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# Language assessment in children with autism spectrum disorder: Concurrent validity between report-based assessments and direct tests

Anders Nordahl-Hansen [a,*], Anett Kaale [b], Stein Erik Ulvund [a]

[a] Department of Education, University of Oslo, P.O. Box 1092, Blindern, 0317 Oslo, Norway
[b] Division of Mental Health and Addiction, Oslo University Hospital, P.O. Box 4959, Nydalen, 0424 Oslo, Norway

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ABSTRACT

Impairments in expressive and receptive language are common in individuals with autism spectrum disorder (ASD). Therefore, the importance of language assessment is emphasized in e.g. DSM-5. Thus, studies addressing the validity of different language measures are important. Parents and preschool teachers of 55 children diagnosed with childhood autism separately filled out the Communicative Development Inventory (CDI), a widely used report-based assessment of language. The children were also tested with the two standardized direct language tests: Reynell Developmental Language Scales (RDLS) and Mullen Scales of Early Learning (MSEL). Concurrent validity across the three measures was investigated. The results suggested very high agreement between the measures, and this was found regardless of whether parents or preschool teachers filled out the CDI. Given the difficulty in testing children with low language levels, as often is the case in young children with ASD, this study shows that several valid measures are available for measuring expressive and receptive language.



## 1. Introduction

Language impairments are common in individuals with autism spectrum disorder (ASD) (Luyster, Kadlec, Carter, & Tager-Flusberg, 2008). Both receptive and expressive language development in children with ASD are different from children with typical development (Charman, Drew, Baird, & Baird, 2003; Luyster, Lopez, & Lord, 2007) and children with developmental delay (Ellis Weismer, Lord, & Esler, 2010). In the new DSM-5, language delay is no longer a criterion for ASD. However, as ASD often is associated with language impairments, it is included as a specifier in the diagnostic system. A record should be made on whether the child has accompanying language impairments, and current language level needs to be recorded if the child has some impairments (e.g. "with accompanying language impairments – minimally verbal (<20 words)"). It is further emphasized that expressive and receptive language should be assessed separately, as children with ASD tend to have weaker receptive language as compared to expressive language (American Psychiatric Association, 2013). This underlines the need for valid ways of measuring language level in children with ASD.

* Corresponding author. Tel.: +47 40 87 31 79.
*E-mail address:* a.j.n.hansen@iped.uio.no (A. Nordahl-Hansen).

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Two approaches are commonly used to assess children's language levels. One is standardized tests administered by a licensed tester. The second is report-based assessments such as parental reports. Debates revolve around which approach gives the best picture of children's language levels, in part because both direct tests and report-based assessments have different strengths and weaknesses (Dockrell, 2001). Direct tests have the advantage of being based on observations from highly trained personnel, often with extensive education and understanding of children's language development. The assessment procedures are standardized so that each individual is tested in a highly similar fashion. Nevertheless, lack of motivation (Koegel, Koegel, & Smith, 1997), short attention span, and problems of cooperation with testers (Feldman et al., 2005; Feldman et al., 2000) may influence the test results. These problems are more prevalent among younger children (Chiat & Roy, 2007), and are compounded further when testing young children with ASD (Charman, 2004). Studies have also found that scores for direct tests among young children with ASD tend to fall below basal levels (Charman et al., 2003; Luyster et al., 2007; Thal, DesJardin, & Eisenberg, 2007). Together this knowledge has led researchers to propose that direct testing of language may be less appropriate for young children with autism (Charman, 2004; Tager-Flusberg et al., 2009).

Report-based assessments avert some of these problems. Building on caregivers' observations of the child's language in naturalistic settings, report-based assessments are not subject to problems with motivation and cooperation in test situations. Moreover, these reports are easy to distribute and less time-consuming compared to direct tests. However, caregivers typically lack expertise in evaluating children's language, making it challenging to fill out the reports correctly (Law & Roy, 2008). This can increase the chances of inaccurately reporting the child's language abilities (De Houwer, Bornstein, & Leach, 2005; Feldman et al., 2005; Roberts, Burchinal, & Durham, 1999; Tomasello & Mervis, 1994). In turn, this raises questions about whether report-based assessments provide valid information of children's language abilities.

### 1.1. Reynell Developmental Language Scales

The Reynell Developmental Languages Scales (RDLS; Reynell & Gruber, 1990) is widely used when testing for language delay in various samples of children, including children with ASD (Charman et al., 2003; Kaale, Smith, & Sponheim, 2012; Kjellmer, Hedvall, Holm, et al., 2012; Mundy, Sigman, & Kasari, 1990; Siller & Sigman, 2008). RDLS is standardized for children from 1 year to 6 years, 11 months (Reynell & Gruber, 1990). It consists of two scales, one for expressive language and one for receptive language, and has demonstrated good psychometric properties for children with typical development (Reynell & Huntley, 1985). For instance split-half reliability for expressive language is .93, and a bit lower (.83) for language comprehension for children aged 18 months (Bornstein & Haynes, 1998).

### 1.2. Mullen Scales of Early Learning

Mullen Scales of Early Learning (Mullen, 1997); or MSEL, is a test of developmental level standardized for children from birth to 5 years, 8 months. The test provides a composite score (Early Learning Composite), as well as separate scores for the four subtests: visual reception, fine motor, receptive language, and expressive language. Robust inter-rater, test–retest, and internal reliabilities have been reported for MSEL when used with typically developing children (see Mullen, 1989 for a review). Studies have also demonstrated acceptable reliability for children with ASD (Luyster et al., 2008), although Akshoomoff (2006) found that children with ASD, compared to typically developing children, spent significantly less time engaged during the administration of MSEL. Moreover, while MSEL has not been independently validated for use in the autism population, a recent report found good convergent validity in domains of non-verbal IQ and verbal IQ (Bishop, Guthrie, Coffing, & Lord, 2011). Likewise, an investigation by Burns, King, and Spencer (2013) revealed support for using MSEL as a test to identify levels of receptive and expressive language in children with neurodevelopmental disorders, including ASD.

### 1.3. MacArthur–Bates Communicative Development Inventory

The MacArthur–Bates Communicative Development Inventory also known as the CDI (Fenson et al., 1993; Fenson, Marchman, Thal, Reznick, & Bates, 2007), is the most commonly used report-based assessment of language in children (Mayor & Plunkett, 2011). The CDI exists in two complementary scales: the CDI infant form (Words and Gestures; CDI W–G) standardized for children aged 8 months to 1 year, 4 months, and the CDI toddler form (Words and Sentences; CDI W–S) standardized for children aged 1 year, 4 months to 2 years, 6 months. CDI W–G assesses language production and reception, communicative gestures, symbolic behavior, and nonverbal imitation. Fenson et al. (1993) have reported high internal consistency for the vocabulary scales with alpha values of .95, for comprehension items, .96 for the production items, and .96 for toddler form production. Investigations of test–retest reliability report high correlations for both language reception and language production (Fenson et al., 1993).

Although CDI W–G is standardized for infants, studies have reported few cases of ceiling effects when used with preschool-aged children with ASD (Charman et al., 2003; Kjellmer, Hedvall, Fernell, Gillberg, & Norrelgen, 2012; Miniscalco, Fränberg, Schachinger-Lorentzon, & Gillberg, 2012; Nordahl-Hansen, Kaale, & Ulvund, 2013). Studies investigating concurrent validity between CDI and direct language tests have uncovered moderate to high correlations for children with typical development (Law & Roy, 2008), and some studies have found similar correlations for children with ASD (Luyster et al., 2008; Miniscalco et al., 2012).