

The Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) schizotypy scale in psychiatry

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Summary

The aim of this paper is to describe a schizotypy scale, the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE), and its use in psychiatry. Schizotypy is a strongly biologically determined personality phenomenon. Schizotypal disorder, as a diagnostic category in contemporary psychiatric classifications, has been included in schizophrenia spectrum disorders. This may reflect similarities in neurobiological and neuropsychological features between persons with schizotypy and patients with schizophrenia. However, schizotypal traits are also more marked in bipolar disorder (BD) compared with those in healthy subjects.

The O-LIFE was created by Claridge and his co-workers and consists of four dimensions: unusual experiences, cognitive disorganisation, introverted anhedonia and impulsive nonconformity. Studies using O-LIFE in psychiatry, demonstrated a number of associations between the dimensions of the O-LIFE and the clinical features of schizophrenia, in mood disorders and in healthy persons. In patients with BD treated with lithium carbonate, worse effects of lithium were observed in subjects with high scores on the O-LIFE dimensions (particularly cognitive disorganisation). Recently, some molecular-genetic associations have also been shown between O-LIFE dimensions and polymorphisms of the dopaminergic system and circadian rhythm genes.

schizotypy / O-LIFE / schizophrenia / bipolar disorder

SCHIZOTYPY

Schizotypal personality can be perceived as a personality trait and considered as a dimension. In recent decades, this way of thinking has been promoted by a British psychologist Gordon Claridge, the main author of the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) schizotypy scale, which is the subject of this article. In such dimensional model, schizotypy represents a continuum, including the characteristics predisposing to psychosis. Thus, schizotypal features are observed in the general population,

and they may sometimes be linked with health and sometimes with disease [1, 2]. Schizophrenic subjects, even when in remission, achieve high scores on schizotypy tests. However, “non-clinical” subjects can obtain high scores on these tests but do not necessarily present symptoms of the schizophrenia spectrum [3].

Schizotypal dimensions correspond to the factorial models of schizophrenia. The two-factor model reflects both positive and negative schizotypy. The three-factor model adds cognitive disorganization. Negative schizotypal symptoms include withdrawal from social activities, disturbances in close relationships and anhedonia, all similar to the symptoms of schizophrenic deficit. Positive schizotypy includes features such as ideas of reference, perceptual and cognitive distortion and magical thinking, all related to psychotic symptoms [4]. The positive schizotypal

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dimension can be divided into two parts: unusual perceptual experiences relating ideas and / or bizarre beliefs inconsistent with the cultural system [5]. In addition, cognitive disorganization may also be included, probably being most closely associated with the development of psychosis [6].

Some schizotypal components may be advantageous from an evolutionary point of view. For example, it was found that elevated levels of "remarkable sensibility" and creativity are associated with reproductive success [7].

In contrast to the "dimensional" aspect, schizotypy can be regarded, in "categorical" terms, as a disorder with a susceptibility to psychosis and, in extreme cases, to schizophrenia. This is reflected in contemporary psychiatric diagnostic classifications. In the fifth version of the Diagnostic and Statistical Manual [8] schizotypal disorder (schizotypal personality), is classified within "Schizophrenia spectrum disorders and other psychotic disorders," but its description is included in the section on personality disorders as follows: „The essential feature of schizotypal personality disorder is a pervasive pattern of social and interpersonal deficits marked by acute discomfort with, and reduced capacity for, close relationships as well as by cognitive or perceptual distortions and eccentricities of behavior. This pattern begins by early adulthood and is present in a variety of contexts.” [8].

Also, the International Classification of Diseases [9] locates schizotypy in the section entitled: "Schizophrenia, schizophreniform disorder (schizotypal) and delusional disorders", There it is characterized by eccentric behavior, thinking and affectual abnormalities which resemble the symptoms of schizophrenia, but also suggests that the development and course of schizotypy may resemble personality disorders.

