

# Behavioural equivalents of schizophrenia in people with intellectual disability and autism spectrum disorder. A selective review

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Assessment of schizophrenia (SCZ) in people with autism spectrum disorder (ASD) is complicated due to confounding symptoms between ASD and SCZ. These confounding factors are aggravated when the patient has sparse verbal skills. A selective review was conducted to identify behavioural equivalents when assessing SCZ in individuals with ASD with sparse verbal skills, from 16 years of age. Only clinical papers were reviewed. Eight relevant articles were analysed for the use of behavioural equivalents in clinical settings. The results showed that especially disorganized speech and behaviour and negative symptoms can be observed in patients with SCZ and ASD who speak sparsely. It is not possible to observe delusions, but they may be reported by the patients when treated adequately for some time, usually months. Hallucinations cannot be observed directly, but 'hallucinatory behaviour' may be interpreted as hallucinations when observed concurrently with other SCZ symptoms. Additionally, age of onset and marked impaired global functioning compared to habitual functioning may constitute a diagnosis of SCZ in ASD. ASD is considered a lifelong condition and may be identified within the first 3–4 years, while SCZ onset is usually in adolescence or early adulthood.

**Keywords:** intellectual disability, autism spectrum disorder, schizophrenia, behavioural equivalents

## Introduction

Identification of mental illness in patients with autism spectrum disorder (ASD) is generally challenging (Bakken *et al.* 2016). Especially differentiating ASD from schizophrenia (SCZ) is difficult because symptoms presented by the patients can be confounded (Marin *et al.* 2018, Bakken and Høidal 2014). The challenges of separating the two disorders will be aggravated in people who use words sparsely when communicating (Engebretsen *et al.* 2019, Kildahl *et al.* 2017). Hence, in patients with both ASD and intellectual disability (ID), identification of psychosis may be (too) challenging if behavioural equivalents are not used in addition to conventional symptoms (Bertelli *et al.* 2015, Bakken and Høidal 2014).

ASD is classified as a neurodevelopmental disorder with onset in very early childhood (APA 2013). The diagnosis, according to the DSM-5 (APA 2013), requires substantial impaired social communication and social interaction, and also a restricted, repetitive repertoire of behaviours and/or interests. The prevalence is found to be around one percent (Lyll *et al.* 2017,

Baxter *et al.* 2015), and ID is estimated to be present in about 45% of people with ASD (Lai *et al.* 2014). The other way around, ASD is found to be present in about 20% of children with ID (Tonnsen *et al.* 2016).

Schizophrenia is classified as a spectrum of mental illness, in which delusions, hallucinations, disorganized speech and behaviour, and negative symptoms are displayed by the patient (APA 2013). The schizophrenia subtypes are no longer part of the diagnostic criteria, as the boundaries of the different subtypes have proven to have low criterion validity (APA 2013). Schizophrenia is assumed to occur more frequently in people with autism compared to the general population (Lai *et al.* 2019, De Giorgio *et al.* 2019, Chisholm *et al.* 2016, Bakken *et al.* 2010). However, estimates of co-morbid SCZ and ASD vary considerably, as different studies report between about 4 and 13 percent co-morbidity (Lai *et al.* 2019, De Giorgio *et al.* 2019, Chisholm *et al.* 2016). The co-morbidity of SCZ in ASD has drawn attention relatively recently in mental health services (Marin *et al.* 2018, Uptegrove *et al.* 2018, Bakken *et al.* 2016). A diagnosis of concurrent autism and schizophrenia was allowed for the first time in ICD-10 and DSM-4 (WHO, 1992, APA, 1994). Though the

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diagnostic criteria distinguish the two conditions, there are overlapping symptoms displayed by the patients (Nylander 2014, Bakken and Høidal 2014, Nylander *et al.* 2008). Overlapping symptoms that confound the assessment of SCZ in ASD are especially found to be delusions that may be taken for autistic idiosyncrasies (Bakken and Høidal 2014), disorganized speech taken for autistic communication deficits (Nylander 2014, Bakken and Høidal 2014, Nylander *et al.* 2008, Konstantareas and Hewitt 2001, Cherry *et al.* 2000), disorganized behaviour taken for behaviour problems and not further investigated, and finally negative symptoms (apathy, social withdrawal, lack of motivation etc.) taken for autistic social and adaptive impairments (Bakken and Høidal 2014, Bakken *et al.* 2009, Bakken *et al.* 2007).

Genetic studies reveal that some genetic syndromes such as 22q11.2 Deletion Syndrome (formerly called Di George syndrome) elicit ultra-high risk of developing schizophrenia (Engebretsen *et al.* 2019). In a meta-study including about three hundred thousand adults with schizophrenia, bipolar disorder or with no psychiatric diagnosis, a significant association was found between schizophrenia and low cognitive performance (Smeland *et al.* 2020). This association is not found between bipolar disorder and low IQ. Because ASD is many times more frequent among people with ID compared to the general population, about twenty percent versus about one percent, this may be one of the explanations why the risk of SCZ among people with ASD is increased many times.

