

Obsessive-compulsive phenomena and symptoms in Asperger's disorder and High-functioning Autism: An evaluative literature review

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Abstract

Although obsessional, ritualistic and stereotyped behaviors are a core feature of autistic disorders, substantial data related to those phenomena are lacking. Ritualistic and stereotyped behaviours can be found in almost all autistic patients. Additionally, cognitive able individuals with Asperger's disorder (AD) and High-Functioning Autism (HFA: defined by the presence of IQ- levels > 70, Howlin, 2004, p. 6) mostly develop circumscribed, often called obsessional interests and preoccupations. Results from recent research indicate that autistic individuals frequently suffer from obsessions and compulsions according to DSM-IV criteria of Obsessive-Compulsive Disorder (OCD), being associated with marked distress and interference with daily life. OCD and autism share several similarities regarding symptom profiles and comorbidity. Etiologic overlap between the disorders becomes especially evident when focussing cognitive, neurobiological and genetic aspects. Autism-related obsessive-compulsive phenomena (AOCP) have generally to be differentiated from OCD-symptoms, although there is no sharp borderline.

Keywords: Autistic disorders, Obsessive-compulsive phenomena, Asperger's disorder, High Functioning Autism

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1. Introduction

Obsessional, ritualistic, stereotyped and repetitive behaviours are the third core feature of autistic disorders, co-occurring with communicational difficulties and problems in social interaction (DSM-IV: APA, 2000). Autism-related obsessive-compulsive phenomena (AOCP) are part of the clinical picture in all disorders of the autistic spectrum, including early childhood autism (Kanner, 1943; Probst & Hillig, 2005), high-functioning Autism (Howlin, 2004) and Asperger's disorder (Asperger, 1944; 1944/1991). AOCP include all kinds of obsessional, compulsive, ritualistic, stereotyped and repetitive behaviours.

According to the formal diagnostic criteria, social problems and the obsessive compulsive phenomena of Asperger's disorder (AD) do not differ from those found in Early Childhood Autism (ECA) and High-Functioning-Autism (HFA). The occurrence of social deficits and obsessive compulsive phenomena in AD shows that typical autistic features also occur in individuals generally displaying higher cognitive abilities and better language skills than autistic individuals (Baron-Cohen, 2004; Wing, 2005). Recent research results (Howlin, 2004) don't provide a basis for a separate classification of AD and HFA which also applies to obsessive compulsive phenomena (Cuccaro, Nations, Brinkley, Abramson, Wright, Hall *et al.*, 2007). According to these findings only the development of better cognitive skills and the degree of linguistic-communicative impairment can serve as a relevant marker for differentiating AD/HFA from ECA (Baron-Cohen, 2004).

Obsessions and compulsions in Obsessive-Compulsive Disorders (OCD) and Autism-related obsessive-compulsive phenomena (AOCP) are often regarded as an overlapping class of behaviors, sharing a similar genetic, biobehavioral and neurobiological basis. Case-reports of OCD-symptoms in adolescents often contain descriptions of ritualized behaviours also being common in autism (Winter & Schreibman, 2002). On the other hand AOCP often have different functions for the individual (Kennedy, Meyer, Knowles, & Shukla, 2000) than the obsessions and compulsions of typical OCD (Hand, 1992).

Although cognitive deficits and language problems generally make it difficult to specify if autistic individuals display typical obsessions and compulsions (Baron-Cohen, 1989), recent studies show that many of them, including those with AD and HFA, have typical obsessions and compulsions associated with marked distress (McDougle, Kresch, Goodman, Naylor, Volkmar, Cohen, & Price, 1995; Russell, Mataix-Cols, Anson, & Murphy, 2005; Zandt, Prior, & Kyrios, 2006; Levallois, Béraud, & Jalenques, 2007). Furthermore there is some evidence for the existence of a distinct OCD subcategory being typical for autistic disorders (McDougle *et al.*, 1995). Interestingly, recent research results show that there is a subgroup of OCD patients with autistic features (Bejerot, 2007; Ivarsson & Melin, 2008) which

may present with autism-related social and communication-related difficulties (Cullen, Samuels, Grados, Landa, Bienvenu, Liang *et al.*, 2008). Bjerot and Mörtberg (2009) showed an increasing risk of being bullied at school for children and adolescents with OCD associated with autistic features like low social competence.

Symptoms of obsessive-compulsive disorders are time-consuming obsessions and compulsions which cause marked distress and significant interference with daily life. Obsessions are recurrent thoughts, impulses or images intruding repetitively into consciousness, often related to the fear of a threatening event for which the patient feels responsible (APA, 2000). Common obsessions are associated with fear of contamination, death or illness, other thoughts or impulses have an aggressive, sexual or blasphemous content. Compulsions are irresistible rituals the individual has to carry out over and over to reduce the anxiety or discomfort generated by the obsessions.

