Transdiagnostic conceptualization of schizophrenia and autism spectrum disorder. An integrative framework of minimal self disturbance

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Aims: Autism spectrum disorder and schizophrenia are traditionally viewed as distinct diagnostic categories. However, evidence increasingly suggests overlapping pathological functioning at various levels, starting from brain circuitry to behaviour. Notably, both disorders are characterized by anomalous minimal self-experience (altered body ownership and agency), which is a trait-like, phenomenological distortion. We propose a conceptual framework that unites multiple levels, from neural mechanisms to cognitive and phenomenological correlates, for understanding minimal self-disturbance across diagnostic boundaries. **Methods:** A comprehensive review of existing literature was conducted, examining phenomenological, neurocognitive, and neural correlates of minimal self-disturbance in both schizophrenia and autism spectrum disorder. Assessment tools and scales such as the Examination of Anomalous Self-Experience Scale, as well as experimental neurocognitive paradigms like the Rubber-Hand Illusion and self-relevant stimuli tasks, were examined for their relevance in evaluating self-experience in both conditions. **Results:** Minimal self-disturbances were found to be a prominent feature of both schizophrenia and autism, albeit with different manifestations. Patients with schizophrenia showed heightened susceptibility to body ownership alterations, while individuals with autism exhibited decreased susceptibility. Neural markers, particularly within the default mode network and thalamocortical connectivity, were implicated in self-disturbance in both disorders, suggesting a shared neurobiological basis. **Conclusion:** The minimal self-disturbance appears to be a transdiagnostic feature of both schizophrenia and autism spectrum disorder, indicating that these conditions may represent points along a shared psychopathological continuum. The proposed model integrates neurobiological, cognitive, and phenomenological aspects of self-disturbance, offering a comprehensive framework for understanding and assessing disruptions in self-experience across these conditions. This approach promotes a shift away from rigid diagnostic classifications towards approaches that highlight the importance of atypical self-experience.

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SCH AND ASD AS DISORDERS OF THE SELF

While autism spectrum disorder (ASD) and schizophrenia (SCH) are clinically differentiable disorders, it is frequently argued that they overlap in terms of social difficulties (Couture et al. 2010; Eack et al. 2013), cognitive deficits (Eack et al. 2013), impairments in neural processing (Pinkham et al. 2008), patient life histories (Nilsson et al. 2020), genetic bases (Rapoport et al. 2009) and both are characterised by marked perceptual anomalies (Bertone et al. 2004) such hallucinations in the case of SCH and sensory over-responsivity in the case of ASD. Most importantly, they share clinical features which hinder cross-sectional differential diagnosis in early adulthood (Mazza et al. 2022). As a result, it has been argued that the boundaries should be redrawn between the two disorders; there is a layer of the two disorders that can be interpreted along the same psychopathological dimension, however, at opposite ends (King & Lord 2011). Based on current classification systems, SCH is a disorder with a notoriously heterogeneous illness manifestation, the symptoms of which are categorised into distinct symptom dimensions such as positive, negative, cognitive and general symptoms (American Psychiatric Association 2013; Kay et al. 1987). Concerning ASD, psychiatric nosology rather emphasises social-communication difficulties and perceptual and sensorimotor anomalies (American Psychiatric Association 2022). While the disorders may seem only superficially similar at first glance in terms of negative symptoms, or social deficits (Hommer & Swedo 2015; Trevisan et al. 2020), at a deeper level, both disorders can be understood as a disorder of self-organisation (Nijhof & Bird 2019; Parnas & Zandersen 2018; Tordjman et al. 2019). Importantly, both ASD and SCH have been first conceptualised as a disorder of the self, and this has been preserved in the naming of the two disorders. The term schizophrenia stands for "splitting of the mind" (Bleuler 1950), and the term autism originates from the Greek word "atos" meaning self (Uddin 2011).

Disturbance to the self can be interpreted as a pathological transformation that takes place at a deeper level than what is commonly captured by diagnostic symptom dimensions (Raballo 2012; Szczotka & Majchrowicz 2018). It is also presumed to constitute a core underlying factor to a variety of surface-level symptoms (Szczotka & Majchrowicz 2018) such as perceptual anomalies (Wright et al. 2020), social deficits (Tordjman et al. 2019), or psychotic symptoms (Parnas & Zandersen 2018). Although very broad in terminology, and abstract in nature, the concept of the self appears to be of high explanatory value at multiple levels of organisation such as at the neural, or at a higher, experiential level (Szczotka & Majchrowicz 2018).

SELF DISORDERS AND THE MINIMAL SELF

Neurophenomenology - conceptualising philosophical concepts for neuroscience

Phenomenology provides a framework to describe subjective experience (Fuchs 2010). Phenomenological psychiatry is a field that is concerned with anomalous subjective experience and, thus, its insights are readily interpretable when studying self disorders. Finally, another important, related area is neurophenomenology that arises from the union of phenomenology and neuroscience to uncover the links between the unfolding experience and corresponding brain processes (Bayne 2004).

