**Title**: Caregiver Ratings of Appropriateness of the Children’s Communication Checklist – 2 (CCC-2) in Youth with Down Syndrome

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**Introduction**: Youth with Down syndrome (DS) have a unique communication profile of expressive language delays (e.g., syntax, morphology) paired with relatively strong pragmatic language skills (Grieco et al., 2015). The Children’s Communication Checklist-2 (CCC-2; Bishop, 2006) is a standardized caregiver rating scale designed to examine different communication skills and identify youth with pragmatic language or other speech and language impairments. The CCC-2 is the only standardized caregiver report measure of broad language normed for older children and adolescents (4:0-16:11 years), but it is only validated for those who speak in simple sentences. However, many individuals with DS in this age range do not yet speak in sentences. Further, although some studies have provided initial evidence of the use of the CCC/CCC-2 in individuals with DS to examine their pragmatic and structural language profiles (de la Torre Carril et al., 202; Laws & Bishop, 2004; Lee et al., 2017; Losh et al., 2012; Smith et al., 2017; Stephen et al., 2021), the extent to which this measure adequately captures their language and communication skills in authentic settings is not yet known. One approach is to ask caregivers to indicate the appropriateness, or applicability, of the questions for their youth with DS. Thus, the present study examined the use of the CCC-2 in a large sample of youth with DS, some of whom spoke in sentences and some of whom used single words or phrases. We aimed to (1) examine caregiver ratings of the appropriateness of the CCC-2 items across the sample, and (2) determine whether caregiver appropriateness ratings differed for those who speak in sentences vs. those who do not.

**Method**: Participants were 94 caregivers (94.7% mothers) of youth with DS (6-16 years; *M* = 11.5; *SD* = 3.2; 54.3% female; 79.8% White, 10.6% Multi-racial, 4.3% Black, 4.3% Asian, 1.1% Other; 7.4% Hispanic) who completed a large nationwide survey on autism characteristics and development in youth with DS. For the current study, only youth who used speech as a primary mode of communication were included. Via caregiver report, 54.3% (*n* = 51) spoke in single words or phrases, and 45.7% (*n* = 43) spoke using sentences. Additionally, 25.5% of the sample had uncorrected hearing loss. Caregivers completed the CCC-2, a 70-item questionnaire measuring language (i.e., speech, syntax, semantics, and coherence) and pragmatics (i.e., initiations, scripted language, context, nonverbal communication, social relations, and interests). At the end of the questionnaire, we asked caregivers if any of the CCC-2 items were inappropriate for or not applicable to their youth (yes/no).

**Results**: For Aim 1, in the full sample of youth with DS, 35.1% (*n* = 33) of caregivers indicated that some items were not appropriate or applicable for their youth (“Inappropriate”); 64.9% (*n* = 61) indicated that all items were appropriate (“Appropriate”). For Aim 2, there was a significant association between the youth’s verbal ability level (speaks in sentences vs. single words or phrases) and caregiver rating groups (Inappropriate vs. Appropriate), *Χ*2(1) = 19.18, *p* <.001. 15.2% (*n* = 5) of caregivers whose youth speak in sentences rated the CCC-2 as “Inappropriate,” whereas 84.8% (*n* = 28) whose youth speak in single words or phrases rated it as “Inappropriate.” There was no significant difference in the CCC-2 Global Communication Composite standard scores between the Inappropriate (*M* = 71.0, *SD* = 12.4) and Appropriate (*M* = 71.6, *SD* = 13.1) groups, *t* (92) = -.23, *p* = .82, Cohen’s *d* = -.05.

**Discussion:** Approximately one-third of caregivers stated that the CCC-2 included some items that were not appropriate for, or applicable to, their youth with DS. Significantly more caregivers whose youth do not yet speak in sentences rated the CCC-2 as including items that were inappropriate for their youth (compared to those whose youth speak in sentences). This is not surprising given that the CCC-2 was originally validated for children who speak in sentences. However, regardless of their youth’s verbal ability level, some caregivers reported that the CCC-2 included items that were not appropriate or applicable to their youth. Thus, it may not be a functional measure of communication, at least for some individuals with DS. Future research should evaluate the utility of the CCC-2 across the range of characteristics and communication profiles observed among individuals with DS. Despite caregiver ratings, across our sample, those who speak in simple sentences had higher standard scores on the CCC-2 than those who speak in single words or phrases, indicating the CCC-2 at least broadly differentiated language and communication skills in the expected direction.

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