Like patients in the general population, patients diagnosed with both ASD and SCZ may appear disorganized and severely disturbed in the acute phase (APA 2013, Bakken *et al.* 2007). However, as most patients in the general population will be able to report on core symptoms such as delusions and hallucinations, patients with ASD, even the more able patients without ID or with mild ID may become non-verbal during episodes of acute psychosis (Engebretsen *et al.* 2019, Kildahl *et al.* 2017). Generally, people with ASD tend to have decreased ability for introspection, which may complicate reporting symptoms of mental illness (Robinson *et al.* 2017). Additionally, people with ASD usually have poor mentalizing ability (Robinson *et al.* 2017), and hence may not know what is normal thinking and tend not to tell when they experience unpleasant thoughts, or hallucinations (Bakken *et al.* 2009). Hence, facilitating non-verbal communication with the patient, and skills in observing symptoms in daily interaction are prerequisites for both identification and treatment of patients with co-morbid ASD and SCZ (Bakken 2014). Knowledge of behavioural equivalents is an advantage for clinicians relating both to identification and treatment.

The meaning of 'equivalent' is 'having the same value' or 'correspondingly'. The concept is frequently used in mathematics, physics, philosophy, and semantically. The term has also been used for a few years in papers on mental illness in patients with considerably decreased verbal skills, mainly patients with ASD and/or ID (Baudewijns *et al.* 2018, Painter *et al.* 2018). Observable symptoms, especially problem behaviour, have been associated with mental illness in patients with ASD and/or ID (Hausman *et al.* 2020, Painter *et al.* 2018). For example, in a paper from the 1980s, aggression was regarded as a symptom of psychosis in ID (Lund 1985). However, there is a complex relationship between problem behaviour and mental illness, as people with mental illness may, or may not, express their emotional pain through actions. In people who only speak sparsely, problem behaviour may arise from a number of different origins. More specific attention must therefore be given to behavioural equivalents of symptoms of mental illness than to observations of problem behaviour. Behavioural equivalents must be observable symptoms corresponding to criteria of mental illness as described in the assessment manuals. The use of behavioural equivalents when the patients only speak sparsely, or are non-verbal, will increase the possibility of reaching a more accurate diagnosis, which may give a direction for adequate treatment (Fletcher *et al.* 2016, Bakken *et al.* 2007).

However, the use of behavioural equivalents will also decrease the validity of the diagnoses. With regard to SCZ, observable symptoms encompass disorganized speech and behaviour (Bakken *et al.* 2007, Cherry *et al.* 2000), and negative symptoms (Bakken *et al.* 2007, O'Dwyer 2000). Delusions are not observable. Hallucinations may be interpreted through observations of possible hallucinatory behaviour (Bakken *et al.* 2007, Hurley 2003).

The aim of this review was to identify clinical studies using behavioural equivalents in assessment of schizophrenia in patients with ASD and sparse verbal capacity. More specifically, how are behavioural equivalents of conventional criteria described in clinical studies of assessment of SCZ in patients with ASD and sparse verbal capacity?

## Methods

The term 'selected review' is used because articles by the author were pre-selected for this review.

## Inclusion and exclusion criteria

Inclusion criteria were 1. being a clinical paper, 2. age from 14 and up (Bakken *et al.* 2010), i.e. adolescents and adults, 3. having both ASD and SCZ, and sparse verbal capacity (ID or other speech impairment). Exclusion criteria encompassed papers published before the year 1993, as the diagnostic criteria in DSM-4 and

**Table 1. Overview of included papers.**

Author Year	Design	Participants, N and characteristics	Criteria included	Equivalents described
Bakken <i>et al.</i> 2007	Qualitative Case reports	N = 8, ASD, Moderate/severe ID, SCZ/psychosis, severely impaired functioning	Disorganized behaviour/speech, Negative symptoms Suggested hallucinations	Disorganization NS Hallucinations
Bakken <i>et al.</i> 2008	Quantitative Staff communication	N = 4 Patients Moderate/severe ID, SCZ/psychosis, severely impaired functioning	Disorganized behaviour Disorganized speech	Disorganized behaviour/speech
Bakken <i>et al.</i> 2009	Single-case design. Validation of behavioural disorganization	N = 84 episodes of dyadic patient – staff interaction	Disorganised behaviour Disorganised speech	Disorganized behaviour/speech
Bakken 2014	Case series. Differing SCZ from ASD	N = 12, Mild ID / Borderline IQ. Tentative ASD and / or SCZ at admission	Delusions Hallucinations Disorganized speech/behaviour Negative symptoms Globally impaired function	Disorganizes speech Disorganized behaviour Negative symptoms
Engebreetsen <i>et al.</i> 2019	Clinical study. 22q11.2 DS and psychosis.	N = 1 Patient with mild ID, 22q11.2 DS and psychosis	Hallucinations Disorganized speech Disorganized behaviour Negative symptoms	Disorganized speech Disorganized behaviour Negative symptoms
Hurley 2003	Clinical study; psychosis in adults with ID in two groups.	N = 106 adults with ID. One group with 'ID only'. One group with ID + Down Syndrome.	Delusions Hallucinations	Disorganized speech? Hallucinations
Kildahl <i>et al.</i> 2017	Clinical study. Assessment of psychosis in ID / ASD	N = 1 Patient with mild ID, ASD and severely impaired global functioning	Disorganized speech Disorganized behaviour Negative symptoms	Disorganized speech Disorganized behaviour Negative symptoms
Rumsey <i>et al.</i> 1986	Group comparisons	N = 56 Four groups of adults; one group ASD, one group SCZ inpatients, one group mania inpatients, one group neurotypicals (no mental problem)	Formal thought disorder (disorganized speech)	Disorganized speech