Different self dimensions

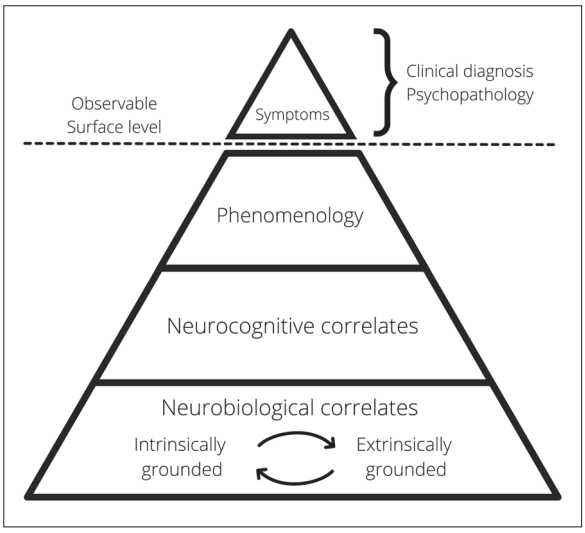
While the contemporary philosophical theories of the self are complex and greatly varied, it has been proposed within the realm of neurophenomenology that the self can be broadly categorised into one of two dimensions - the minimal self and the narrative self (Gallagher 2000). The minimal self, which is also known as "core self", "basic self", "proto-self", or ipseity, lacks temporal extension and is believed to be the most fundamental level of selfhood. It enables us to prereflectively and non-judgmentally be a subject of our own experiences from moment to moment (Gallagher 2000). Importantly, the implicit assumption of the first-person quality of all experiences arises at this level, which corresponds to a feeling of "mineness" with regard to one's own thoughts, feelings, or physical realm (Nelson et al. 2014). The minimal sense of self is also closely related to the aspect of embodiment (Fuchs & Schlimme 2009); in other words, it affords us an awareness of what constitutes the self and non-self in the momentary experience. It has been proposed that minimal self is composed of two related constructs: sense of self-agency and sense of self-ownership (Gallagher 2000).

Minimal self in SCH and ASD

Disturbance of the minimal self could manifest in various symptoms such as alterations in body ownership when certain body parts are not recognised as our own, the sense of agency related to own actions is obscured, or body boundaries are blurred. Such alterations arguably lie at the heart of SCH (Nelson et al. 2014; Parnas & Henriksen 2014; Parnas & Zandersen 2018; Sass 2014; Sass & Parnas 2003), as it is directly interpretable as a root construct behind clinical symptoms, such as coenestopathy when abnormal bodily sensations are experienced (Stanghellini 2009), and thought insertion when the feeling of mineness with regards to one's own thoughts is disrupted (Henriksen et al. 2019). It has been noted as early as in the foundational works of Kraepelin (1913), Bleuler (1950), Jaspers and colleagues (1997) or Schneider (1959) that the thought process and subjectivity of SCH patients become unstable (Parnas & Henriksen 2014). While the disordered self phenotype theory of SCH has continued to enjoy remarkable interest from phenomenological psychiatrists, it has slowly vanished from the diagnostic manuals (Parnas & Henriksen 2014). Nevertheless, minimal self disturbance has been demonstrated to be present already in the prodromal stage (Møller & Husby 2000). More importantly, some argue that anomalous self experiences are already present as early as during childhood development (Parnas & Henriksen 2014; Raballo 2012). At the same time, minimal self disorder may be masked by the fact that by the time of illness onset, its symptoms become intrinsically natural to existence (Parnas & Henriksen 2014). Further, it is argued to reliably distinguish SCH from other psychotic disorders (Parnas et al. 2003), to represent a strong predictor of illness onset (Nelson et al. 2012; Parnas et al. 2011), and to correlate with suicidal ideation (Skodlar & Parnas 2010), aberrant insight (Henriksen & Parnas 2014; Parnas & Henriksen 2013) and social deficits (Haug et al. 2014), all of which are important determinants in the functional outcome of patients.

Although less extensively studied from a phenomenological perspective (Nilsson et al. 2019), alterations at the prereflective level of the self have been indicated to play a key role in the aetiology, and subjectivity of ASD as well (Crespi & Dinsdale 2019; Noel et al. 2017). It has been implicated to underlie all the flagship symptoms of ASD - social deficits such as Theory of Mind deficits as one's capability to mentalize may be impeded if one's self boundaries are obscured (Tordjman et al. 2019), sensory dysfunction (Noel et al. 2020; Tordjman et al. 2019) such as hypo- or hypersensitivity to pain, or temperature, and altered bodily experiences (Noel et al. 2017; Tordjman et al. 2019) such as instability of body image due to impairments in multimodal integration (Tordjman et al. 2019). Similarities in SCH and ASD in terms of minimal selfhood alterations prompted consideration to redraw the boundaries between the two disorders (King & Lord 2011) as there is a layer of the two disorders that can be interpreted along the same psychopathological dimension, however, at opposite ends. In the next section, we outline a framework which allows the examination of minimal self alterations transdiagnostically, and, hence, advance our understanding of the similarities and dissimilarities of the two disorders.

Figure 1. Pyramidal (Iceberg) model of minimal self disturbance



Note(s). Minimal self disturbance can be conceptualised as a bottom-up assembly starting from the neurobiological level of organisation. The alterations cascade onto the neurocognitive, phenomenological levels and also causally influence behaviour resulting in observable symptoms (constituting the "tip" of the iceberg).

