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A multi-method assessment of study strategies in higher education students with an autism spectrum disorder

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ABSTRACT

Recent research shows that the number of students with autism spectrum disorder (ASD) attending higher education (HE) is increasing. However, their academic success rates and chances of graduating are lower than reported for typically developing peers. Combining a self-report study- attitude and -strategies inventory and empirical think-aloud protocols, this study is the first to use a multi-method design to try and explain these differences in first-year undergraduates with and without ASD.

It was investigated whether, compared to typical controls, HE students with ASD find it more difficult to glean relevant information from their study material, have poorer academic-planning and purposeful-acting skills and are metacognitively less proficient.

No group differences were found for motivation, fear of failure or time management. The undergraduates with ASD did have more problems selecting relevant information from study materials than their typical peers and knew and used fewer relevant study strategies.

The results presented relate to the three dominant explanatory models of ASD. They contribute to the available evidence and to a profile of HE students with ASD detailing their academic strengths and weaknesses, allowing student guidance protocols to be tailored to their specific needs. Recommendations for such protocols are given.

1. Introduction

For many students higher education (HE) is a challenge because of the greater demands it places on them compared to secondary education. HE students are expected to study more independently, to take notes during lectures and to review and understand large quantities of complex text materials (Denissen, Léonard, Van den Brande, & Willems, 2008). They hence need more advanced study skills than before (Ten Dam, Van Hout, Terlouw, & Willems, 2004). For young adults with autism spectrum disorder (ASD), a growing group in HE, all or some of these study skills may pose a problem. As a result, they have significantly lower chances of graduating in comparison to their typically developing peers (Howlin, Alcock, & Burkin, 2005).

First-year undergraduates with ASD also encounter more difficulties with social communication and interaction in HE than they did during secondary school. Often preferring to work alone, they have problems adapting to others in group assignments (Roberts, 2010). Compared to their typical peers, they also seem weaker in planning their studies and in processing large quantities of study material that are typically more complex than in secondary education (Van Bergeijk, Klin, & Volkmar, 2008), because - as a group - their self-regulation skills and metacognitive knowledge about learning strategies is less well developed (Roberts, 2010).

The ability to reflect on one's own learning process, often referred to as metacognition, is indeed an important factor in the development of good study skills (Brown, 1987; Flavell, 1979). Some researchers consider metacognition to be a specific form of Theory of Mind (ToM), i.e. Theory of Own Mind (ToOM; Lysaker et al., 2005). It is generally accepted that some people with ASD have difficulties with these higher-order processes (Erbas, Ceulemans, Boonen, Noens, & Kuppens, 2013; Frith & Happé, 1999; Williams, 2010). In our study, we have adopted Efklides (2006), who defines metacognition as a multifactorial and conscious process, leading to three forms of metacognition: metacognitive knowledge (the knowledge people have about their thinking), metacognitive experiences (the feeling of knowing, of confidence, familiarity and difficulty) and metacognitive skills (conscious use of

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strategies to control cognition). Wilkinson, Best, Minshew, and Strauss (2010) argued that young adults with ASD have sufficient metacognitive knowledge but that they have difficulties using or regulating it. Grainger, Williams, and Lind (2014) found that their metacognitive control processes are less well-developed than they are in their typical counterparts and that they have problems recognising their own thoughts and feelings as well as those of others.

Apart from the problems with metacognition, students with ASD have difficulties with planning and purposeful acting. Breetvelt (2005) and Bramham et al. (2009) showed that adults with ASD have more difficulty with (study) planning and time management than peers without ASD. Also, (quickly) selecting efficient solution strategies seems difficult for people with ASD (Bramham et al., 2009). Van Eylen et al. (2011) observed that high-functioning children with ASD, moreover, appear less skilled at coming up with new ideas (also called generativity), making it harder for them to give personal meaning to tasks than is the case for typical age peers (Van Eylen et al., 2011). The latter authors also found their students with ASD to be more challenged by tasks requiring cognitive flexibility. In the study by de Jonge and Verbeek (2007) students with ASD showed more attention and concentration deficits, displaying problems ignoring distracting stimuli. All these difficulties point to weaker executive functions in ASD.

A third cluster of problems derives from a poor ability to select relevant and ignore irrelevant information. People with ASD tend to have problems making connections and transferring what they have learnt to new situations (Happé & Frith, 2006), finding it difficult to deal with the shift from local to global processing. This deficit is often related to their weaker central coherence. The weak central coherence theory states that people with ASD have problems with global processing in unrestricted tasks, which often results in a detail-oriented cognitive style (Booth & Happé, 2010; Evers et al., 2014; van Lang, Bouma, Sytema, Kraijer, & Minderaa, 2006). Breetvelt (2005) concluded that students with ASD have difficulty separating major from minor issues because they lack an overview of the whole question at hand, rendering reading comprehension, précis writing, schematising, giving a meaningful structure to and grasping the context of an assignment difficult for this group (Boswijk, Breetvelt, & Mensink, 2007; van Lang et al., 2006).