The first column refers to first author and year published. \*NS = negative symptoms.

ICD-9 did not allow diagnosing SCZ and ASD concurrently.

### Search strategy

A selective literature search was performed, which included articles in English reporting on the use of behavioural equivalents of psychotic symptoms in people with ASD or both.

The following databases were used to search for articles published from 2000 through 2020: MEDLINE (PubMed), PsycINFO, and CINAHL. In addition, a manual search was performed.

The main search terms were: *autism spectrum disorder* (with the synonym *pervasive developmental disorder*), *psychosis symptoms* (with the synonym *schizophrenia symptoms*); and *behavioural equivalents* (with the synonyms *clinical characteristics* and *observable symptoms*), and *intellectual disabilities* (with the synonyms *learning disabilities*, *developmental disabilities* or *mental retardation*).

A three-step procedure was followed. Step one screened all potentially relevant articles through titles and abstracts, which resulted in thirty one potentially relevant articles; seven articles from the databases, seventeen from the manual search, and seven relevant articles previously published by the author.

When reading through the method section, all articles from the databases were excluded because symptoms were not described in detail, i.e. not in terms of observable indicators of the symptoms. Of the seventeen articles from the manual search, only two were included in the review. Of the author's seven articles, six were included.

### Analyses

In steps two and three the full-text versions of the articles were used. In step two, the eight articles included were sorted for core symptoms of SCZ, using the DSM-5 criteria as a starting point. The diagnosis of SCZ is constituted by the main criteria duration, severity, severely impaired functioning, and presence of

**Table 2. Overview of behavioural equivalents in the articles.**

Author, year	Behavioural equivalents / other
Bakken <i>et al.</i> 2007	Disorganized behaviour: derailment, sequence failure, aimlessness, disorientation, bizarre motor activity Disorganized speech: incoherence, severely impoverished speech, speech vanished Negative symptoms: Social withdrawal Suspected hallucinations: staring at fixed points and yelling, covering ears and at the same time strange sounds, earaches without otitis, Delusions: describing monsters coming to get her, grossly altered body language and voice, 'as a different person' Other: severely impaired global functioning, distress (weight loss, less sleep, unrest, yelling, crying, physical aggression)
Bakken <i>et al.</i> 2008	Disorganized behaviour: derailment, aimless wandering, rocking, repetitive behaviour, Disorganized speech: meaningless response, words or gesture, crying / shouting
Bakken <i>et al.</i> 2009	Disorganized behaviour: derailment, aimless wandering, rocking, repetitive behaviour, unexpected violent behaviour, meaningless response, task interruption by change in focus Disorganized speech: incoherence, derailment, pressure of speech
Bakken 2014	Disorganized speech: incoherence, derailment, pressure of speech, alogia (impaired speech) Disorganized behaviour: task derailment, sequencing problems, using known objects wrongly, impaired task solving in known activities like tooth brushing, dressing themselves etc., two patients showed severe disorganization like smearing faeces on objects Negative symptoms: social withdrawal, apathy, depressed mood
Engebreetsen <i>et al.</i> 2019	Hallucinations. No equivalents described Disorganized speech: verbal speech vanished in the most acute phase, derailment, incoherent speech Disorganized behaviour: No equivalents described Negative symptoms: lack of motivation, severe fatigue, and social withdrawal. Other: frequent anxiety reactions, verbal outbursts, physical aggression
Hurley 2003	Delusions: strange beliefs, thinks people are controlling him, thinks people are 'out to get me', engages openly in fantasy thought or play, has an imaginary friend Hallucinations: talks to himself out loud, talks directly to people not there, talks out loud if upset, says he sees things not there, complains about smells not evident to others, reports sensations not explainable
Kildahl <i>et al.</i> 2017	Hallucinations. No equivalents described Disorganized speech: verbal speech deterioration, confused use of words, Disorganized behaviour: only 'general disorganized behaviour' was described Negative symptoms, blunted affect, withdrawal, apathy, lack of spontaneity,
Rumsey <i>et al.</i> 1986	Disorganized speech in ASD participants: significantly more poverty of speech (than SCZ), more echolalia, Disorganized speech in SCH participants: significantly more derailment, loss of goal, illogicality, pressure of speech, Negative symptoms: affective flattening (both ASD and SCZ)

