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### Autism traits: The importance of "co-morbid" problems for impairment and contact with services. Data from the Bergen Child Study

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#### ABSTRACT

*Background:* Co-occurring problems are common in individuals with clinical autism spectrum disorder (ASD) but their relevance for impairment and contact with health services in ASD is largely unexplored.

*Aims:* We investigated the extent of co-occurring problems in children with high ASD traits from a total population sample. We explored the contribution of co-occurring problems to impairment and service contact, and whether there were children without co-occurring problems in this group; as proxy for "ASD only".

*Methods and procedures:* Children screening positive on the Autism Spectrum Screening Questionnaire (ASSQ) were used as proxy for ASD. Attention Deficit/Hyperactivity Disorder (ADHD) and Oppositional Defiant Disorder (ODD) were operationalised using symptom counts. A parent or teacher report above the 95th percentile counted as "problem" present for other symptom domains.

*Outcomes and results:* 92% of ASSQ high-scorers had a minimum of two other problems. Emotional problems, ADHD symptoms and learning problems were the most commonly reported problems, also predicting impairment and contact with services.

*Conclusions and implications:* Co-occurring problems were common in ASD screen positive children and contributed strongly to both impairment and to contact with services. Gender differences indicated that female symptoms were perceived as less impairing by parents and teachers.

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#### What this paper adds?

Autism spectrum disorder (ASD) has historically been associated to poor outcome and lack of independent life in adulthood, but very few studies have examined the extent to which this poor outcome may be due to the extensive comorbid problems also suffered by individuals with ASD. This study contributes with unique information showing that also children from a population-based sample who screen positive for ASD have considerable and clinically relevant impairment and

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psychiatric comorbid problems as reported by parents and teachers. Furthermore, their reported impairment is to a large degree explained by their comorbid problems. The present findings indicate that very few children with ASD traits have autism traits alone, and that they most likely also suffer from other cognitive and mental health problems, e.g. learning problems, tics, emotional problems and ADHD symptoms. This indicates that "autism plus" is the most common autism problem also in population based samples and not only a result of a referral bias. It also indicates that the "plus" part accounts for a large part of the impairment children with ASD traits have. A broad assessment of mental health, learning and cognition is thus crucial in the management and treatment of children with suspected ASD. There were differences between female and male symptomatology. Eating problems and obsessive–compulsive symptoms were more common in girls, but were not rated as impairing and had no bearing towards service use. The implications of this gender difference are unknown.

#### 1. Introduction

Adults with autism spectrum disorders (ASD) comprise a heterogeneous group (Happe, Ronald, & Plomin, 2006) many of whom grew up undiagnosed (Brugha et al., 2011; Nylander, Holmqvist, Gustafson, & Gillberg, 2013). Over the past 10 years, we have seen a surge in diagnoses, due to a combination of increased awareness, changes in the perception of the ASD phenotype, and revisions to the diagnostic criteria (Fombonne, Quirke, & Hagen, 2009). Functional ability in individuals with ASD may vary broadly and some individuals are able to lead independent and successful lives (Grandin, 2011). Studies to date however indicate that a large majority of adults with ASD have poor outcome (Billstedt, Gillberg, & Gillberg, 2005) and have indicated that autism symptoms themselves are predictive of dysfunction in adulthood (Howlin, Moss, Savage, & Rutter, 2013; Magiati, Tay, & Howlin, 2014). The factors influencing functional outcome have been difficult to tease apart. There is a dearth of studies assessing the extent of impairment arising from ASD traits vs. co-occurring conditions although co-occurring conditions are common (Gillberg & Fernell, 2014).