A COMPREHENSIVE FRAMEWORK FOR STUDYING MINIMAL SELF DISTURBANCE

Pyramidal model of minimal self disturbance

In most cases, subtle, but pervasive changes to the quality of self at the level of the minimal self cannot be articulated or measured. These alterations are rooted in dysfunctional brain circuitry causing widespread alterations in cognitive processes, subjective experience and, subsequently, behaviour

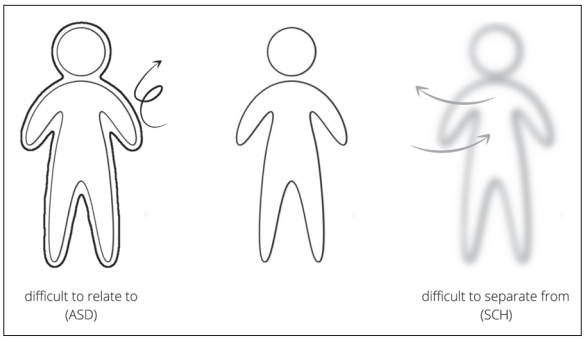
and clinical symptoms. In this section we put forth a pyramidal model of minimal self disturbance, with a structure that corresponds to different organisational levels. The hierarchically connected levels of the pyramid span from brain circuits to neurocognitive and phenomenological alterations, as well as surface-level diagnostic symptoms which constitute the most readily observable manifestation of pathological functioning. Thus, the model can be conceived of as an Iceberg model of psychopathological functioning. Different levels of the model correspond to different brain-behaviour aspects of pathological functioning increasing its explanatory and predictive power (Nelson et al. 2009). The model promotes the integration of neurobiology, cognition, and phenomenology to develop a comprehensive framework for minimal self disturbance (see Figure 1). Within this framework, distinct disorders can be assessed transdiagnostically.

Phenomenological correlates of minimal self disturbance

Previous literature has identified altered functioning in SCH and ASD corresponding to different layers of this pyramidal model. In this section, we attempt to give a narrative overview of previous findings and also highlight how disturbance to the minimal self can be assessed experimentally at the different pyramidal layers.

Starting from the tip of the pyramid, we can find the heterogeneous symptoms which constitute the observable diagnostic criteria for SCH and ASD e.g. perceptual anomalies, communication, social functioning, behavioural and psychotic symptoms. At the phenomenological level, it is presumed that alteration of the minimal self is behind such ineffable ontological differences in SCH, such as the feeling of existing as an object, fragmented self-unity, and weaker self-coherence (Henriksen & Parnas 2014). Additionally, it is also argued to lead to disturbance in the inherent first-person perspective (decreased feeling of mineness with regards to own thoughts, feelings, or actions e.g. observing own thoughts as if they were generated from outside of the realm of the self), and diminished attunement through decreased capability to grasp meaning (Parnas & Henriksen 2014). Further, alterations in bodily experiences such as blurring boundaries of the self makes distinguishing the own experience from the experience of others difficult hindering self-other demarcation. Alterations in the fundamental experiences as embodied agents decreases the capability to connect to people, or be affected by events (Raballo 2012). In relation to ASD, sharp self-other boundaries have been linked to minimal self disturbances, implying weaker ability to relate to, or interact with others and the physical world (Noel et al. 2017). Further, anomalous experiences have been argued to be linked to atypicalities in sensory processing in multiple modalities (e.g. auditory, visual, or tactile) and a deficit in multisensory binding (Robertson & Baron-Cohen 2017) underlying subtle perceptual disturbances in ASD (Noel et al. 2017, 2020; Tordjman et al. 2019) (see Figure 2).

Figure 2. Diametrical differences in anomalous bodily experiences in SCH and ASD



Note(s). Subtle phenomenological alterations manifest in differential biases in self-world interactions in the case of ASD and SCH. IN ASD, the demarcation from the world is alleviated, while in SCH it is attenuated.

Altered phenomenology may be assessed via questionnaires and semi-structured interviews. Semi–structured interviews include the Bonn Scale for the Assessment of Basic Symptoms (Gross et al. 1987), which covers items like perceptual, cognitive and motor anomalies, the Perceptual Aberration Scale (Chapman et al. 1978), which was introduced to measure body image aberrations in relation to SCH, or the Examination of Anomalous Self-Experience Scale (EASE; Parnas et al. 2005). The EASE aims to measure the alteration at the level of the minimal self by assessing domains such as Cognition and Stream of Consciousness, Self-Awareness and Presence, Bodily Experiences, Demarcation/Transitivism, and Existential Reorientation (Parnas et al. 2005). A study assessing minimal selfhood distortions transdiagnostically in SCH and ASD by comparing the scores achieved on the EASE scale has shown that the two disorders differed in terms of the degree of disruption (Nilsson et al. 2020). Schizotypal disorder diagnosis was the only predictor of higher total, as well as domain scores indicating that anomalous

minimal self experience is a fundamental property of the SCH spectrum and less so in the case of ASD (Nilsson et al. 2020). Other self-reported measures that can be utilised to assess alterations of selfhood include the Embodied Sense of Self Scale (ESSS; Asai et al. 2016), the Reflective Functioning Questionnaire (RFQ; Fonagy et al. 2016), The Beck Cognitive Insight Scale (BECK; Beck et al. 2004), or the Mentalization Questionnaire (MZQ; Hausberg et al. 2012).