Discussing the pathophysiology of schizotypy, in the context of schizophrenia spectrum disorder, Siever and Davis [4] point to a higher prevalence of schizotypy in the relatives of schizophrenia patients in comparison with other groups. Probably both schizophrenia and schizotypy subjects show a distinct inheritance of positive and deficit symptoms. In both disorders, similar psychophysiological abnormalities have been identified e.g. abnormal eye movements, evoked potentials (P50 and P300) and abnormal

results in such tests as "prepulse inhibition" and "backward masking". As in schizophrenia, schizotypy presents cognitive dysfunctions, including deficits in working memory, executive function and attention, connected mostly with impaired activity of the prefrontal cortex. Functional neuroimaging studies have shown deficient prefrontal and temporal cortex activity in both disorders, more severe in schizophrenia, and an increase in metabolic activity of subcortical structures (striatum), associated with elevated dopaminergic neurotransmission. A number of studies have indicated shared genetic factors underlying both bipolar disorder and schizophrenia. Schizotypal traits might form a phenotype intermediate between these diseases. The dimension common to both groups is cognitive disorganization. The level of this is substantially higher in schizophrenic families and in bipolar patients with psychotic symptoms, but does not reach a high level in the relatives of those with bipolar disorder without psychotic symptoms. This dimension of schizotypy is probably a risk factor for psychotic forms of bipolar disorder [10].

According to Heron et al [11], schizotypal traits are significantly more frequent in patients with bipolar disorder than among healthy people, although their intensity in bipolar patients is lower than in schizophrenia. Also, studies carried out in the Department of Adult Psychiatry, Poznań University of Medical Sciences, showed that patients with bipolar disorder obtained significantly higher scores on all scales of schizotypy, compared with the control group. In addition it was found that, in the bipolar group, schizotypal traits were associated with the level of creativity [12].

THE TOOLS FOR MEASUREMENT OF SCHIZOTYPY: TOWARDS THE O-LIFE

One of the most important tools for the measurement of schizotypy features is the Schizotypal Personality Questionnaire created by Adrian Raine in 1991 [13]. Important contributions to the psychometrics of schizotypy have been made by an American psychologist, Loren Chapman, who created five scales of susceptibility to psychosis. These scales are: the Physical Anhedo-

nia Scale (PhyAnh), Perceptual Aberration Scale (PerAb), Magical Ideation Scale (MagicId), Impulsive Nonconformity Scale (NonCon) and Social Anhedonia Scale (SocAnh) [3, 14, 15].

Other useful diagnostic tools include the Schizophrenism Scale [15], which mainly concerns social withdrawal and specific cognitive functioning, and the Hallucination Scale [15]. Based on the DSM-III criteria for schizotypal personality, the Schizotypal Personality Scale [16] and the Kings Schizotypy Questionnaire were created [17].

There is also a schizotypy scale created by Peter Venables, a prominent researcher of this issue. He has shown that both cognitive dysfunctions and problems with concentration and perception belong to a positive dimension. On the other hand, anhedonia and withdrawal can be considered as a schizotypal aspect of negative symptoms. However, positive and negative dimensions were not correlated [18].

The schizotypy concept, as defined by Claridge, is mainly based on personality traits, and not on the basis of clinical observation of patients with schizotypal personality or patients with schizophrenia. This approach suggests the existence of a number of attributes, the occurrence of which result in high schizotypy scores, and may increase the risk of psychosis. It also emphasizes the presence of schizotypal traits in the general population, divides them into positive and negative aspects, and adds cognitive disorganization and impulsivity. Initially, for the creation of the Schizotypal Personality Scale (37 questions) and the Borderline Personality Scale (18 questions) the schizotypal personality and borderline personality criteria of the DSM-III were used. This tool, a prototype of the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE), was published in 1989 [19], but was not subjected to psychometric procedures.

The next step was the creation of the O-LIFE. This scale includes four subscales, unusual experiences, cognitive disorganization, introverted anhedonia and impulsive nonconformity. Inclusion of the last subscale, although often questioned, may refer among others, to the violent offenses sometimes made by psychotic patients [20].