Frequent compulsions are ritualized washing, checking (e.g. stoves or light switches), repeating (repeating words or sentences, rereading or rewriting sentences), ordering, counting, questioning and hoarding (Rasmussen & Eisen, 1992). A diagnosis of autism with comorbid OCD requires specific cognitive-behavioural (Lehmkuhl, Storch, Bodfish, & Geffken, 2008) and pharmacological interventions (Levallois, Beraud, & Jalenques, 2007) effectively targeting obsessions and compulsions, the core symptoms of OCD. These special OCD interventions should be an integral part of a treatment plan including interventions for the autistic disorder and comorbid conditions.

2. Method

To review the research literature about AOCP and OCD-symptoms in autism, the online data bases "Medline", "Psyndex" and "PsycInfo" were screened for articles from 1977 to 2009. Relevant information was also found in relevant psychiatric, psychological and educational handbooks and single publications about Autism, Asperger's disorder and Obsessive-compulsive disorders. When screening the online data bases, the search terms "autism" and "Asperger" were combined either with "OCD", "compulsions", "obsessions", "obsessive compulsive", "rituals", "stereotypies" and "repetitive". In the online research the relevant articles containing descriptions, analyses and classification of obsessive-compulsive symptoms in autistic disorders were found. The selected literature consists of reviews and studies about phenomenological, genetic and etiologic overlap areas of OCD and autism, analyses of stereotyped behaviour and therapy studies and three studies especially focusing on obsessions and compulsions in autistic disorders.

3 Autism and Obsessive-compulsive Disorder: phenomenological and etiological overlap

3.1 Symptoms

Less excessive variants of repetitive behaviours in OCD and autism can also be found in typically developing children (Militerni, Bravaccio, Falco, Fico, & Palermo, 2002; Greaves, Prince, Evans, & Charman, 2006). Ritualized behaviours like bedtime rituals, insistence on sameness or ritualized play mostly peak at the age between 2 and 4 and decrease with growing age (Evans, Leckman, Carter, Reznick, Henshaw, King, & Pauls, 1997). Motor stereotypies like nail biting or rocking often occur in periods of concentration, excitement or boredom (Tröster, 1994). In typical development ritualized behaviors tend to change over time which is the case in OCD and autism as well (Winter & Schreibman, 2002). Rapoport (1989) asks if the ritualized play of a four-year-old with e.g. a string could be his individual variant of a washing or checking compulsion (Winter & Schreibman, 2002). People with OCD and autistic individuals display compulsive behaviour, obsessive insistence on sameness, repetitive movements, a strong need for symmetry and certain principles of ordering (Winter & Schreibman, 2002; Zandt *et al.*, 2006). Ego-dystonic OCD-symptoms have generally to be separated from autism-related enjoyable “obsessional” interests (Russell *et al.* 2005; South, Ozonoff, & McMahon, 2005), although the distinction remains unclear (Cath, Ran, Smit, van Balkom, & Comijs, 2008).

3.2 Patterns of Comorbidity

OCD and autistic disorders share a similar pattern of comorbid conditions like anxiety disorders, affective disorders, tic disorders (Rasmussen & Eisen, 1992; Howlin, 2004) or personality disorders (Bejerot, Nylander, & Lindström, 2001). Anxiety in autism (Gillott, Furniss, & Walter, 2001) is often triggered by typical autism-related problems like sensory overload or the interruption of rituals (Samet, 2006). Sensory overload can be viewed as a typical autism-related trigger for anxiety, whereas the function of rituals to reduce anxiety is similar but not identical in OCD (DSM-IV: APA, 2000). Concomitant specific phobias (Rasmussen & Eisen, 1992; Leyfert *et al.*, 2006) social phobia (Cath *et al.*, 2008) and separation anxiety (Bhardwaj, Agarwal & Sitholey, 2005; Nestadt *et al.*, 2003) are common in OCD and ASD. In contrast to earlier findings, comorbidity with schizophrenia and other psychotic conditions is rare in Autism (Howlin, 2004) and OCD (Frommhold, 2006). Interestingly, however, there is overlap between both AD/HFA and OCD with schizotypal symptoms and personality features (Bejerot, 2007). The personality style of many AD/HFA individuals has much in common with schizotypal personality features (reviewed by Andresen & Maß, 2001), especially regarding bizarre fantasies and interests, eccentric behaviour, metaphoric and stereotypical use of language, social and