Neurocognitive correlates of minimal self disturbance

Our subjective experience that is rooted in minimal selfhood may be largely influenced by subtle alterations in how we perceive the world around us. Dysfunctional sensory, cognitive and motor functions all have the potential to distort our subjectivity and our ontological dimensions. Gallagher (2000) identified two main aspects of minimal selfhood - sense of body ownership and body agency - which are also inherently grounded in sensory, motor and cognitive functions. Body ownership refers to the first-person quality with regards to bodily experiences, while body agency refers to the implicit awareness of being the one who carries out an action (Gallagher 2000). Body ownership has been studied via proprioceptive paradigms such as the Rubber-Hand Illusion (Costantini & Haggard 2007), or the Full-Body Illusion (Blanke & Metzinger 2009). Relatedly, the meta-analysis of Shaqiri and colleagues (Shaqiri et al. 2018) found no evidence for disturbed body ownership in SCH. Nevertheless, Crespi and Dinsdale (2019) synthesised the Rubber-Hand Illusion findings in relation to SCH and ASD and found support for the hypothesis that there is a layer of the two disorders that can be interpreted along the same psychopathological dimension, however, at opposite ends. ASD was associated with a decreased susceptibility, and SCH was associated with an increased susceptibility to the illusion (Crespi & Dinsdale 2019). Further, atypical self-processing in SCH and ASD were detected when subjects were presented with self-relevant stimuli such as pictures of their own body parts. Ferri and colleagues (2012) showed that bodily self advantage effects could not be detected in first-episode SCH patients when completing a recognition task involving body parts and objects belonging to them versus belonging to others. Relatedly, diminished advantage of self-relevant stimuli was found in ASD compared to controls when subjects were shown photographs of their own faces versus others (Cygan et al. 2014). Body agency, on the other hand, has been primarily studied through action attribution tasks (Farrer et al. 2003), or self-monitoring tasks (Stirling et al. 1998) (for a more complete list of studies, see the meta-analytic review of Hur et al. 2014). Hur and colleagues (2014) have summarised the literature on anomalous minimal self-experience in SCH and have found that anomalous body ownership and body agency characterise SCH patients with medium to large effect sizes.

Finally, Nelson and colleagues (2020) hypothesised that defective source monitoring and aberrant salience are two candidate foundational neurocognitive factors estimating minimal self disturbance, however, their model gained only partial empirical support. They argued that their model might yield better explanatory power if they added further correlates such as disturbed temporal processing, and multisensory integration (Nelson et al. 2020).

Neural correlates of minimal self disturbance

While important steps were taken to uncover cognitive and phenomenological correlates of minimal self disturbance, neurobiological correlates have been relatively understudied. Based on previous findings, minimal selfhood can be conceptualised either as the output of brain activity that unfolds in internally oriented moments (Nelson et al. 2009; Robinson et al. 2016), or as based on sensory, motor, and cognitive components, all of which require the brain to be externally engaged (Gallese & Ferri 2014; Salomon 2017).

Those in favour of the theory of intrinsically grounded minimal selfhood have argued that the Default Mode Network (DMN) plays a central role in the construction of the minimal self (Nelson et al. 2009). The DMN, which is typically activated during internally oriented moments, is antagonist to task-positive networks (Buckner et al. 2008; Raichle et al. 2001) and its dysfunction is thought to be an important biological marker of psychiatric disorder across diagnostic categories (Doucet et al. 2020). In line with this, Robinson and colleagues (2016) argued that the DMN contributes to an intact sense of agency - a bedrock to minimal selfhood - in turn, the abnormality of the network results in commonly recognized symptoms in SCH such as misattribution of actions. Relatedly, the DMN has been reported to be dysfunctional in both ASD and SCH with studies reporting atypical connectivity in both disorders (Jutla et al. 2022).

Others, in favour of the theory of extrinsically rooted minimal selfhood, suggested that minimal self knowledge arises from bodily sensations and motor aspects of the self (Gallese & Ferri 2014; Salomon 2017). Gallese and Ferri (2014) suggested that the lateral cortices (i. e. ventral premotor cortex and insula) play a crucial role in the construction of the minimal self. They found that the ventral premotor cortex, which is a plausible candidate area for forming some form of a foundational body consciousness through the integration of multisensory signals, was activated specifically when seeing self-related stimuli (Gallese & Ferri 2014). Relatedly, Farb and colleagues (2007) found that minimal selfhood was linked to the activity of the exteroceptive somatic and interoceptive insular cortices, further underpinning the importance of external and bodily signals. Finally, altered thalamocortical functional connectivity, which emerged as one of the most robust biomarkers of SCH (Cheng et al. 2015; Giraldo-Chica & Woodward 2017) could also be linked to a dysfunctional minimal self. In particular, enhanced thalamic functional connections to sensorimotor areas have been hypothesised to be linked to aberrant bodily sensations in SCH (Cheng et al. 2015). Hyperconnectivity to sensorimotor regions was also found in ASD (Ayub et al. 2021; Woodward et al. 2017). This implies that a minimal self disturbance could potentially be linked to thalamocortical network pathology in both disorders, which is an important pattern within the disconnectivity framework of both SCH and ASD (Coyle et al. 2016; Geschwind & Levitt 2007).