DESCRIPTION OF THE O-LIFE AND ITS VERIFICATION

The O-LIFE scale covers four areas of symptoms: 1) a tendency to experience unusual perceptual and cognitive sensations and /or a tendency to magical interpretation of occurring events (positive aspects of schizotypy); 2) cognitive disorganization, which is similar to the formal thought disorder occurring in schizophrenia and may include unconventional trains of thought and associations; 3) a tendency to anhedonia and introversion associated with blunted affect, antisocial behavior and lack of ability to feel pleasure from contacts with other people, or physical pleasure (negative aspects of schizotypy); 4) impulsivity and failure to follow social rules, which are associated with mood instability and unpredictability of behavior, especially non-compliance with conventional or established social roles [1].

Two versions of the questionnaire have been elaborated. Both of these consist of four subscales. A full version of the O-LIFE was introduced in 1995 and contains 104 questions. The subscale of unusual experiences contains 30 questions, of cognitive disorganization 24, of introverted anhedonia 27, and of impulsive nonconformity 23 questions [21]. The short version was introduced in 2005 and consists of 43 questions and. It was introduced as a screening instrument, whose application takes considerably less time than the full version. In this version a tendency to unusual experiences is evaluated on the basis of answers to 12 questions, cognitive disorganization 11, introverted anhedonia 10, and impulsive nonconformity 10 [22].

The unusual experiences subscale includes questions describing abnormal thinking, magical thinking and hallucinations ("Do you ever feel sure that something is about to happen, even though there does not seem to be any reason for you thinking that?", „Can some people make you aware of them just by thinking about you?", „When you look in the mirror does your face sometimes seem quite different from usual?") [21].

Cognitive disorganization refers to disorders of attention and concentration, difficulty in making decisions, and to fear appearing in social situations („Are you easily distracted when you

read or talk to someone?", „Do you ever feel that your speech is difficult to understand because the words are all mixed up and don't make sense?", „Do you often hesitate when you are going to say something in a group of people whom you more or less know?") [21].

Introvertive anhedonia includes questions concerning lack of satisfaction with social contacts and the inability of enjoyment - including physical - which is also associated with the avoidance of intimacy. Examples include such questions as: „Do people who try to get to know you better usually give up after a while?", „Are people usually better off if they stay aloof from emotional involvements with people?", „Has dancing or the idea of it always seemed dull to you?", „Have you often felt uncomfortable when your friends touch you?".

The questions in the subscale of impulsive nonconformity describe unpredictable and eccentric forms of antisocial behavior, often due to a lack of internal control („Do you often feel like doing the opposite of what other people suggest, even though you know they are right?", „Do you often have an urge to hit someone?", „When you catch a train do you often arrive at the last minute?" [21, 22].

The O-LIFE has been translated into many languages. Verification of the scale on large groups of subjects has been conducted since 1995. Internal consistency and reliability of both: long (104 questions) and short (43 questions) versions have been confirmed [22].

In the study of Cochrane et al (2010), the O-LIFE scale was used to assess schizophrenia patients and control subjects, and, in these patients, the results were compared with those obtained on the Scale for the Assessment of Positive Symptoms (SAPS) and the Scale for the Assessment of Negative Symptoms (SANS). On O-LIFE, patients obtained significantly higher scores than those in the control group in both positive and negative dimensions and in disorganization. There were no differences in relation to impulsive nonconformity. In the patients group, where positive symptomatology (measured by the SAPS) correlated with the level of unusual experiences and cognitive disorganization recorded in O-LIFE. However, no association was found between the results obtained in the SANS and introvertive anhedonia.