minimum two of criterion A symptoms: delusions, hallucinations, disorganised speech, disorganized behaviour, and negative symptoms (APA 2013). Positive symptoms (delusions, hallucinations and disorganization) must have been present for at least four weeks, and marked decreased ability of self-care, taking care of relationships, and task solving, must have been present for six months (APA 2013).

In step three, indicators described as equivalents of the five A-criteria were extracted and systematized in a Table 1.

## Results

The included articles describe observable symptoms in patients presented in empirical studies. The observable symptoms may serve as behavioural equivalents of conventional symptoms.

An overview of behaviour equivalents is presented in Table 2. The most frequently presented symptoms were disorganized speech and disorganized behaviour, mentioned in seven out of eight articles. Delusions were mentioned in two articles, hallucinations were

**Table 3. Overview of behavioural equivalents to DSM-5 SCZ criteria.**

DSM-5 criteria		Behavioural equivalents
Criterion A Core symptoms	Delusions	Not observable when patient does not speak, or barely speaks
	Hallucinations	Hallucinatory behaviour including staring at fixed points and yelling, covering ears and at the same time uttering strange sounds, earaches without otitis, talks to himself out loud, talks directly to people not there, talks out loud if upset, sensations not explainable, and says he sees things not there
	Disorganized speech	Incoherence / word salad, derailment, (severely) impoverished speech, speech vanished, meaningless response/ confused use of words (illogical speech), pressure of speech, and echolalia.
	Disorganized behaviour	Derailment in task solving including task interruption by changing focus, sequence failure, aimlessness, rocking, repetitive behaviour, unexpected violent behaviour, meaningless response (non-verbal/gestures), using known objects wrongly (apraxia), impaired task solving in known activities
Criterion B Functioning fall	Negative symptoms	Social withdrawal (more than usual, decreased number of patient initiatives, apathy/fatigue, lack of motivation (fewer initiatives than usual), blunted affect, lack of spontaneity
	Related to self-care, work, and relationships	Neglect related to self-care, work, and relationships. Tasks usually solved are neglected
Criterion C Duration	Continuous signs for at least 6 months	Not relevant
Criterion D, E, F Differentials	Criterion A symptoms for at least 1 month Other conditions are ruled out	Described above Not relevant

mentioned in two articles, and negative symptoms were mentioned in five articles.

One patient with reported delusions appeared in a case series of eight patients in a study of behavioural disorganization in patients with ASD and ID (Bakken *et al.* 2007). This patient lived by the sea, and during psychotic episodes she reported on a great black monster, on its way to take her, and additionally, staff members reported gross alterations in her body language and voice 'as a different person'. In Hurley (2003) 106 patients with ID participated in two groups. One group had Down syndrome and ID, while the other had ID 'only'. Six out of 106 were judged to have delusions and/or hallucinations. Delusions were described as 'strange beliefs, people controlling self, acting out fantasy, and having an imaginary friend'.

Equivalents of hallucinations in people with ID/ASD were described in the articles by Bakken *et al.* (2007) and Hurley (2003). The two articles used the terms 'suspected hallucinations' and 'pseudopsychotic symptoms'. The signs of hallucinations described were 'staring at fixed points and yelling, covering ears and at the same time making strange sounds, earaches without otitis, talking to himself out loud, talking directly to people not there, talking out loud if upset, sensations not explainable, and saying he sees things not there'.

Disorganized speech included the features incoherence, derailment, (severely) impoverished speech, vanished speech, meaningless response/confused use of words (illogical speech), pressure of speech, and echolalia. Disorganized behaviour included the following features: derailment (in task solving), sequence failure, aimlessness, rocking, repetitive behaviour, unexpected violent behaviour, meaningless response (non-verbal/gestures), task interruption by changing focus (derailment), task derailment, using known objects wrongly (apraxia), impaired task solving in known activities like tooth brushing etc. The following case highlights the importance of observation of disorganized behaviour in patients with ASD, who are suspected of having a psychotic episode (Bakken 2010): 'Claire' has severe ID and ASD, usually using and understanding the meaning of approximately 20-30 words. In retrospect, it seems that she had experienced at least three episodes of schizophrenia before admission to a specialized inpatient unit for ID. She was referred for psychiatric assessment as she displayed sleeplessness and lost about 25% body weight. Her verbal language disappeared. She both attacked people without early signs of aggression and destroyed things in the environment. This challenging behaviour was for the most part associated with anxiety attacks. Delusions or hallucinations