While the theories of intrinsically and extrinsically grounded minimal selfhood seem inherently discordant, it has also been suggested that the sense of minimal self arises from an interplay between regions that form part of the DMN such as the posterior cingulate cortex, and the lateral regions (Gallese & Ferri 2014). Relatedly, aberrant functional interaction between these regions were reported to correlate with alterations in subjectivity in SCH (Gallese & Ferri 2014). This would imply that the minimal self is grounded in the interaction between the core psychological and bodily aspects of our existence.

To summarise, the neural correlates of minimal selfhood have been studied by either assessing the integrity of the DMN, or by paradigms that activate neural circuits related to body consciousness and sensory processing. However, the neural substrates of minimal selfhood might be more reliably assessed during a body scan task. A body scan task requires a non-judgmental focus on elementary bodily sensations and an intuitive awareness of the present. This process could induce a transition towards the most basic level of selfhood, the minimal selfhood, while simultaneously suppressing mind wandering that usually promotes a narrative-like stream of thoughts lacking focus on the present moment.

CONCLUSION

In this article, we have introduced a comprehensive framework that breaks down minimal self disturbance to different, hierarchically-related layers such as neurobiological, cognitive and phenomenological. Based on this pyramidal model, have provided a narrative review of the literature that had conceptualised SCH and ASD as disorders of the minimal self. We argue that anomalous minimal self-experience is the main aspect that can explain alterations at several levels of organisation in the two disorders and, thus, help disentangle the shared pathological dimension. Assuming that minimal self dysfunction arises in childhood in the form of subtle alterations in subjectivity and the way one feels immersed in the world, clinical awareness of self-disorders might improve early diagnosis and treatment (Raballo 2012). Besides SCH and ASD, a multitude of psychiatric disorders have been associated with anomalous self-experience, although minimal self disturbance seems to be a distinctive characteristic of SCH and ASD. Alterations of more complex self-dimensions are typically identified in personality disorders (e.g., borderline personality disorder) (Parnas & Zandersen 2018). This implies that over and above modelling minimal self disturbance, implementing more general self-dysfunction models would advance our understanding of pathological states across several disorders. The self has enjoyed increasing interest from several fields in the past few years including psychology, psychiatry, and neuroscience - it is time that it is incorporated as an important pathological dimension into scientific enquiry and clinical practice.