In studies using the short version of the O-LIFE performed in a group at high risk of psychosis, significant correlations were found between the following dimensions: unusual experiences, cognitive disorganization, introvertive anhedonia and psychopathological symptoms, psychosocial functioning and quality of life, but there was no such relationship with impulsive nonconformity. This confirms the suggestion that, in the O-LIFE short version, impulsive nonconformity should be interpreted with caution. Unusual experiences proved to be a factor associated with a positive dimension of psychosis. Cognitive disorganization was associated with symptoms of depression, anxiety, anhedonia, introversion as well as with quality of life and social functioning [23].

THE O-LIFE IN PSYCHIATRY

Many studies using the O-LIFE have attempted to establish a link between schizotypy and schizophrenia. Research on thinking and semantic language have indicated that schizotypy subjects reaching high scores in the O-LIFE make the same errors in the word associating test, as patients with schizophrenia [24]. On the other hand, people with high scores on schizotypy scales show deficits in tasks testing subtle processes of categorization. However, they do not show a global impairment of the semantic processing which occurs in schizophrenia. Their deficits may correspond to semantic tasks which require both fast and accurate access to the semantic web [25].

Any correlation between the O-LIFE and declarative memory and its emotional dysfunction, which is a basic feature of psychotic disorders was also studied [26]. It appeared that a positive dimension of schizotypy is important for the deterioration or improvement of memory caused by emotional factors. Improvement of declarative memory by emotional designation was shown in a group having low scores on the scale of extraordinary experiences and was absent in a group having high scores on this scale. A negative dimension of schizotypy had no effect on memory. This may suggest that the emotional memory problems that occur in schizophrenia are also evident in the group with qua-

si-psychotic experiences similar to the positive symptoms of schizophrenia, since this group achieves high scores in unusual experiences and impulsive nonconformity [26].

The experimental results also show that so called shift-learning deficits, similar to those in schizophrenia, are associated with negative schizotypal dimensions (introvertive anhedonia) and impulsivity (impulsive nonconformity), but not with the level of cognitive disorganization. None of the schizotypy dimensions had a noticeable impact on learning, before the target shift, which confirms the notion that ability to change the way of thinking in changing conditions is related to the severity of negative symptoms of schizophrenia [27].

High scores in the O-LIFE have been achieved by those people who use the right hand for writing, but prefer to use the left hand for a number of other basic activities (e.g. throwing, holding racquets, using hammers, toothbrushes and scissors). The results indicate that inconsistency in favoring one hand are associated with a higher probability of schizotypal thinking [28].

A rich area of research is studying a possible relationship between schizotypy and creativity. Results indicate that artists receive higher scores in scales measuring positive schizotypy, disorganisation, antisocial behavior, neuroticism, openness to experience, divergent thinking, but lower scores on conformity, when compared with a group of people who are not artists [29]. Studies performed in our Department using the O-LIFE scale showed that, in patients with bipolar disorder, there was a significant relationship between schizotypy and creative thinking [12]. Using this scale, Burch et al [30] demonstrated that visual artists achieved significantly higher results in three subscales of the O-LIFE (unusual experiences, cognitive disorganization, and impulsive nonconformity) compared to a control group. It follows, therefore, that bipolar patients may have a tendency to both original ideas and creative action, which go hand in hand with a tendency to impulsivity, antisocial behavior and eccentricity. It can also be assumed that the positive dimension of schizotypy in such patients is related to both psychotic features in thinking, as well as to the occurrence of excessive and unstable emotions [12, 31].

Recently, a confirmation of the relationship between creativity and high scores of schizotypy came from the study of Ando et al [32]. They administered the O-LIFE to 500 comedians and found very high scores in all scales of the O-LIFE, the highest being introvertive anhedonia and impulsivity. One of the manifestations of creative ability may be humor, an ability to connect unrelated areas or ideas in unexpected and absurd ways. It can therefore be concluded that the cognitive style (divergent thinking) of comedians may be similar to cognitive psychotic style (excessive switching).