communicational deficits (Esterberg, Trotman, Brasfield, Compton, & Walker, 2008). Also certain subcategories of OCD are more strongly related to schizotypal symptoms than to other anxiety disorders (Sobin, Blundell, Weiller, Gavigan, Haiman, & Karayiorgou, 2000). Like in tic-related OCD, a broad spectrum of clinical manifestations of comorbid tic disorders can also be found in autism (Ringman & Jankovic, 2000). Another condition frequently co-occurring with both OCD (Masi, Millepiedi, Mucci, Bertini, Pfanner, & Arcangeli, 2006) and autism (Leyfert, Folstein, Bacalman, Davis, Dinh, Morgan *et al.*, 2006) is Attention deficit Hyperactivity Disorder (ADHD), especially being prevalent in children and adolescents. Eating disorders like anorexia nervosa are a frequent comorbid condition of OCD (Kaye, Bulik, Thornton, Barbarich, & Masters, 2004) also being associated with autistic disorders, especially with AD/HFA (Jørgensen, 1994; Fisman, Steele, Short, Byrne, & Lavallee, 1996).

3.3 *Etiological overlap*

OCD and autism both have a neurobiological basis (Winter & Schreibman, 2002). Neuroimaging studies show volumetric and structural abnormalities in the cerebellum, the frontal lobe, the hippocampus, the amygdala and the corpus callosum of autistic individuals (Herbert, Ziegler, Deutsch, O'Brien, Lange, Bakardjiev *et al.*, 2003; Baron-Cohen, 2004; Boucher, Cowell, Howard, Broks, Farrant, Roberts, & Mayes, 2005; Boger-Meggido, Shaw, Friedman, Sparks, Artru, Giedd *et al.*, 2006). Reports of a sudden onset of OCD symptoms following brain injury and infections show that OCD has a neurological basis (Steketee & Pigott, 2006, p. 53). Especially the effectiveness of serotonergic antidepressants and cognitive-behavioural treatment being visible in PET (Schwartz, Martin, & Baxter, 1992), SPECT and MRI scans strongly contributed to the conception of neurobiological disease models (Steketee & Pigott, 2006).

Neurobiological findings in OCD and autism show similarities which might be relevant regarding obsessive compulsive phenomena (Winter & Schreibman, 2002). Patterns of familiar interaction, educational styles or other external stressors can contribute to exacerbations, improvements or changes in both AOCP (Howlin, 2004) and OCD-symptoms (Probst, Asam, & Otto, 1979). A solid social background and the involvement in productive activities diminishes the dependence on stereotyped and ritualized behaviors in OCD (Schwartz & Beyette, 1997) and autistic disorders as well (Howlin, 2004, p. 137).

3.3.1 *Cognitive aspects*

Similar deficits in information processing might underlie OCD and autism (Winter & Schreibman, 2002). According to several authors local information processing is preferred to global processing in autism and OCD. Additionally, impairment in the executive functions has been noted in

OCD and different disorders of the autistic spectrum (Frith, 1989, 1992; Russell *et al.*, 2005). The preference of local information processing causes the individual to focus attention on single elements of the environment which can lead to stereotypy, rituals and narrow interests (Frith, 1989, 1992). In OCD individuals are often internally forced to gain control over a small part of their environment with the attention focussed on dysfunctional thoughts and urges (Schwartz *et al.*, 1992). An internal signal automatically terminating repetitive behaviour from a central processing unit seems to be lacking in OCD (Hoffmann & Hofmann, 2004) and ASD (Frith, 1989, 1992). Delorme, Gousse, Roy, Trandafir, Mathieu, Mouren-Simeoni *et al.* (2006) discuss a possible common endophenotype related to executive dysfunctions commonly associated with OCD and autism which may even be related to repetitive behavior (Zandt, Prior, & Kyrios, 2009). According to the cognitive-behavioural model of OCD (Salkovskis, Forrester, & Richards, 1997) primary neutral thoughts get filled with feelings of anxiety, disgust and/or guilt which increases their intrusiveness. Compulsions are carried out to reduce these emotions for a short period of time which reinforces the intrusiveness of the thought. As Russell *et al.* (2005) state, cognitive styles being typical for autistic individuals can also contribute to a specific way of giving value to those thoughts.

Deficits in autonomous habituation processes, possibly being associated with amygdala dysfunction (Amaral & Corbett, 2002; Steketee & Pigott, 2006), could serve as an explanation for the obsessive resistance against change in autism and OCD. In autistic persons minimal environmental changes can trigger strong anxiety and panic attacks (Samet, 2006), whereas OCD-patients often panic when their rituals are not carried out “appropriately” (Rasmussen & Eisen, 1992). The persistent engagement in rigid obsessive-compulsive behaviours might serve as a protection against new stimuli being experienced as threatening.