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REFERENCES

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition, text rev. American Psychiatric Association, 2013
2. Asai T., Kanayama N., Imaizumi S., Koyama S., Kaganoi S. (2016) Development of Embodied Sense of Self Scale (ESSS): Exploring Everyday Experiences Induced by Anomalous Self-Representation. Front Psychol, 7: 1005
3. Ayub R., Sun K.L., Flores RE, Lam V.T., Jo B., Saggar M., Fung L.K. (2021) Thalamocortical connectivity is associated with autism symptoms in high-functioning adults with autism and typically developing adults. Transl Psychiatry, 11:1–9.
4. Bayne T. (2004) Closing the gap? Some questions for neurophenomenology. Phenomenol Cogn Sci, 3:349–64.
5. Beck A.T., Baruch E., Balter J.M., Steer R.A., Warman D.M. (2004) A new instrument for measuring insight: the Beck Cognitive Insight Scale. Schizophr Res, 68:319–29.
6. Bertone A., Mottron L., Faubert J. (2004) Autism and schizophrenia: Similar perceptual consequence, different neurobiological etiology? Behav Brain Sci, 27:592–3.
7. Blanke O., Metzinger T. (2009) Full-body illusions and minimal phenomenal selfhood. Trends Cogn Sci, 13:7–13.
8. Bleuler E. Dementia praecox or the group of schizophrenias. International Universities Press, Oxford, 1950, pp 548.
9. Buckner R.L., Andrews-Hanna J.R., Schacter D.L. (2008) The Brain's Default Network. Ann N Y Acad Sci, 1124:1–38.
10. Chapman L.J., Chapman J.P., Raulin M.L. (1978) Body-image aberration in schizophrenia. J Abnorm Psychol, 87:399–407.
11. Cheng W., Palaniyappan L., Li M., Kendrick K.M., Zhang J., Luo Q., Liu Z., Yu R., Deng W., Wang Q., Ma X., Guo W., Francis S., Liddle P., Mayer A.R., Schumann G., Li T., Feng J. (2015) Voxel-based, brain-wide association study of aberrant functional connectivity in schizophrenia implicates thalamocortical circuitry. Npj Schizophr, 1:1–8.
12. Costantini M., Haggard P. (2007) The rubber hand illusion: Sensitivity and reference frame for body ownership. Conscious Cogn, 16:229–40.
13. Couture S.M., Penn D.L., Losh M., Adolphs R., Hurley R., Piven J. (2010) Comparison of social cognitive functioning in schizophrenia and high functioning autism: more convergence than divergence. Psychol Med, 40:569–79.
14. Coyle J.T., Balu D., Puhl M., Konopaske G. (2016) A Perspective on the history of the concept of "disconnectivity" in schizophrenia. Harv Rev Psychiatry, 24:80–6.
15. Crespi B., Dinsdale N. (2019) Autism and psychosis as diametrical disorders of embodiment. Evol Med Public Health, 1:121–38.
16. Cygan H.B., Tacikowski P., Ostaszewski P., Chojnicka I., Nowicka A. (2014) Neural Correlates of Own Name and Own Face Detection in Autism Spectrum Disorder. PLOS ONE, 9:e86020.
17. Doucet G.E., Janiri D., Howard R., O'Brien M., Andrews-Hanna J.R., Frangou S. (2020) Transdiagnostic and disease-specific abnormalities in the default-mode network hubs in psychiatric disorders: A meta-analysis of resting-state functional imaging studies. Eur Psychiatry, 63, E57.
18. Eack S.M., Bahorik A.L., McKnight S.A.F., Hogarty S.S., Greenwald D.P., Newhill C.E., Phillips M.L., Keshavan M.S., Minshew N.J. (2013) Commonalities in social and non-social cognitive impairments in adults with autism spectrum disorder and schizophrenia. Schizophr Res, 148:24–8.
19. Farb N.A.S., Segal Z.V., Mayberg H., Bean J., McKeon D., Fatima Z., Anderson A.K. (2007) Attending to the present: mindfulness meditation reveals distinct neural modes of self-reference. Soc Cogn Affect Neurosci, 2:313–22.
20. Farrer C., Franck N., Georgieff N., Frith C.D., Decety J., Jeannerod M. (2003) Modulating the experience of agency: a positron emission tomography study. NeuroImage, 18:324–33.
21. Ferri F., Frassinetti F., Mastrangelo F., Salone A., Ferro F.M., Gallese V. (2012) Bodily self and schizophrenia: The loss of implicit self-body knowledge. Conscious Cogn, 21:1365–74.
22. Fonagy P., Luyten P., Moulton-Perkins A., Lee Y.W., Warren F., Howard S., Ghinai R., Fearon P., Lowyck B. (2016) Development and Validation of a Self-Report Measure of Mentalizing: The Reflective Functioning Questionnaire. PLoS ONE, 11:7.
23. Fuchs T., Schlimme J.E. (2009) Embodiment and psychopathology: a phenomenological perspective. Curr Opin Psychiatry, 22:570–5.
24. Fuchs T. (2010) Subjectivity and Intersubjectivity in Psychiatric Diagnosis. Psychopathology, 43:268–74.
25. Gallagher S. (2000) Philosophical conceptions of the self: implications for cognitive science. Trends Cogn Sci, 4:14–21.
26. Gallese V., Ferri F. (2014) Psychopathology of the Bodily Self and the Brain: The Case of Schizophrenia. Psychopathology, 47:357–64.
27. Geschwind D.H., Levitt P. (2007) Autism spectrum disorders: developmental disconnection syndromes. Curr Opin Neurobiol, 17:103–11.
28. Giraldo-Chica M., Woodward N.D. (2017) Review of thalamocortical resting-state fMRI studies in schizophrenia. Schizophr Res, 180:58–63.
29. Gross G., Huber G., Klosterkötter J., Linz M. Bonner Skala für die Beurteilung von Basissymptomen. Berlin: Springer, Berlin, 1987.
30. Haug E., Øie M., Andreassen O.A., Bratlien U., Raballo A., Nelson B., Møller P., Melle I. (2014) Anomalous self-experiences contribute independently to social dysfunction in the early phases of schizophrenia and psychotic bipolar disorder. Compr Psychiatry, 55:475–82.
31. Hausberg M.C., Schulz H., Piegler T., Happach C.G., Klöpper M., Brütt A.L., Sammet I., Andreas S. (2012) Is a self-rated instrument appropriate to assess mentalization in patients with mental disorders? Development and first validation of the Mentalization Questionnaire (MZQ). Psychother Res, 22:699–709.