Apart from these three problem domains, which can be closely linked to the main causal models of ASD (the Executive Functioning and Central Coherence theories and ToM), there are other factors that can also impede academic participation and success in this population. Students with ASD sometimes find the curriculum and/or assignments either too complicated or not interesting enough, which can have a negative influence on their motivation (Kögel, Singh, & Kögel, 2010). Bellini (2004) argued that students with ASD have more fear of failure than typical students, which could be attributed to their difficulties with social interaction.

Empirical evidence regarding the study skills of young adults with ASD is as yet scarce (Magiati, Tay, & Howlin, 2014) and often heterogeneous in regard to intelligence (e.g., 70 < IQ < 130) and age. The ASD groups are compared to other clinical populations, e.g. peers with attention-deficit/hyperactivity disorder (ADHD) or specific language impairment (SLI), but some studies lack a control group of typical peers. Qualitative research in this domain is abundant but studies are often performed by student coaches of local student services and mainly founded on their clinical and/or educational expertise. However valuable these studies may be, they are exclusively based on self-reports and not compared to the data of typical controls.

In the present study we compare the study skills of bachelor students with ASD to those of typically developing peers using a multimethod design. Although the validity of self-report questionnaires in ASD research was previously questioned but shown to be sufficient in (young) adults with ASD (Spek, Scholte, & Van Berckelaer-Onnes, 2010), Desoete (2008) and Veenman, Van Hout-Wolters, and Afflerbach (2006) argued that metacognition can best be gauged by a combination of offline and online methods. We accordingly decided to apply both a self-report study-attitude and -strategies inventory and think-aloud protocols (TAPs) in which we asked the participants to articulate their thoughts, experiences and actions while executing several study assignments. This 'thinking aloud' process provides real-time and detailed information on the participants' processing and problem-solving skills during task performance (Desoete, 2008).

We addressed the following research questions: Compared to typically developing peers, do HE students with ASD have more difficulty selecting relevant information from their study materials? Are their skills pertaining to planning and purposeful acting in HE context poorer? And finally, are their metacognitive abilities weaker? Based on the literature, we expected the students with ASD to perform less well than the controls on all domains.

2. Method

The study was approved by the local ethics committee. All students gave their informed consent prior to study commencement and received a small financial compensation for their participation. They were also informed that they could terminate their participation at any time without explanation or negative (financial or other) consequences.

2.1. Part 1: Self-report inventory

2.1.1. Participants

A total of 79 first-year bachelor students completed the self-report inventory. General characteristics of the two study groups are given in Table 1.

Of the total, 26 (6 female students) met the DSM-IV-TR criteria for ASD (American Psychiatric Association [APA], 2000), with ASD being their sole or primary diagnosis. Their mean age was 19.9 years (SD = 1.40) [18.0–22.0 years]. All had been diagnosed prior to the study by multidisciplinary teams comprising at least one physician (paediatrician or child psychiatrist) and a psychologist. An independent child psychiatrist and the first author verified their diagnoses before inclusion based upon the available diagnostic reports using the same DSM-IV-TR criteria. Ten students (38%) had one or more comorbid disorders (7 SLI, 1 ADHD, 1 Developmental Coordination Disorder (DCC), and 1 Obsessive Compulsive Disorder (OCD)). The students were recruited with the help of student services, student coaches of the university and university colleges of the KU Leuven Association, and independent student coaches (who support students with special educational needs but can guarantee anonymity towards the HE institution if so desired by the student).

We derived the demographic and self-reported data of 53 first-year bachelors (32 female BAs) without known functional, neurological or neurobiological disorders whose fields of study largely matched those of the students with ASD from a pool of 100 controls from the study by Callens, Tops, and Brysbaert (2012). Mean age of the controls was 19.2 year (SD = 0.77)[17.9–21.10].

There was a small but significant difference in age between the two groups, U = 488.50, p = 0.04, which was due to the fact that more students with ASD had doubled a year in secondary education.

There were no significant group differences as regards general intelligence, word reading or simple arithmetic, $p > 0.05$, $g < 0.45$ (small to medium effect sizes).

2.1.2. Instrument

We used the Learning Attitude and Study Strategies Inventory (LASSI), a computer-based multiple-choice questionnaire developed by Weinstein and Palmer (2002). Its 10 scales provide a 'strengths and weaknesses' profile of the respondents' metacognitive knowledge. Each scale has eight items except for the 'selecting main ideas' scale, which has five. Using a 5-point response Likert scale (ranging from 'I completely agree' to 'I completely disagree'), respondents indicate to what