3.3.2 Neuroanatomical and neurobiochemical overlap

Several authors state that dysfunctions in cortico-striatal-thalamic pathways are involved in the pathogenesis of autism (Damasio & Maurer, 1978) and are a crucial element of the neuronal circuitry underlying OCD (Schwartz *et al.*, 1992). Abnormalities in specific areas of the fronto-striatal system cause changes of adaptive responses to environmental stimuli, especially basal ganglia dysfunctions lead to repetitive and rigid behaviours (Bradshaw & Sheppard, 2000). MRI-scans of the basal ganglia in autism and OCD patients show enlarged volumina of the nucleus caudatus being associated with compulsive rituals and motor mannerisms (Sears, Vest, Mohamed, Bailey, Ramson, & Piven, 1999; Hollander, Anagnostou, Chaplin, Esposito, Haznedar, Licalzi, Wassermann *et al.*, 2005). A lack of basal-ganglia-modulated cortical inhibition can lead to hyperactivity in the orbito-frontal cortex. As the orbito-frontal cortex is overactive, flexible behav-

itorial responses to thoughts and urges are impaired (Schwartz *et al.*, 1992; Schwartz & Beyette, 1997). As the amygdala plays a crucial role in the modulation of anxiety and fear (Wand, 2005), metabolic changes in the amygdalae of autistic individuals can lead to phobias and anxiety (Amaral & Corbett, 2002). Also in OCD the amygdala has been found to be overactive (Steketee & Pigott, 2006, p. 55). Reduced amygdala volumes have already been associated with rigid and compulsive behaviours and narrow interests (Dziobek, Fleck, Rogers, Wolf, & Convit, 2006).

Imbalances of several neurotransmitters like serotonin and dopamine are more or less involved in the pathogenesis of autism and OCD (Gross-Isseroff, Hermesh, & Weizman, 2001; Steketee & Pigott, 2006, p. 59).

Serotonergic dysfunction is a crucial element in the etiology of OCD (Baumgarten & Grozdanovic, 1998) and has also been reported in the literature about autism (Winter & Schreiber, 2002). Serotonin re-uptake inhibitors (SSRI) have not only been shown to be effective in OCD (Greist, Jefferson, & Kobak, 1995), in some cases they can also improve AOCF (Levallois *et al.*, 2007) and other autism-related symptoms like social deficits and aggression (Howlin, 2004, p. 290). Additionally, family studies have shown mutations of the serotonin transporter gene in both disorders (Ozaki *et al.*, 2003; Wendland, DeGuzman, McMahon, Rudnick, Detera-Wadleigh, & Murphy, 2008). The property of the dopamine-agonists L-Dopa and amphetamines of inducing stereotyped behaviour (Ricciardi & Hurley, 1990) implies the involvement of dopaminergic pathways in stereotypical behaviour. Also the efficacy of dopamine-antagonist antipsychotics in reducing tic-like compulsions and some classes of stereotypical behaviour, can serve as evidence for the involvement of the dopaminergic system into autism (Howlin, 2004; Levallois *et al.*, 2007) and tic-related OCD (McDougle, 1992), also the role of nicotinic acetylcholine-receptors both in OCD (Pasquini, Garavini, & Biondi, 2005) and autism (Lipiello, 2006) is being investigated.

3.3.3 Genetic similarities

The occurrence of OCD in families can predict a genetic vulnerability for autism. In comparison with normal controls motor tics, OCD symptoms, anxiety disorders and depression run significantly more often in families of autistic patients, while there is evidence for the transmission of a broad phenotype (Bolton, Pickles, Murphy, & Rutter, 1998; Wendland *et al.*, 2008). OCD symptoms in parents are often positively correlated with strong repetitive behaviours in autistic children (Hollander, King, Delaney, Smith, & Silverman, 2003), e.g. the obsessive insistence in sameness (Abramson, Ravan, Wright, Wieduwilt, Wolpert, Donnelly *et al.*, 2005). Furthermore, OCD-patients display autism-like communicative impairment more often than individuals with depressive disorders (Bolton *et al.*, 1998) and tend to have autism-related personality features in several cases (Bejerot *et al.*,

2001). Research results from molecular genetics indicate genetic links between OCD and autism as well (Hollander *et al.*, 1999; Ozaki *et al.*, 2003; Fontenelle, Mendlovicz, Bezerra de Menezes, dos Santos Martins, & Verisano, 2004).