were not reported and difficult to assess. The staff observed behaviour suspected to be 'auditory hallucinatory behaviour' (constantly holding her ears, and she would complain about 'hurt in the ear' without otitis or other ear complaints). At the same time she was screaming. If the problems described above encompassed all information available about Claire's condition, there would be insufficient clues for identifying the origin of her problems, and how to supply the right treatment and care. A closer look revealed important additional information: *Disorganized speech and behaviour was observed and assessed as severe during the acute phase, but was still the most prominent sign of psychosis for about four to five months. Her verbal language vanished completely. Claire displayed distorted ability of sequencing during almost all activities through the day. She seemed to hesitate and frequently stop during all activities, also when walking. She stopped, turned around, went back a couple of steps, turned around again, and took some steps forward. After a few steps she stopped again. She seemed confused in most settings and was not able to keep her attention focused for more than a few seconds. She would eat paper napkins beside the main dish for supper.*

Observable indicators of negative symptoms included social withdrawal, decreased number of patient initiatives, apathy/fatigue, lack of motivation (fewer initiatives than usual), blunted affect, and lack of spontaneity (Table 3).

## Discussion

Four of the five symptoms of criterion A of the SCZ diagnosis (APA 2013) were covered by behavioural equivalents of conventional symptoms in the eight articles included in this review. However, there were substantial differences in relation to the descriptions of the behavioural equivalents. Disorganized speech and disorganized behaviour, and negative symptoms were thoroughly described and discussed in the reviewed articles, delusions were not reported, and hallucinations were more vaguely described in patients with ASD.

SCZ is currently understood as a disorder usually characterized by episodes of acute psychotic symptoms including delusions, hallucinations, and disorganization, superseded by periods with low symptom load, or habitual functioning. Age of onset is usually in adolescence or early adulthood. SCZ differs from ASD both in that that SCZ is a phase disorder, and in the age of onset. As mentioned above, patients with ASD who are also intellectually disabled do not usually report on delusions and hallucinations during acute phases. Furthermore, during acute phases, most patients display severely high levels of stress and severely decreased adjustment skills, which seem to be a core feature in

the patient group in question (Bakken *et al.* 2010, Bakken *et al.* 2007).

Delusions and hallucinations may be reported by patients with ASD and additional low intellectual function when the most acute phase is over (Engebretsen *et al.* 2019, Kildahl *et al.* 2017). However, delusions may easily be confused with features of autism. When a patient with ASD reports phenomena not understood by other people, they may be idiosyncrasies (Bakken and Høidal 2014). People with ASD frequently use phrases only understandable to people who know them well, a phenomenon often referred to as idiosyncratic speech. For example a woman with ASD and mild ID had been fascinated by urine coming out of the body since she was a child (Bakken *et al.* 2009). From this fascination, she had evolved a system of ranking other people as good and trustworthy to insignificant. When she spoke about someone who had 'really big kidneys', it meant it was a good person. Big kidneys produce a lot of urine.

Behaviour may also be idiosyncratic, which emphasizes the need for profound knowledge of the patients' idiosyncratic ways of behaviour, in addition to the use of thoroughly defined behavioural indicators. If professionals do not know the patient well, it may be difficult to judge whether the patient is disorganised or not. An example is when 'Peter', who has ASD and severe ID, and lives in a community based residence, is heading for the coffee table, he has a grand routine of touching doors and the TV, bending his knees twice etc., before he approaches the coffee table. This behaviour is his 'normal' way of behaving, but may appear as severely confused, if this complex ritual is unknown to the observer (Bakken 2010).

One of the reported features of delusions was 'having a fantasy friend' (Hurley 2003). However, having fantasy friends is typical for children around school-starting age. As people with ASD, and especially those with moderate to severe ID, will both be cognitively and emotionally delayed, having fantasy friends may be adequately related to developmental stage, and hence must not be taken for a psychotic symptom. However, if the patients report being controlled by the fantasy friend, psychosis should be considered.

Hallucinations are most reliably assessed when reported by the patient. Observations of 'suspected hallucinations or hallucinatory behaviour' (Bakken *et al.* 2007, Hurley 2003) should only be considered as being psychotic symptoms when observed concurrently with other psychotic symptoms. For example 'talks to himself out loud' is frequently seen in people with autism, and is probably for the most part a way of processing experiences during the day.