32. Henriksen M.G., Parnas J., Zahavi D. (2019) Thought insertion and disturbed for-me-ness (minimal selfhood) in schizophrenia. Conscious Cogn, 74:102770.
33. Henriksen M.G., Parnas J. (2014) Self-disorders and Schizophrenia: A Phenomenological Reappraisal of Poor Insight and Noncompliance. Schizophr Bull, 40:542–7.
34. Hommer R.E., Swedo S.E. (2015) Schizophrenia and Autism—Related Disorders. Schizophr Bull, 41:313–4.
35. Hur J.W., Kwon J.S., Lee T.Y., Park S. (2014) The crisis of minimal self-awareness in schizophrenia: A meta-analytic review. Schizophr Res, 152:58–64.
36. Jaspers K., Hoenig J., Hamilton M.W. General psychopathology. John Hopkins University Press, London, 1997.
37. Jutla A., Foss-Feig J., Veenstra-VanderWeele J. (2022) Autism spectrum disorder and schizophrenia: An updated conceptual review. Autism Res, 15:384–412.
38. Kay S.R., Fiszbein A., Opler L.A. (1987) The Positive and Negative Syndrome Scale (PANSS) for Schizophrenia. Schizophr Bull, 13:261–76.
39. King B.H., Lord C. (2011) Is schizophrenia on the autism spectrum? Brain Res, 1380:34–41. Kraepelin E. Psychiatrie; ein Lehrbuch für Studierende und Aerzte: Klinische Psychiatrie. Vol. 3., Barth, Leipzig, 1913
40. Mazza M., Pino M.C., Keller R., Vagnetti R., Attanasio M., Filocamo A., Le Donne I., Masedu F., Valenti M. (2022) Qualitative Differences in Attribution of Mental States to Other People in Autism and Schizophrenia: What are the Tools for Differential Diagnosis? J Autism Dev Disord, 52:1283–98.
41. Møller P, Husby R. The Initial Prodrome in Schizophrenia: Searching for Naturalistic Core Dimensions of Experience and Behavior. Schizophr Bull, 26:217–32.
42. Nelson B., Fornito A., Harrison B.J., Yücel M., Sass L.A., Yung A.R., Thompson A., Wood S.J., Pantelis C., McGorry P.D. (2009) A disturbed sense of self in the psychosis prodrome: Linking phenomenology and neurobiology. Neurosci Biobehav Rev, 33:807–17.
43. Nelson B., Lavoie S., Gawęda Ł., Li E., Sass L.A., Koren D., McGorry P.D., Jack B.N., Parnas J., Polari A., Allott K., Hartmann J.A., Whitford T.J. (2020) The neurophenomenology of early psychosis: An integrative empirical study. Conscious Cogn, 77:102845.
44. Nelson B., Parnas J., Sass L.A. (2014) Disturbance of Minimal Self (Ipseity) in Schizophrenia: Clarification and Current Status. Schizophr Bull, 40:479–82.
45. Nelson B., Thompson A., Yung A.R. (2012) Basic Self-Disturbance Predicts Psychosis Onset in the Ultra High Risk for Psychosis "Prodromal" Population. Schizophr Bull, 38:1277–87.
46. Nijhof A.D., Bird G. (2019) Self-processing in individuals with autism spectrum disorder. Autism Res, 12:1580–4.
47. Nilsson M., Arnfred S., Carlsson J., Nylander L., Pedersen L., Mortensen E.L., Handest P. (2020) Self-Disorders in Asperger Syndrome Compared to Schizotypal Disorder: A Clinical Study. Schizophr Bull, 46:121–9.
48. Nilsson M., Handest P., Nylander L., Pedersen L., Carlsson J., Arnfred S. (2019) Arguments for a Phenomenologically Informed Clinical Approach to Autism Spectrum Disorder. Psychopathology, 52:153–60.
49. Noel J.P., Cascio C.J., Wallace M.T., Park S. (2017) The spatial self in schizophrenia and autism spectrum disorder. Schizophr Res, 179:8–12.
50. Noel J.P., Failla M.D., Quinde-Zlibut J.M., Williams Z.J., Gerdes M., Tracy J.M., Zoltowski A.R., Foss-Feig J.H., Nichols H., Armstrong K., Heckers S.H., Blake R.R., Wallace M.T., Park S., Cascio C.J. (2020) Visual-Tactile Spatial Multisensory Interaction in Adults with Autism and Schizophrenia. Front Psychiatry, 11:578401.
51. Parnas J., Handest P., Sæbye D., Jansson L. (2003) Anomalies of subjective experience in schizophrenia and psychotic bipolar illness. Acta Psychiatr Scand, 108:126–33.
52. Parnas J., Henriksen M.G. (2014) Disordered Self in the Schizophrenia Spectrum: A Clinical and Research Perspective. Harv Rev Psychiatry, 22:251–65.
53. Parnas J., Henriksen M.G. (2013) Subjectivity and Schizophrenia: Another Look at Incomprehensibility and Treatment Nonadherence. Psychopathology, 46:320–9.
54. Parnas J., Møller P., Kircher T., Thalbitzer J., Jansson L., Handest P., Zahavi D. (2005) EASE: Examination of Anomalous Self-Experience. Psychopathology, 38:236–58.
55. Parnas J., Raballo A., Handest P., Jansson L., Vollmer-Larsen A., Saeby D. (2011) Self-experience in the early phases of schizophrenia: 5-year follow-up of the Copenhagen Prodromal Study. World Psychiatry, 10:200–4.
56. Parnas J., Zandersen M. (2018) Self and schizophrenia: current status and diagnostic implications. World Psychiatry, 17:220–1.
57. Pinkham A.E., Hopfinger J.B., Pelphrey K.A., Piven J., Penn D.L. (2008) Neural bases for impaired social cognition in schizophrenia and autism spectrum disorders. Schizophr Res, 99:164–75.
58. Raballo A. (2012) Self-disorders and the experiential core of schizophrenia spectrum vulnerability. Psychiatr Danub, 24 Suppl 3:303–10.
59. Raichle M.E., MacLeod A.M., Snyder A.Z., Powers W.J., Gusnard D.A., Shulman G.L. (2001) A default mode of brain function. Proc Natl Acad Sci, 98:676–82.
60. Rapoport J., Chavez A., Greenstein D., Addington A., Gogtay N. (2009) Autism Spectrum Disorders and Childhood-Onset Schizophrenia: Clinical and Biological Contributions to a Relation Revisited. J Am Acad Child Adolesc Psychiatry, 48:10–8.
61. Robertson C.E., Baron-Cohen S. (2017) Sensory perception in autism. Nat Rev Neurosci, 18:671–84.
62. Robinson J.D., Wagner N.F., Northoff G. (2016) Is the Sense of Agency in Schizophrenia Influenced by Resting-State Variation in Self-Referential Regions of the Brain? Schizophr Bull, 42:270–6.
63. Salomon R. (2017) The Assembly of the Self from Sensory and Motor Foundations. Soc Cogn, 35:87–106.
64. Sass L.A., Parnas J. (2003) Schizophrenia, Consciousness, and the Self. Schizophr Bull, 29:427–44.
65. Sass L.A. (2014) Self-disturbance and schizophrenia: Structure, specificity, pathogenesis (Current issues, New directions). Schizophr Res, 152:5–11.
66. Schneider K. Clinical psychopathology. (Trans. by M.W. Hamilton), 5th ed. Grune & Stratton, Oxford, 1959.
67. Shaqiri A., Roinishvili M., Kaliuzhna M., Favrod O., Chkonia E., Herzog M.H., Blanke O., Salomon R. (2018) Rethinking Body Ownership in Schizophrenia: Experimental and Meta-analytical Approaches Show no Evidence for Deficits. Schizophr Bull, 44:643–52.
68. Skodlar B., Parnas J. (2010) Self-disorder and subjective dimensions of suicidality in schizophrenia. Compr Psychiatry, 51:363–6.