4. Obsessive-compulsive phenomena in autism

4.1 Classification

According to DSM-IV-criteria (APA, 2000) Autism-related obsessive-compulsive phenomena (AOCP) comprise (a) the excessive involvement into one or more circumscribed special interests (b) the engagement in dysfunctional, compulsive rituals triggering anxiety of change when being interrupted (c) stereotyped and repetitive motor mannerisms (d) anxious insistence in sameness.

OCD is characterized by the following features: (a) The occurrence of repetitive and intrusive obsessions and compulsions causing anxiety and/or discomfort. (b) The thoughts and behaviours are generally recognized as inappropriate (in the category *OCD with poor insight* symptoms haven't necessarily to be experienced as ego-dystonic) (c) Individuals make an effort to resist the obsessions and compulsions. (d) The obsessions and compulsions must cause substantial functional impairment. Rituals are carried out to reduce anxiety and/or discomfort or to prevent a potentially threatening event (APA, 2000).

Between AOCP and OCD-Symptoms there are similarities and differences as well (Hashimoto, 2007). Turner (1997) classifies *obsessions* and *compulsions* as belonging to AOCP. Although the involvement in special interests often has an *obsessional* character, AOCP-related preoccupations are not the same as the obsessions of OCD. Baron-Cohen and Wheelwright (1999) regard those *obsessions* as an ego-syntonic subtype of OCD (also see Fontenelle *et al.*, 2004). AOCP are generally ego-syntonic as they are not experienced as inappropriate (Baron-Cohen & Wheelwright, 1999). *Obsessional* interests normally do not trigger anxiety or guilt, as they are often accompanied by feelings of euphoria (Jørgensen, 1994, p. 55).

Other rituals in autism, however, can resemble the compulsions of OCD, as they are carried out to reduce anxiety or to prevent threatening events. According to Joliffe *et al.* (1992) rituals in autism serve as a structuring element in a world experienced as chaotic. Routine, the recognition of regular patterns, temporal structuring and rituals can help to reduce anxiety and feelings of confusion triggered by sensory overload (see Howlin, 2004, p. 137).

The idiosyncratic stereotypies of autism, reaching from simple reflex-like actions to complex movement patterns sometimes resemble tic-related OCD symptoms (Rasmussen & Eisen, 1992). Stereotypies are often triggered by certain stimuli (Gritti, Bove, Di Sarno, D'Addio, Chiapparo, &

Bove, 2003) and may indicate distress or hidden anxieties (Howlin, 2004, p. 144). AOCP are not necessarily associated with functional impairment, although this is often the case.

4.2 Autism-related obsessive-compulsive phenomena (AOCP)

According to Lam, Bodfish and Piven (2008) there is considerable structure within repetitive behaviors in autism being differentially related to subject characteristics and familiarity. Using exploratory factor analysis the authors identified three distinct factors related to AOCP: (a) repetitive motor behaviors (b) insistence on sameness and (c) circumscribed interests .

“Repetitive motor behaviors” were found to be associated with a variety of subject characteristics such as IQ or age. Like “insistence of sameness” they are associated with social and communication impairments, whereas circumscribed interests appeared to be independent of subject characteristics. Based on sib-pair correlations, insistence on sameness and circumscribed interests and circumscribed interests appear to be familial. According to Lam *et al.* (2008) the presence of multiple forms of AOCP in an individual is associated with more impairment in the social and communication domains, suggesting a more severe autistic disorder.

4.2.1 Circumscribed Interests

Circumscribed interests often appearing obsessional and bizarre, are common in AD/HFA. The preoccupation often becomes so dominant in the individuals' lives that other interests and duties are neglected (Jørgensen, 1994; Howlin, 2004). Special interests can be linked with special abilities and differ from the other categories of AOCP (South *et al.*, 2005; Lam *et al.*, 2008). Individuals being fascinated by the subject of their interest, commonly acquire great knowledge in a special, circumscribed field mostly having to do with technical aspects of objects and things (Baron-Cohen & Wheelwright, 1999). One individual collects exact information about the organization of seat systems in trains, another memorizes exactly timetables of arriving and departing planes and a third one may know in detail all types of vacuum cleaners. The interests are often dysfunctional, senseless and without any connection to a certain purpose, while in other cases autistic people can use their knowledge and talents in a job (see Asperger, 1944/1991; Jørgensen, 1994; Howlin, 2004).