Disorganized speech and disorganized behaviour are the two most thoroughly described symptoms in the selected articles. Research points to features of formal

thought disorder, manifested by disorganised speech, as being present both in individuals with SCZ and ASD (Bakken *et al.* 2009, Konstantareas and Hewitt 2001, O'Dwyer 2000, Rumsey *et al.*, 1986). Persons with ASD have cognitive and information-processing impairments, which will affect their thinking and language (Volkmar *et al.* 2004). Both people with autism and people with schizophrenia will show features of thought disorder, but differently. Adults with schizophrenia will tend to show more incoherent speech, also referred to as 'word salad', pressure of speech and severe derailment, during acute phases, whereas adults with autism will show more impoverished speech, poverty of content of speech, deviant responses and inappropriate thinking. Other differences regarding disorganized speech found in individuals with ASD compared to individuals with SCZ, are that the ASD group tend to show more perseveration, and paucity of expressive gestures (Rumsey *et al.* 1986). Additionally, clinical experience indicates that individuals with ASD usually have problems with taking turns and flexibility related to topics and taking the perspectives of the communication partner (Robinson *et al.* 2017). The latter is rarely seen in patients with SCZ when the acute phase is in remission. However, patients with ASD will show the same features of disorganised speech as other patients, when they are in acute psychotic phases (Bakken 2014).

Negative symptoms are also described relatively thoroughly as apathy and loss of motivation. However, as impaired executive function is observed both in ASD and SCZ, negative symptoms must not be assumed to be part of SCZ unless apathy and loss of motivation represent a marked change of the patient's habitual functioning. Fewer initiatives for interaction with carers or none, or social withdrawal may be observed in patients with both ASD and SCZ (Bakken *et al.* 2008, 2007).

The use of behavioural equivalents in case identification facilitates the task of differentiating between SCZ and other mental illnesses, and ASD 'only'. This is important for treatment. Accurate diagnoses of SCZ in ASD make it possible to provide correct medical and psychosocial interventions (Bakken 2014, Bakken *et al.* 2007). The importance of the possibility of using behavioural disorganisation in particular as a criterion is emphasized, since there is always a chance of misinterpretation, when using non-validated behavioural equivalents. Thus, it may be difficult to distinguish SCZ from other severe mental illnesses. For example, it is especially challenging to distinguish SCZ from affective psychoses, because patients with both disorders are often in an agitated state (Glenn *et al.* 2003, Sovner and Hurley, 1983). This highlights the need for defining unique behavioural equivalents to disorganisation. Furthermore, the findings in the reviewed articles

support behavioural disorganisation as a valid indicator by the successful treatment of the patients with SCZ, ASD, and ID in Bakken *et al.* (2007).

Third-party information is especially important in the diagnostic process when the patient has ASD and severely impaired verbal speech, and psychosis is suspected (Helverschou *et al.* 2020). The clinician will have to interview relatives and professional caregivers about the defined features of behavioural equivalents, keeping idiosyncratic indicators in mind (Bakken *et al.* 2009). Such an interview will be difficult to conduct without asking about defined behavioural equivalents to SCZ symptoms. This includes disorganization manifested as gross disorientation, sequencing problems, task derailment, aggravated social withdrawal, bizarre motor activity, and unexpected aggression. In the case of 'Claire' (see results), the detailed description of disorganization, when added to the information about global fall in functioning together with stress and physical aggression, seemed to provide sufficient information for both assessment and treatment. Claire's case files described the severe stress symptoms, but contained no references to a possible psychosis. Members of the staff did not focus on disorganized behaviour, and were not able to describe it, until the interviewer listed the defining indicators. This negligence of behavioural disorganization is common. As disorganized behaviour is not a commonly used indicator of SCZ, it is for the most part not highlighted or focused upon during the assessment procedure.

Regarding negative symptoms, there appears to be a huge area for overlap (O'Dwyer 2000). Low social activity, lack of motivation and affect flattening can be attributed to both ASD and SCZ (Konstantareas and Hewitt 2001, Rumsey *et al.* 1986).

## Conclusions

In patients with ASD who sparsely speak, behavioural indicators of SCZ are important in the diagnostic process because of impaired verbal language. Especially disorganized speech and behaviour and negative symptoms can be observed in patients who speak sparsely. It is not possible to observe delusions, but they may be reported by the patients when treated adequately for some time, usually months. Hallucinations cannot be observed directly, but 'hallucinatory behaviour' may be interpreted as hallucinations when observed concurrently with other SCZ symptoms. Additionally, age of onset, number of relapses, and markedly impaired global functioning compared to habitual functioning, may constitute a diagnosis of SCZ in ASD.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## References