69. Stanghellini G. (2009) Embodiment and schizophrenia. World Psychiatry, 8:56–9.
70. Stirling J.D., Hellewell J.S.E., Quraishi N. (1998) Self-monitoring dysfunction and the schizophrenic symptoms of alien control. Psychol Med, 28:675–83.
71. Szczotka J., Majchrowicz B. (2018) Schizophrenia as a disorder of embodied self. Psychiatr Pol, 52:199–215.
72. Tordjman S., Celume M.P., Denis L., Motillon T., Keromnes G. (2019) Reframing schizophrenia and autism as bodily self-consciousness disorders leading to a deficit of theory of mind and empathy with social communication impairments. Neurosci Biobehav Rev, 103:401–13.
73. Trevisan D.A., Foss-Feig J.H., Naples A.J., Srihari V., Anticevic A., McPartland J.C. (2020) Autism Spectrum Disorder and Schizophrenia Are Better Differentiated by Positive Symptoms Than Negative Symptoms. Front Psychiatry, 11:548.
74. Uddin L.Q. (2011) The self in autism: An emerging view from neuroimaging. Neurocase, 17:201–8.
75. Woodward N.D., Giraldo-Chica M., Rogers B., Cascio C.J. (2017) Thalamocortical Dysconnectivity in Autism Spectrum Disorder: An Analysis of the Autism Brain Imaging Data Exchange. Biol Psychiatry Cogn Neurosci Neuroimaging, 2:76–84.
76. Wright A., Nelson B., Fowler D., Greenwood K. (2020) Perceptual biases and metacognition and their association with anomalous self experiences in first episode psychosis. Conscious Cogn, 77:102847.

A szkizofrénia és az autizmus spektrum zavar transzdiagnosztikus értelmezése a minimál szelf zavarának keretében

Célkitűzés: A szkizofrénia és az autizmus spektrum zavar diagnosztikailag elkülönülő rendellenességek, ám a kóros működés több szinten is átfedéseket mutat, az agyi hálózatoktól kezdve egészen a viselkedésig. Mindkét állapot esetén megfigyelhetőek a minimál szelf anomáliái („body ownership" és ágencia eltérései), amelyek tartós, jellegzetes torzulásokat okoznak az egyén élményvilágában. Kéziratunkban egy olyan diagnosztikus határokon átívelő elméleti keretrendszert vázolunk fel, amely az idegi alapoktól a kognitív és fenomenológiai korrelátumokig több szinten egységesen közelíti meg a minimal szelf zavarának koncepcióját. **Módszer:** Átfogó irodalomkutatásunk során a minimál szelf zavarainak fenomenológiai, neurokognitív és idegi összefüggéseit, valamint a szelf-érzékelés vizsgálata során alkalmazott kérdőívekkel (például „Anomalous Self-Experience Scale"), és kísérleti neurokognitív paradigmákkal (Rubber-hand illúzió és különböző szelf-releváns ingerek alkalmazása) feltérképezhető eltéréseket tekintettük át szkizofrénia és autizmus spektrum zavar esetében. **Eredmények:** A vizsgálat eredményei arra utalnak, hogy a szelf-percepció zavarai mindkét kórképben kulcsszerepet játszanak, bár eltérő módon jelennek meg. Szkizofrén páciensek fokozott fogékonyságot mutattak a testérzékelésük („body ownership") megváltozására, míg autisták esetében ez nem volt jellemző. A nyugalmi hálózat („default mode network") és a talamokortikális konnektivitás eltérései mindkét állapotra jellemzőek, ami közös neurobiológiai hátterükre utal. **Következtetés:** A minimal szelf zavarai szkizofrénia és autizmus spektrum zavar esetében egyaránt megfigyelhető, transzdiagnosztikus eltérések. Ebből következtethetünk arra, hogy egy közös pszichopatológiai dimenzió mentén helyezkedhetnek el. A kéziratban bemutatott modell integrálja a szelfzavar neurobiológiai, kognitív és fenomenológiai szintjeit, új keretet nyújtva ezek értelmezéséhez. Emellett az operacionalizált nozológia alkalmazásán túllépve hangsúlyozza az atipikus szelf-élmény figyelembevételének jelentőségét.

Kulcsszavak: minimal szelf, szkizofrénia, autizmus spektrumzavar, neurofenomenológia