4.2.2 Stereotypies

Stereotyped movements (Bodfish, Symons, Parker, & Lewis, 2000) occur more frequently in autistic individuals than in those with other developmental disorders. Stereotypies like gazing at objects and fingers rocking, finger twitching or self-injuring behaviours are frequently triggered by minimal changes in environment (Goldman, Wang, Salgado, Greene, Kim, & Rapin, 2009), daily routine, feelings of emptiness, boredom or inadequate

stimulation (Kennedy *et al.*, 2000). Stereotyped behaviour can have multiple functions (Cunningham & Schreibman, 2008), often being associated with “narrowing or widening the autistic barrier” (Gritti *et al.*, 2003). The behaviours and movements which tend to exacerbate under conditions of stress, can have sensory or social function (Cunningham & Schreibman, 2008), sometimes they can be anxiety-or tension-reducing (Howlin, 2004, pp. 144) or reveal inner conflicts (Tinbergen & Tinbergen, 1984, p. 86). In other cases stereotyped movements serve to avoid managing tasks or to arouse the attention of others. Self-injurious behaviour can have multiple functions, e.g. the one of self-stimulation in individuals who only “feel themselves” when experiencing physical pain (Kennedy *et al.*, 2000, p. 560).

4.3 Transition from AOCP to obsessions and compulsions

AOCP tend to become more complex with growing age, especially when there is a high intellectual potential. In the research literature there are descriptions of cases showing mixtures and transitions between AOCP and typical OCD-symptoms. The permanent verbalization of special interests often includes excessive ruminating about the special topic, where euphoria can change into anxiety (Howlin, 2004; Fontenelle *et al.*, 2004).

The excessive collecting and hoarding of objects like stones, CDs or books is a characteristic activity of autistic individuals. Collections are often arranged in elaborate catalogues containing precise numbering and data systems (Howlin, 2004, p. 141). The collecting passion of autistic individuals can convert into OCD-specific hoarding compulsions, when collecting and hoarding is associated with distress for the individual and/or the family members. Apartments of hoarders are often overloaded with useless objects towards which the individual is emotionally attached to in an unusual intensity. Patients with compulsive hoarding are extremely anxious to throw things away and feel excessive responsibility for keeping them (Schwartz & Beyette, 1997, p. 29). Fascination and anxiety can also be entangled in regard to obsessional interests. Objects being primarily fascinating can turn into objects eliciting phobic anxiety and obsessive fears (examples see Howlin, 2004, pp. 145).

Box No. 1: Primarily fascinating objects trigger obsessions and phobic anxiety

An intelligent autistic boy, who had been fascinated with all aspects of electricity for many years, had been experimenting with electrical equipment for many hours daily. Years later he developed intense and excessive fears and obsessions related to electricity, triggered by his parents' warnings concerning his dangerous preoccupation. He then refused to touch any electrical appliance without excessively and repeatedly having checked their safety before. With the exacerbation of his obsessional fears he finally wasn't able to use kitchen and bathroom because he feared causing an accident bringing electricity into touch with water.

This boy, whose autism- related special interest converted into an OCD-symptom, developed an electricity obsession associated with compulsive checking and typical avoidance behaviour which would require the diagnosis of autism with concomitant OCD.

The keeping of fixed times, rituals and ordering principles is an essential part of life in autistic individuals. Problems are likely to occur when life conditions change and important activities get neglected in favour of ritualized behaviours (see Howlin, 2004; Box No.2).

Box No. 2: Problems caused by the change of habits

An autistic boy living in Australia had been fascinated by meteorology. Every day he had been checking the congruence of the weather forecast with the observable weather which was always "guaranteed" in his home country. After having moved to England with his family, he became increasingly disturbed about the fact that in Great Britain the real weather frequently differed from the weather predicted in the forecast.

A young woman diagnosed with an autistic disorder insisted compulsively in keeping a certain order in her room in her parents' house. Although living in an institution, no family member was ever allowed to move any item in the room because she had strongly forbidden any kind of minimal change there.

Like in many cases of OCD, a need for absolute completeness, sameness and symmetry gets evident in both examples of Box No. 2 (Rasmussen & Eisen, 1992). The boy's behaviour, a typical autism-related special interest accompanied by a strong ritualization, also displays features of a checking compulsion. The interruption or the incompleteness of rituals causes significant distress in autistic individuals and is also characteristic for OCD. The intense fear of change underlying these rituals is a typically autistic feature also applying to several OCD- symptoms. The woman's behaviour has typical elements of an ordering compulsion accompanying the autism- related insistence on sameness. In both cases OCD symptoms and autistic features go hand in hand (Bejerot *et al.*, 2001; Bejerot, 2007).

4.4 Obsessions and compulsions in autistic disorders

4.4.1 Examples

In the autism literature there are descriptions of several obsessive thoughts and compulsive behaviours meeting the DSM- IV- criteria for OCD-related obsessions and compulsions (see Howlin, 2004; Box No.3).

