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Comparison between a Mandarin Chinese version of the Childhood Autism Spectrum Test and the Clancy Autism Behaviour Scale in mainland China



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ABSTRACT

A Mandarin Chinese version of the Childhood Autism Spectrum Test (CAST) and Clancy Autism Behaviour Scale (CABS) were applied to 150 children aged 4–11 years old from clinical settings and mainstream schools in Beijing. All the children were further assessed using the Autism Diagnostic Observation Schedule (ADOS) and the Autism Diagnostic Interview-Revised (ADI-R). The validity of two instruments on screening of ASC was examined and compared using receiver operating characteristic (ROC) curve analysis. The validity of CAST (sensitivity: 89%, specificity: 80%, PPV: 70%) was better than the CABS (sensitivity: 58%, specificity: 84%, PPV: 65%). The area under the curve (AUC) of the CAST (AUC = 0.90) was significantly higher than the CABS (AUC = 0.79, $p = 0.0002$). The Mandarin CAST demonstrated a better validity in distinguishing children with ASC from children without ASC. It is an acceptable candidate as a screening instrument for ASC in large epidemiological study in Chinese population.

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1. Introduction

Autism Spectrum Conditions (ASC) are neurodevelopmental disorders characterised by impairments in social interaction and communication, alongside unusually repetitive and stereotyped behaviours, and unusually narrow interests and activities (American Psychiatric Association, 2000). In the West, recent epidemiological studies of ASC have adopted a two-phase method for case identification. The first phase is population-based screening using appropriate screening instruments.

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The second phase comprises diagnostic assessments in a smaller sample of children considered to be at risk of having ASC according to screening results (Fombonne, 2009). Studies using this method have estimated that ASC occurs in approximately 1% of the general population (Baird et al., 2006; Baron-Cohen et al., 2009).

Many explanations for the apparent rise in prevalence have been proposed by researchers (Blaxill, 2004; Fombonne, 2009). One contribution could be the adoption of the spectrum definition (Rutter, 2005). The changes in definition led to the revision of diagnostic criteria for ASC which shifted the boundary to include people on the borderline of the spectrum (King & Bearman, 2009). Autism was first described by Leo Kanner in 1943 (Kanner & Eisenberg, 1957) based on the case histories and observations of 11 children who showed a similar pattern of behaviour including social remoteness, stereotypy and echolalia (Croen, Grether, Hoogstrate, & Selvin, 2002). At that time, the term autism was used to describe early infantile autism or infantile autism (Blaxill, 2004). In 1944, Hans Asperger independently described a syndrome now known as Asperger syndrome (Asperger, 1991; Williams, 2003). With the accumulation of research and clinical experience, more behavioural symptoms have been described and categorised as autistic traits (Croen et al., 2002). The term “autism spectrum” was proposed by Wing and Gould in 1979 in order to capture a wider presentation of autistic features (Wing & Gould, 1979). In 1993, the *International Classification of Disease, 10th revision* (ICD-10), suggested that the following categories should be grouped under the autism spectrum: childhood autism, atypical autism, pervasive developmental disorder-not otherwise specified (PDD-NOS) and Asperger's Syndrome (World Health Organisation, 1993). In 2013, the DSM-V revised the diagnostic criteria of ASC by combining the impairments in social interaction and communication into a single subgroup. The three domains of core impairments becomes two: (1) social/communication deficits; (2) fixated interests and repetitive behaviours. A single diagnosis of ASC replaces separate diagnostic subtypes in the *Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (DSM-V), so the diagnosis such as Asperger Syndrome and PDD-NOS are no longer used (American Psychiatric Association, 2012).

Another contribution could be the development in screening and diagnostic instruments for the identification of ASC (Williams, Higgins, & Brayne, 2006). The changes in diagnostic criteria have led to the development of screening and diagnostic instruments. Within the autism spectrum, children with AS may have different autistic behaviours from children with childhood autism since the former do not have delays in language or cognitive development (Baron-Cohen, Wheelwright, Robinson, & Woodbury-Smith, 2005). The impairments due to ASC in children with AS may not be as obvious as those seen in children with childhood autism (Tantam & Girgis, 2009). The borderline diagnostic criteria require instruments to be sensitive enough to capture more subtle and milder autistic traits. The purpose of capturing subtle traits is to make sure instruments can be used for case detection across the whole spectrum. As a developmental condition, autistic features at different developmental stages would not be expected to be identical. Thus, screening instruments in the West have been designed to be age specific. The *Checklist for Autism in Toddlers* (CHAT) targets children as young as 18 months old (Baron-Cohen et al., 2000), and the *Autism Spectrum Quotient* (AQ) has child (Auyeung, Baron-Cohen, Wheelwright, & Allison, 2008), adolescent (Baron-Cohen, Hoekstra, Knickmeyer, & Wheelwright, 2006) and adult versions (Ketelaars et al., 2011).

In mainland China, epidemiological studies have mainly focused on childhood autism (Wu et al., 2010; Zhang et al., 2011). The prevalence of ASC in mainland China has not been well described (Sun & Allison, 2009; Sun, Allison, Auyeung et al., 2013). Earlier studies in mainland China have adopted varied research methodologies for case definition in terms of screening and diagnosis (Sun, Allison, Matthews, et al., 2013). However, the results from previous studies cannot be compared with Western studies directly for many reasons. One reason is that most screening instruments only target the most severe subtype, childhood autism, but not the ASC. The most frequently used screening instrument in Chinese studies is the *Clancy Autism Behavioural Scale* (CABS), the use of which was first reported in 1969 in the West (Clancy, Dugdale, & Rendle-Short, 1969; Sun, Allison, Auyeung, et al., 2013). There has been almost no research using CABS among the Western populations since the 1970s. However, the CABS has been widely used in epidemiological studies of ASC in mainland China. Another reason is the lack of standard diagnostic instruments to assess and further confirm the screening results (Sun, Allison, Auyeung, et al., 2013). In developed countries, the combination of the *Autism Diagnostic Observation Schedule* (ADOS) and the *Autism Diagnostic Interview-Revised* (ADI-R) has been frequently used in epidemiological studies for case confirmation (Lord, Rutter, DiLavore, & Risi, 2001; Rutter, LeCouteur, & Lord, 2003). By adopting these two instruments, the validity of the screening instruments can be tested. In China, these diagnostic instruments have not been well adopted yet. Thus, with the limited usage of CABS in Western populations, as well as the limited usage of ADOS and ADI-R in Chinese populations, it is difficult to compare prevalence estimates from previous studies in mainland China with more recent results from developed countries directly. In order to investigate the current situation of ASC in China, an important question would be whether we need to adopt more recent developed instruments for prevalence studies instead of using those which are already there.

The *Childhood Autism Spectrum Test* (CAST) was developed and validated among a general population from the United Kingdom and demonstrated good validity and reliability (Williams, Allison, et al., 2006; Williams et al., 2005). Sensitivity was 100% and specificity was 97% in primary school age children (Williams et al., 2005). The test-retest reliability of the CAST was good with a kappa statistic of 0.7 (Williams, Allison, et al., 2006). The CAST was used as a screening instrument in an ASC prevalence study in the UK in 2009 (Baron-Cohen et al., 2009). Evidence has demonstrated that the CAST is a relatively robust screening instrument in epidemiological studies on ASC in general population. However, the performance of the CAST in different cultures has not been thoroughly investigated. This study adopted Mandarin versions of both the CAST and the CABS for use in a Chinese sample to compare the utility of these two instruments as screening tools for ASC in Chinese population.

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