by Prof. PhD Sonja Karabelova, 2022.

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