Box No. 3: Obsessions and compulsions

A very gifted young woman had autistic symptoms being hardly recognizable for other people. The clinical picture was dominated by compulsive rituals she had to carry out in her room during night-time because her parents had set limits to their daily performance in other rooms. She always had to pull the curtains from left to right and vice versa as often as they were *exactly in the right position*. She was also compelled to remove even the smallest dust particles on the floor.

A boy with an autistic disorder developed the typical aggressive obsession to leave a shop without having paid. He feared to have stolen something without having recognized it. Even for the smallest expenses he insisted in receiving the bill to be absolutely sure that he had paid. He systematically collected all the bills because he feared being arrested as a thief. When he once could not find one of his collected bills, he became very anxious and agitated.

The woman in the first example displays obsessions and compulsions related to symmetry and cleanliness. She had to engage in ritualized adjusting the curtains and cleaning the floor till she experienced a typical OCD-related *just right*-feeling of perfect symmetry, completeness and cleanliness (see Rasmussen & Eisen, 1992). The boy described in the second example suffered from a typical aggressive obsession associated with the fear of becoming guilty. The obsession is neutralized by compulsive reassuring and checking behaviours. The symptom again displays a kind of dissociation experience because like many compulsive checkers the boy could not trust his own perception and memory. These “black outs”, *the dark spot* in the experience of OCD-patients, lead to feelings of permanent insecurity, incompleteness and doubt (Hoffmann & Hofmann, 2004). The type of symptoms described in Box. No. 4 might also occur in cases of OCD not related to autistic disorders.

Green *et al.* (2000) described a boy with AS who developed an obsessive fear of vomiting. He ruminated about how to avoid people who might vomit in front of him because of having certain diseases. Although he didn't regard his fear as completely unreasonable, he felt the wish to overcome his obsession because of the substantial impairment it caused (Fontenelle *et al.*, 2004; Cath *et al.*, 2008). In this case the classification as a comorbid OCD-symptom belonging to the category *OCD with poor insight* (DSM-IV: APA, 2000) seems to be appropriate.

4.4.2 Clinical trials

(a) McDougle *et al.* (1995) studied repetitive thoughts and behaviours in adults with a primary diagnosis of autistic disorder and compared them with the obsessions and compulsions of OCD, measured with the Yale-Brown Obsessive-Compulsive Scale (YBOCS).

Individuals with OCD had more washing, checking and counting compulsions, whereas autistic probands displayed a greater frequency of com-

pulsive questioning, telling, hoarding, ordering and touching as well as self-injurious behaviours. The autistic patients had significantly less aggressive, religious, sexual and somatic obsessions than the OCD-patients. A subgroup of seven YBOCS symptom variables could be identified which reliably predicted belonging to the autism group. The authors concluded that repetitive thoughts, behaviours and activities in autism significantly differ from the obsessions and compulsions displayed in the OCD-group (McDougle *et al.*, 1995).

(b) Zandt *et al.* (2006) compared repetitive behaviours of children with HFA and those displayed by children with OCD. Both groups reported more obsessions and compulsions than a typically developing comparison group, whereas children with OCD reported more obsessions and compulsions than children with HFA. Levels of *sameness behaviour* and repetitive movements in the clinical groups were similar, whereas children with OCD engaged in more repetitive behaviour focussed on routines and rituals. According to the authors, types of obsessions and compulsions tended to be less sophisticated in children with HFA than in those with OCD (Zandt *et al.*, 2006).

(c) Russell *et al.* (2005) compared obsessive-compulsive thoughts and behaviors in AS and HFA-patients (n= 40) with obsessions and compulsions experienced by OCD-Patients (n= 45); 10 (25%) participants were diagnosed with AS/HFA plus comorbid OCD (AS/HFA+OCD). AS/HFA-participants with an average IQ frequently displayed intrusive, time-consuming obsessions and compulsions causing significant distress. Only somatic obsessions, repeating compulsions and checking compulsions occurred significantly more often in the OCD-group. Comparing the OCD+AS/HFA-group with the OCD-group it became evident that somatic obsessions occurred significantly more commonly in the OCD-group, whereas more AS/HFA+OCD-patients suffered from sexual obsessions (Russell *et al.*, 2005).

As 50 % of the participants in the study of McDougle *et al.* (1995) (a) had IQ levels below average, many of them may not have been able to communicate about all their OCD-symptoms, especially they couldn't report obsessions (Russell *et al.*, 2005). The results of Zandt *et al.* (2006) (b) and Russell *et al.* (2005) (c) reveal that individuals with AS/HFA often have obsessions and compulsions according to DSM-IV-criteria.

