



Examining the relationship between Autism spectrum disorders and technical professions in high functioning adults



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ABSTRACT

A relationship has been hypothesized between Autism and technical professions. This has been attributed to superior folk physics in individuals with Autism. Folk physics can be described as the capability to understand physical causality. Since all the previous studies in this area were focused on family members of individuals with Autism, it was unclear if there is a direct relationship between Autism and technical professions. Therefore, we examined the degree to which the professions of high functioning adults with Autism ($N = 29$) encompass technical skills and compared the results to adults with Schizophrenia ($N = 17$) and a neurotypical control group ($N = 30$). Furthermore, we examined whether the degree of technical skills in the professions of the Autism group was related to their autistic traits. The results showed that the last and longest attained professions of the adults with Autism require more technical skills than those of the Schizophrenia and neurotypical group. Furthermore, the degree of technical skills in the professions of the adults with Autism is related to impairments in social skills, but not to strengths in detailed information processing.

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1. Introduction

Autism is a neurobiological developmental disorder that first becomes apparent during childhood and which continues into adulthood. The core symptom domains of Autism include impairment in social interaction and communication and the presence of restricted, repetitive and stereotyped patterns of behavior, interests and activities (APA, 2000).

In Autism research throughout the years, emphasis has been put on the associated impairments. Recently, however, Autism has been described as having a 'different' mind rather than a 'deficient' mind (Happé, 1999). Individuals with autistic impairment are thought to have specific skills. They show enhanced detailed information processing, which means that they have a bias for detailed information (Happé & Frith, 2006). Research also provided evidence for enhanced perceptual functioning in Autism, which implies superior performance in both visual and auditory cognitive tasks, for example in recognizing visual patterns (Mottron, Dawson, Soulieres, Hubert, & Burack, 2006). These strengths have been hypothesized to be especially helpful in technical professions, for example in the areas of physics, engineering, and mathematics (Wheelwright & Baron-Cohen, 2001). It is therefore not surprising that a relationship has been hypothesized between the autistic phenotype and technical professions. This has been mainly attributed to superior folk physics and impaired folk psychology in individuals with Autism (Baron-Cohen et al., 1998). Folk psychology has been defined as the natural capacity to explain and predict the behavior and mental states of other people, folk physics can be described as the capability to understand physical objects in terms of their causal and mechanical properties (Baron-Cohen et al., 1998). Folk psychology is often used to understand 'how people work', folk physics is about how inanimate things, like machines, work.

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A strength in folk physics is thought to be related to strengths in technical areas (Wheelwright & Baron-Cohen, 2001). Results of a relevant study in this area showed higher numbers of children with Autism living in a technical region, when compared to a non-technical region (Roelofsma et al., 2011). Although the large number of participants in this study was advantageous, no formalized instruments were used in the diagnostic process. Also, response rate in the two control cities was relatively low (49.8 and 45.7%), which can give rise to a sampling bias. Furthermore, the study was correlational and other factors that might have been of influence were not investigated. Therefore, definite conclusions about the relationship between Autism and technical skills could not be drawn. To our knowledge, all other studies in which the relationship between Autism and technical occupations were examined, focused on family members of individuals with Autism, while the participants with Autism themselves were never assessed on their strengths (Baron-Cohen, Wheelwright, Stott, Bonton, & Goodyer, 1997, Baron-Cohen et al., 1998). Moreover, if individuals with Autism indeed have qualities in technical areas, as hypothesized, we do not know if they are able to use these qualities in their work environment. If they can incorporate their strengths into their daily working life, this could enhance the chance of finding a place in society.

Therefore, in this study we will investigate the nature of the professions of a high-functioning adult group with Autism and compare this to a control group of adults without psychiatric disorders or intellectual disability, a so-called neurotypical group. We aim to examine to which degree their professions encompass technical skills. For this end, we will use a dimensional approach as opposed to the categorical system that was used in previous studies that examined the relationship between Autism and technical skills (Baron-Cohen et al., 1997, Baron-Cohen et al., 1998; Windham, Fessel, & Grether, 2009). The reason for this was the awareness that most occupations require a certain degree of engineering skills. For instance, Information Technology (IT) occupations such as functional designer, business analyst and system analyst rely heavily on communicational and social skills, while they may also be considered 'engineering' professions. Therefore, a dimensional approach seems more suitable.

Furthermore, it may be important to examine whether a strength in technical skills is solely an Autism characteristic or a characteristic found in neurodevelopmental disorders in general. For this reason, we included a group of individuals with Schizophrenia in our study, alongside the neurotypical control group. We chose Schizophrenia, because of its overlap with Autism in social and communicative impairments (Konstantareas & Hewitt, 2001; Nylander, Lugnégard, & Hallerback, 2008).

Finally, if our findings point to a relationship between Autism and technical professions, it is relevant to examine the underlying mechanism. For example, impairment in social skills and/or communication might be an underlying mechanism, that decreases the chance of finding work in a social work environment and leads to a higher probability of working in a technical, less social environment. In that case, mechanisms underlying the relationship between Autism and technical professions are Autism-specific weaknesses, rather than strengths. Furthermore, more in line with the 'folk physics' theory of Baron-Cohen et al. (1998), choosing a technical profession may also be related to their strengths in detailed information processing. Therefore, we will relate the degree to which the professions encompass technical skills to the different autistic traits, as measured by the Autism-spectrum Quotient.

2. Method

2.1. Participants

All participants in the three groups were male, native Dutch inhabitants of the same city. The participants with Autism and Schizophrenia were randomly selected from a larger group of patients in Autism or Schizophrenia treatment programs. All participants received individual counseling from a mental health nurse or a psychologist. The Autism group encompassed only participants with the autistic disorder; participants with other Autism spectrum disorders were not included. We specifically chose for the autistic disorder because it is considered the most robust and valid diagnosis within the Autism spectrum (Volkmar & Klin, 2005). The neurotypical control subjects were recruited from the general population by advertisements in newspapers and by word of mouth. Healthy controls were not included in the present study if they had a history of psychiatric illness or if Autism ran in the family. Participants with genetic conditions or relevant neurodevelopmental conditions other than Schizophrenia or Autism were excluded, as were participants who were institutionalized. Only men who ranged in age from 18 to 65 were asked to participate. In total, 76 participants agreed to take part and signed informed consent forms prior to their inclusion in the present study. The group comprised 29 adults with Autism, 30 neurotypical adults and 17 adults with Schizophrenia. The relatively small size of the Schizophrenia group was due to problems in finding individuals who were capable and willing to participate in the study.

To be sure that all participants were able to understand the items of the questionnaires, participants were only included when the Verbal Comprehension Index (VCI) score of the Wechsler Adult Intelligence Scale III (WAIS III, Wechsler, 2000) was at least 80. This cutoff score was used by Wechsler (2005) as a boundary between retarded (lower than 80) and (below) average intelligence (higher than 80). It was not possible to use the WAIS IV, since at the time of this study, there was no Dutch translation available. In order to reduce the Flynn effect of the WAIS-III, an update of the Dutch norms was used (Wechsler, 2005).

2.2. Assessment of disorders

All adults with Autism and Schizophrenia were diagnosed by experienced psychologists or psychiatrists who were trained in assessing the Autistic Disorder Diagnostic Interview, revised version (ADI-R; Lord, Rutter, & Le Couteur, 1994) and the Structured Clinical Interview Schedule for the DSM-IV (SCID-CV; First, Spitzer, Gibbon, & Williams, 1996).

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