In our Department, we were carried out the first study using the O-LIFE in bipolar patients who have received long-term prophylactic treatment with lithium. A negative correlation was found between the quality of response to long-term lithium treatment and schizotypy traits. This was statistically significant in respect to cognitive disorganization. The answers to the questions in the latter dimension which showed a significant negative correlation with the response to lithium treatment, were related to pre-psychotic situations, such as an inability to control thoughts and situations of information overload. The negative correlation between psychoticism and lithium effectiveness may be consistent with clinical experience, indicating that lithium does not exert an antipsychotic effect [33].

MOLECULAR-GENETIC STUDIES OF THE O-LIFE

Genetic studies of schizotypy have always been closely connected with genetic studies of schizophrenia. The greatest focus in this respect is on genes of the dopaminergic system, the gene for catechol-O-methyltransferase (COMT) which is connected with dopamine catabolism, being most frequently studied. The COMT gene possesses a functional polymorphism Val108Met, where the Met allele is connected with lower metabolic activity. Studies on an association between schizotypal features and the Val108Met polymorphism of the COMT gene have more than a decade of history, and their results have been controversial. Avramopoulos et al. [34] in a study of 379 healthy persons demonstrated an association of schizotypal features with the Val allele, having higher metabolic activity. Similar

results were obtained by Schürhoff et al [35] in healthy persons and the healthy relatives of patients with schizophrenia or bipolar disorder. On the other hand, Ma et al [36], in their study of a Chinese population, showed an association between schizotypal traits and the Met allele. In recent years, an association has also been found between schizotypal traits and “schizophrenic” genes identified through genome-wide association studies (GWAS). These genes include ZNF804A (zinc finger protein 804A) gene [37] and CACNAC1 (Alpha 1C subunit of the L-type voltage-gated calcium channel) gene [38].

Recently, the results of studies, estimating the molecular-genetic background of schizotypal traits assessed by means of the O-LIFE scale appeared. German researchers [20] studied a large group of healthy persons (n=1228), in whom the O-LIFE scale was measured and the genotyping of the polymorphisms of their dopaminergic system genes was carried out. An association was found between the Val allele of the Val108-Met polymorphism of the COMT gene, polymorphism of the dopamine transporter (DAT) gene and the dimension of “unusual experiences”. Also, an association between polymorphism of the monoamine oxidase, type A (MAO-A) gene and the dimension of cognitive disorganisation, as well as between polymorphism of the dopamine receptor D2 (DRD2) gene and the dimension of impulsive nonconformity, was observed in men.

In the Poznań centre, molecular-genetic studies of the O-LIFE dimensions were performed in patients with bipolar disorder. Higher scores of cognitive disorganisation and introverted anhedonia were found in carriers of the Met allele of Val108Met polymorphism of the COMT gene. This may suggest that these dimensions of schizotypy on the O-LIFE scale in bipolar patients may be connected with higher activity of dopaminergic system [39]. This may correspond to other studies of bipolar patients showing that carriers of Met allele of this polymorphism had higher scores of the „novelty seeking” feature, which is associated with higher activity of the dopaminergic system [40]. Another study in the Poznań centre of patients with bipolar disorder and using the O-LIFE scale, involved other genes of the dopaminergic system as well as circadian rhythm genes. An association between poly-

morphism of the DRD3 gene and the “unusual experiences” dimension as well as between polymorphism of the DRD4 gene and introverted anhedonia, was found. Associations were also observed between several polymorphisms of the ARNTL (aryl hydrocarbon receptor nuclear translocator-like) gene, one of the most important circadian rhythm genes and dimensions of both “cognitive disorganisation” and “unusual experiences” [41].

CONCLUDING REMARKS

The schizotypy concept is a significant phenomenon in current psychiatry and the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) is an important tool in this respect. Clinical, neuropsychological and neurobiological studies using O-LIFE, allow us to expand our knowledge about schizophrenia, affective disorders and other psychiatric disorders. The preliminary results of molecular-genetic findings pertaining to this scale, suggest the possibility of utilising the O-LIFE scale in the context of the neurobiology of brain function.

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