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# Research in Autism Spectrum Disorders

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## Inter-rater reliability of parent and preschool teacher ratings of language in children with autism

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### ARTICLE INFO

#### Article history:

Received 6 July 2013

Accepted 16 August 2013

#### Keywords:

Language

Autism

Inter-rater reliability

MacArthur CDI

Parents

Preschool teachers

### ABSTRACT

Parent reports such as MacArthur-Bates Communicative Development Inventories (CDIs) have been suggested as a measure of language in young children with autism since this group often score below base levels of direct tests. However, questions have been raised concerning the reliability of report-based assessments. Parents and preschool teachers filled out the CDI-Words & Gestures for 55 children diagnosed with autistic disorder. Inter-rater reliability analyses were done for the whole sample and a subgroup of minimally verbal children ( $n=28$ ). Further, potential over- or under-estimation, comparing the raters was analyzed. Results suggested excellent to fair inter-rater reliability between parent and preschool teacher. Parents tended to rate the children slightly higher than preschool teachers. However, the differences were small, and most likely due to contextual variations. These findings suggest that parents can be reliable sources of information about language abilities in children with autism. Therefore, when children are difficult to assess through direct tests, parent reports such as the CDI can be a good alternative.

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## 1. Introduction

Delay in language is one of the key diagnostic markers of autism (Luyster, Kadlec, Carter, & Tager-Flusberg, 2008). As more children with autism are recognized at an early age, there is need for more knowledge about appropriate language assessment tools. Although several instruments are available, their psychometric properties when used with young children with autism are often unknown. This is true also for report-based measures of language abilities (Law & Roy, 2008).

### 1.1. Language assessment

There are two major approaches to assessing children's language levels; direct testing and report-based assessments such as parent-reports. Direct tests have the advantage of being based on observable behaviour. Highly trained personnel with extensive knowledge about language development usually administer these tests. However, children can be difficult to test due to short attention span, problems of cooperating with strangers in unfamiliar settings (Feldman et al., 2000, 2005), and lack of motivation (Koegel, Koegel, & Smith 1997). These problems are especially prominent with young children (Chiat & Roy, 2007), and particularly challenging when assessing children with autism (Charman, 2004). Further, direct testing may

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not be appropriate for young children with autism since their language abilities often is below basal levels of the tests (Charman, Drew, Baird, & Baird, 2003; Luyster, Lopez, & Lord, 2007; Thal, Desjardin, & Eisenberg, 2007). Therefore, many encourage the use of parent reports for this group of children (Charman, 2004; Tager-Flusberg et al., 2009). These language assessment tools largely avert the above-mentioned problems. In addition, they are easy to distribute, and give valuable insights to the child's language in naturalistic settings.

However, if report-based assessments are to be of value for research and clinical purposes, they need to be reliable and valid. A criticism of report-based assessments is that parents tend to over-estimate their child's language abilities (Tomasello & Mervis, 1994). It may be that parents do not have an accurate frame of reference when filling out such reports (Law & Roy, 2008). Nevertheless, studies comparing parent reports to direct assessments do not find a clear tendency of over-estimation. In fact, some studies report tendencies of parents under-estimating their children's language abilities (DeHouwer, Bornstein, & Leach, 2005; Feldman et al., 2005; Roberts, Burchinal, & Durham, 1999). Essentially, this leaves questions to whether parents are reliable sources of information about their children's language abilities.

### 1.1.1. *MacArthur Communicative Development Inventories (CDIs)*

The MacArthur-Bates Communicative Development Inventory (MCDI; Fenson et al., 1993, 1994; Fenson, Marchman, Thal, Reznick, & Bates, 2007) is the most widely used report-based measure to assess language in infants and toddlers (Mayor & Plunkett, 2011). "The CDI", as it is commonly referred to, contains two complementary, but separate scales: The CDI Words & Gestures (CDI-WG), standardized for children aged 0;8 to 1;4, and the CDI Words & Sentences (CDI-WS), standardized for children aged 1;4 to 2;6.

Studies investigating relations between the CDI and direct assessments of language, report moderate to high correlations both for children with typical development (Bornstein & Haynes, 1998), and for children with autism (Luyster et al., 2008). DeHouwer et al. (2005) evaluated the accuracy of parental scores with other adults' scores on the CDI on a sample of typically developing toddlers, and reported fair to good agreement. However, particular characteristics of children with disabilities may influence parent reports of language (Thal et al., 2007), and thus affect the reliability.

### 1.2. *Intraclass correlation coefficients*

Intraclass correlation coefficients (ICCs) are often used as measures of reliability (Shrout & Fleiss, 1979). Four different estimates of ICC are commonly used; absolute agreement, consistency, single measure, and average measure (see McGraw & Wong, 1996 for an extensive review of these and other ICC estimates). Still, the inferences that can be made from the different procedures are less known (McGraw & Wong, 1996). If the main interest is in for example correlations between CDI scores and other variables such as IQ or temperament, the reliability of children' relative scores (consistency) would be adequate. However, in a clinical context the interest is usually in the reliability of children's absolute scores since ICC absolute scores (absolute agreement) take into account disagreement about mean level as well as disagreement about ranking. Another aspect of ICC estimates relate to the number of raters. Information from report-based assessments such as the CDI is usually collected only from one source. If this is the case, the ICC (reliability) of interest is the single measure estimate. If two or more sources are used, an average measure estimate will provide a mean or sum of the ratings. This will generally produce more reliable measurements.

The first aim of this study was to investigate inter-rater reliability between parents' and preschool teachers' ratings of word production and word understanding in children with autism. Four commonly used intraclass correlation procedures were considered in terms of how these influence the reliability scores. The reliability analyses were done both for the entire sample and a subset of minimally verbal children. The second aim was to explore whether parents or preschool teachers showed patterns of over- or under estimating.

## 2. Method

### 2.1. *Participants*

Parents' and preschool teachers' of 55 children with autism participated in the study. Participants were recruited by child and adolescent mental health clinics (CAMHC) in West and East Norway. The children met the inclusion criteria of (a) a chronological age of 2–4 years, (b) an ICD-10 diagnosis of childhood autism, and (c) attendance in preschool. Exclusion criteria were (a) other neurological disorders (e.g. cerebral palsy, hearing deficits), and (b) non-Norwegian speaking parents. The preschool teachers had various educational background (69% with a bachelor degree in education or social science, 12% with vocational education, 16% with no formal training, 3% with unknown education) with an average of 1.4 years (SD = 2.2, range 0–14) of experience with autism (including the time working with the child in this study).

Demographic information for the children and parents is reported in Table 1.

### 2.2. *Assessment procedure*

The measures used in the present study were collected as part of the baseline evaluation for a treatment study (Kaale, Smith, & Sponheim, 2012). A Norwegian translation of the CDI-WG (Smith, 1996) was mailed to parents and preschool

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