4.5 Treatment

4.5.1 Obsessive-compulsive disorder

The most effective treatment of OCD is cognitive behavioural therapy (Rosa-Alcàzar, Sanchez-Meca, Gómez-Conesa, & Marin-Martinez, 2008), often in combination with antidepressants selectively blocking Serotonin re-uptake (SSRI; Choi, 2009). The therapeutic rationale of CBT is domi-

nated by the techniques of exposure and response prevention (ERP) combined with cognitive interventions (Hand, 1992; Salkovskis *et al.*, 1997). After identifying an obsession or a compulsive urge as a symptom of OCD on the cognitive level, a patient with a washing compulsion e.g. decides voluntarily to touch "contaminated objects" (exposure) and then refrains from washing his hands for e.g. 30 minutes or longer (response prevention). He can now realize that anxiety and discomfort gradually decrease with each exposure, although he does not engage in compulsive washing. By reducing anxiety and the intensity of compulsive urges, SSRIs help the individual to resist obsessions compulsions and to shift attention to more adaptive behaviours. CBT helps gradually to disengage OCD-related neuronal circuits and to activate neuronal pathways associated with adaptive behaviours (Schwartz *et al.*, 1992; Schwartz & Beyette, 1997). As family members are often strongly involved into OCD (Probst *et al.*, 1979; Livingston- van Noppen, Rasmussen, Eisen, & McCartney, 1990), in many cases additional family treatment is required (Steketee & Pigott, 2006, pp. 46), especially in children and adolescents.

4.5.2 Treatment approaches to Autism-related obsessive compulsive phenomena

Different behavioural and pharmacological interventions being effective for OCD have been shown to be helpful in reducing AOCP and OCD-symptoms in autistic individuals. On the medication level SSRIs are sometimes efficient (Kolevzon, Mathewson, & Hollander, 2006)., also the co-administration or monotherapy with atypical antipsychotics has been shown to be helpful, especially in cases of strong tic- like stereotypies (Malone & Waheed, 2009). CBT interventions include the OCD standard technique of gradual exposure and response prevention (Lindley, Marks, Philipott, & Snowden 1977), which can be individually adapted to autistic individuals, like as shown by the successful intervention for an 12-year old AD patient with comorbid OCD (Lehmkuhl *et al.*, 2008). Methods which also may be effective are habit reversal, behavioural refocusing and individual variants of thought stopping (Howlin, 2004, p. 147). Nilsson and Ekselius (2009) even have shown the effectiveness of repeated electroconvulsive therapy for an 38-year-old AD patient with refractory OCD-symptoms.

5. Conclusion

Individuals with autistic disorders frequently display obsessions and compulsions co-occurring with Autism- related obsessive- compulsive phenomena (AOCP). In comparison with OCD-symptoms, AOCP are primarily ego- syntonic, serve with different functions for the individuals and don't elicit anxiety and discomfort. However, obsessive-compulsive phenomena

in OCD and autism cannot be dichotomized in terms of ego-syntony and ego-dystony (Fontenelle *et al.*, 2004; Ivarsson & Melin, 2008). The lack of insight or *poor insight* (DSM-IV; APA, 2000) into the senselessness of obsessive-compulsive phenomena is not a specific feature of AOCP. It is also seen in obsessive compulsive personality disorder (Rasmussen & Eisen, 1992) and OCD-symptoms related to schizotypal disorders belonging to the borderline between obsessions and delusions (Sobin *et al.*, 2000; Bejerot, 2007). Although primarily being ego-syntonic, AOCP-related special interests can have a deep impact on family life, e.g. when family members are tyrannized being forced to excessively participate in ritualized special interests. Autism with comorbid OCD-symptoms or a “mixture” of special-interests and OCD-symptoms, moving on a continuum between fascination and anxiety, can cause significant distress in patients and family members.

AS/HFA-individuals having higher cognitive and linguistic abilities are able to verbalize typical obsessions, associated emotions, magical beliefs and the degree of insight. Further studies must reveal which obsessional and compulsive thoughts and behaviors in autistic disorders have to be regarded symptoms of comorbid OCD. Clinicians must take into account that typical OCD-symptoms may not be an integral part of the autistic disorder. An exact differential diagnostic assessment is essential, as autistic patients with comorbid OCD may benefit from standard OCD-treatments (Russell *et al.*, 2005) or individual treatment designs for autism-related OCD. Controlled trials have to reveal which patients may respond to individual variants of CBT and/or pharmacological treatment. On the level of differential diagnosis it has to be specified which symptom profiles might serve as predictors for a patient's response to certain treatment strategies.

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