- American Psychiatric Association (APA). 1994. *Diagnostic and statistical manual of mental disorders. Fifth Edition (DSM-4)*. Washington, DC: APA Publishing.
- American Psychiatric Association (APA). 2013. *Diagnostic and statistical manual of mental disorders. Fifth Edition (DSM 5)*. Washington, DC: APA Publishing.
- Bakken, T. L. 2010. *Schizophrenia in adults with intellectual disability and autism: Behavioural indicators and staff communication skills*. Doctoral dissertation, University of Oslo.
- Bakken, T. L. 2014. Psychosis and disorganized behaviour in adults with autism and intellectual disability: Case identification and staff-patient interaction. In: V. B. Patel, V. R. Preedy, and C. R. Martin, eds. *Comprehensive guide to autism*. New York: Springer Science, pp.585–600.
- Bakken, T. L., Eilertsen, D. E., Smeby, N. A. and Martinsen, H. (2008). Effective communication related to psychotic disorganised behaviour in adults with intellectual disability and autism. *Nordic Journal of Nursing Research and Clinical Studies*, 88, 9–13.
- Bakken, T. L., Eilertsen, D. E., Smeby, N. A. and Martinsen, H. 2009. The validity of disorganised behaviour as an indicator of psychosis in adults with autism and intellectual disability: A single case study. *Mental Health Aspects of Developmental Disabilities*, 12, 17–22.
- Bakken, T. L., Friis, S., Lovoll, S., Smeby, N. A. and Martinsen, H. 2007. Behavioral Disorganisation as an Indicator of Psychosis in Adults with Intellectual Disability and Autism. *Mental Health Aspects of Developmental Disabilities*, 10, 37–46.
- Bakken, T. L., Helverschou, S., Hoidal, S. H. and Martinsen, M. 2016. Mental illness in people with intellectual disabilities and autism spectrum disorders. In: C. Hemmings and N. Bouras eds. *Psychiatric and behavioural disorders in intellectual and developmental disabilities*. Cambridge University Press.
- Bakken, T. L., Helverschou, S. B., Eilertsen, D. E., Heggelund, T., Myrbakk, E. and Martinsen, H. 2010. Psychiatric disorders in adolescents and adults with autism and intellectual disability: a representative study in one county in Norway. *Research in Developmental Disabilities*, 31, 6, 1669–1677.
- Bakken, T. L. and Hoidal, S. H. 2014. Asperger Syndrome or schizophrenia, or both? Case identification of 12 adults in a specialized psychiatric inpatient unit. *International Journal of Developmental Disabilities*, 60, 215–225.
- Baudewijns, L., Ronsse, E., Verstraete, V., Sabbe, B., Morrens, M. and Bertelli, M. O. 2018. Behaviours and Major Depressive Disorder in adults with intellectual disability and autism. *Psychiatry Research*, 270, 769–774.
- Baxter, A. J., Brugha, T. S., Erskine, H. E., Scheurer, R. W., Vos, T. and Scott, J. G. 2015. The epidemiology and global burden of autism spectrum disorders. *Psychological Medicine*, 45, 601–613.
- Bertelli, M. O., Piva Merli, M., Bradley, E., Keller, R., Varruciu, N., Del Furia, C. and Panocchia, N. 2015. The diagnostic boundary between autism spectrum disorder, intellectual development and schizophrenia spectrum disorder. *Advances in Mental Health and Intellectual Disabilities*, 9, 243–264.
- Cherry, K. E., Penn, D., Matson, J. L. and Bamburg, J. W. 2000. Characteristics of schizophrenia among persons with severe or profound mental retardation. *Psychiatric Services*, 51, 922–924.
- Chisholm, K., Lin, A. and Armando, M. 2016. Schizophrenia spectrum disorders and autism spectrum disorders. In: I. L. Mazzone and B. Vitiello, eds. *Psychiatric symptoms and comorbidities in autism spectrum disorders*. Bethesda, MD: Springer, pp. 51–66.
- De Giorgio, R. D., De Crescenzo, F., D'Alo, G. L., Pesci, N. R., Di Franco, V., Sandini, C. and Armando, M. 2019. Prevalence of Non-Affective Psychoses in Individuals with Autism Spectrum Disorders: A systematic Review. *Journal of Clinical Medicine*.
- Engebretsen, M. H., Kildahl, A. N., Hoy, I. H. and Bakken, T. L. 2019. Metyrosine treatment in a woman with chromosome 22Q11.2 deletion syndrome and psychosis: A case study. *International Journal of Developmental Disabilities*, 65, 116–121.
- Fletcher, R. J., Barnhill, J. and Cooper, S.-A. 2016. *Diagnostic manual – Intellectual disability. A textbook of diagnosis of mental disorders in persons with intellectual disability. Second edition. DM-ID-2*. Kingston, NY: The NADD Press.
- Glenn, E., Bihm, E. M. and Lammers, W. 2003. Depression, anxiety, and relevant cognitions in persons with mental retardation. *Journal of Autism and Developmental Disorders*, 33, 69–76.