The Early Symptomatic Syndromes Eliciting Neurodevelopmental Clinical Examinations – ESSENCE – framework, suggests that a wide range of neurodevelopmental difficulties tend to appear and persist together (Gillberg, 2010). In children with ASD, the ESSENCE framework is supported by a large body of research showing that ASD is commonly accompanied with different kinds of neurodevelopmental disabilities (Carlsson et al., 2013; Levy et al., 2010), including epilepsy (Canitano, 2007), intellectual disability (Matson & Shoemaker, 2009) and a broad range of other psychiatric disorders, notably ADHD (Ghaziuddin, Weidmer-Mikhail, & Ghaziuddin, 1998; Joshi et al., 2010), Tourette's syndrome (TS) and tics (Baron-Cohen, Mortimore, Moriarty, Izaguirre, & Robertson, 1999; Baron-Cohen, Scahill, Izaguirre, Hornsey, & Robertson, 1999; Canitano & Vivanti, 2007; Simonoff et al., 2008), and anxiety disorders (Muris, Steerneman, Merckelbach, Holdrinet, & Meesters, 1998; White, Oswald, Ollendick, & Scahill, 2009). Depression and obsessive–compulsive disorders (OCD) become more common in older children (Ghaziuddin, Ghaziuddin, & Greden, 2002; Gjevik, Eldevik, Fjaeran-Granum, & Sponheim, 2011). Furthermore, learning disability, language and learning problems are intricately linked to autism (O'Brien & Pearson, 2004), but both language problems and intellectual problems have been reported to occur in around 80% of children with ASD (Carlsson et al., 2013; Fombonne, 1999). These co-occurring problems are expected to contribute to poor functional outcome, although to our knowledge, no study has examined their respective contribution to impairment and outcome in children with ASD.

Both the ESSENCE model and findings from the Dunedin study suggest that the *amount* of co-occurring problems may be interpreted as indexing an overall factor of severity of functional impairment rather than specific psychopathology alone (Caspi et al., 2014). Diagnosing an increasing number of higher functioning children with ASD could thus lead to less functional disability due to low prevalence of co-occurring problems. The cited studies above have been performed in mainly clinical/ special school populations, raising the question of whether the high rates of comorbidity could be related to a referral bias. If ASD by itself is not clinically impairing, children with only autism would not be found in clinical populations. Park et al. (2014) however found that children diagnosed as part of a population screen had *higher* scores on several of the comorbidity scales than children already clinically diagnosed with ASD (Park, Kim, Koh, Song, & Leventhal, 2014). The authors suggested that externalising symptoms combined with better adaptive functioning were masking the ASD problems in these children, hindering their access to ASD services. Similarly, Levy et al. found that children with other diagnoses and ASD symptoms were diagnosed with their ASD at a later age, indicating that the ASD was masked by other problems (Levy et al., 2010). Gillberg and Fernell point out that the reverse is often true; that children are increasingly diagnosed with autism only, while the functional impairment often stem from the important but overlooked co-occurring problems (Gillberg & Fernell, 2014). As co-occurring symptoms/and problems in ASD thus impact presentation, help-seeking behaviour, assessment and the final diagnosis of ASD, population-based studies of ASD symptoms, co-occurring problems and associated impairment are warranted.

Gender differences characterise the abovementioned disorders, with male:female ratios varying depending on disorder studied, level of ability, age, and a range of other factors. In ASD, the male predominance is considerably higher in individuals with an intellectual function in the normal range than in samples including mainly intellectually disabled children (Van Wijngaarden-Cremers et al., 2014). For ADHD, the male predominance is lower in adult samples than in children (Haavik, Halmoy, Lundervold, & Fasmer, 2010). The underpinnings of the male predominance in childhood neuropsychiatric problems are poorly understood, but some of the differences seem to relate to ascertainment bias, cultural norms and expectations rather than biological differences (Bussing, Zima, Gary, & Garvan, 2003; Ohan & Visser, 2009; Van Wijngaarden-Cremers et al., 2014). Gender expectations have also been shown to be a consistent barrier for girls in access to mental health services (Alegria et al., 2004; Bussing, Zima, Perwien, Belin, & Widawski, 1998; Derks, Hudziak, & Boomsma, 2007).

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