- Hausman, N. L., Rooker, G. W., Bednar, M. K. and Javed, N. 2020. Considerations in the assessment and treatment of aggression and disruption. In: J. Matson, ed. *Handbook of dual diagnosis. Autism and Child Psychopathology Series*. Cham: Springer.
- Helverschou, S. B., Kildahl, A. N. and Bakken, T. L. 2020. Checklists and structured interviews. In: J. L. Matson, ed. *Handbook of dual diagnosis, autism and child psychopathology series*. Switzerland: Springer Nature. pp. 167–193.
- Hurley, A. D. 2003. Delusions and hallucinations in Down syndrome: literature review and comparison with Non-Down-syndrome. *Mental Health Aspects of Developmental Disabilities*, 6, 135–146.
- Kildahl, A. N., Bakken, T. L., Holm, O. K. and Helverschou, S. 2017. Assessment of psychosis in ASD/ID: a case study. *Advances in Mental Health and Intellectual Disabilities*, 11, 17–23.
- Konstantareas, M. M. and Hewitt, T. 2001. Autistic disorder and schizophrenia: diagnostic overlaps. *Journal of Autism and Developmental Disorders*, 31, 19–28.
- Lai, M. C., Kasee, C., Besney, R., Bonato, R., Hull, L., Mandy, W., Szatmari, P. and Ameis, S. H. 2019. Prevalence of co-occurring mental health diagnoses in the autism population: A systematic review and meta-analysis. *The Lancet Psychiatry*, 6, 819–829.
- Lai, M. C., Lombardo, M. V. and Baron-Cohen, S. 2014. Autism. *The Lancet*, 383, 896–910.
- Lund, J. 1985. The prevalence of psychiatric morbidity in mentally retarded adults. *Acta Psychiatrica Scandinavica*, 72, 563–570.
- Lyall, K., Croen, L., Daniels, J., Fallin, M. D., Ladd-Acosta, C., Lee, B. K., Park, B. Y., Snyder, N. W., Schendel, D., Volk, H., Windham, G. C. and Newschaffer, C. 2017. The changing epidemiology of autism spectrum disorders. *Annual Review of Public Health*, 38, 81–102.
- Marin, J. L., Rodriguez-Franco, M.A., Chugani, V. M., Maganto, M. M., Villoria, E. D. and Bedia, R. C. 2018. Prevalence of schizophrenia spectrum disorders in average-IQ adults with autism spectrum disorders: a meta-analysis. *Journal of Autism and Developmental Disorders*, 48, 239–250.
- Nylander, L. 2014. Autism and schizophrenia in adults: clinical considerations on comorbidity and differential diagnosis. In: V. B. Patel, V. R. Preedy and C. R. Martin, eds. *Comprehensive guide to autism*. New York: Springer Science, pp.585–600.
- Nylander, L., Lugnegård, T. and Hallerbäck, M. U. 2008. Autism spectrum disorders and schizophrenia spectrum disorders in adults – Is there a connection? A literature review and some suggestions for future clinical research. *Clinical Neuropsychiatry*, 5, 43–54.
- O'Dwyer, J. M. 2000. Autistic disorder and schizophrenia: similarities and differences and their co-existence in two cases. *Mental Health Aspects of Developmental Disabilities*, 3, 121–131.
- Painter, J., Hastings, R., Ingham, B., Trevithick, L. and Roy, A. 2018. Associations between mental health problems and challenging behavior in adults with intellectual disabilities: a test of the behavioral equivalents hypothesis. *Journal of Mental Health Research in Intellectual Disabilities*, 11, 157–172.
- Robinson, S., Howlin, P. and Russell, A. 2017. Personality traits, autobiographical memory and knowledge of self and others: a comparative study in young people with autism spectrum disorder. *Autism*, 21, 357–367.
- Rumsey, J. M., Andreasen, N. C. and Rapoport, J. L. 1986. Thought, language, communication and affective flattening in autistic adults. *Archives of General Psychiatry*, 43, 771–777.
- Sovner, R. and Hurley, A. D. 1983. Do the mentally retarded suffer from affective illness? *Archives of General Psychiatry*, 140, s. 1539–1540.
- Smeland, O. B., Bahrami, S., Frei, O., Shadrin, A., O'Connell, K., Savage, J., Watanabe, K., Krull, F., Bettella, F., Steen, N. E., Ueland, T., Posthuma, D., Djurovic, S., Dale, A. M. and Andreassen, O. A. 2020. Genome-wide analysis reveals extensive genetic overlap between schizophrenia, bipolar disorders, and intelligence. *Molecular Psychiatry*, 25, 844–853.
- Tonnsen, B. L., Boan, A. D., Bradley, C. C., Charles, J., Cohen, A. and Carpenter, L. A. 2016. Prevalence of Autism Spectrum Disorders Among Children with Intellectual Disability. *American Journal on Intellectual and Developmental Disabilities*, 121, 487–500.
- Upthegrove, R., Abu-Akel, A., Chisholm, K., Lin, A., Zahid, S., Pelton, M., Apperly, I., Hansen, P. C. and Wood, S. J. 2018. Autism and psychosis: clinical implications for depression and suicide. *Schizophrenia Research*, 195, 80–85.
- Volkmar, F. R., Lord, C., Bailey, A., Schultz, R. T., and Klin, A. (2004). Autism and pervasive developmental disorders. *Journal of Child Psychology and Psychiatry*, 45, 135–170.