**Title**: Preliminary examination of the validity of the Communication Complexity Scale applied during unstructured observations

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**Introduction**: The Communication Complexity Scale (CCS; Brady et al., 2012) is a 13-level scale used primarily to describe the communicative behaviors of individuals who are in the presymbolic stages of communication development. Numerous studies (Brady et al., 2012, 2018, 2020) have supported the validity of the CCS as a measure of communication complexity for individuals with intellectual and developmental disabilities (IDDs). However, in all existing research, CCS scores were obtained through videotaped in-person sessions of structured, scripted dyadic interactions. Thus, no current evidence exists examining the validity and utility of the CCS when applied to unstructured, remotely-collected video observations of parent-child interactions. Using such remote video observations and unstructured interactions could increase accessibility and flexibility for researchers and families participating in research, potentially allowing for more diverse samples of participants, as well as decreasing costs. The current study analyzed the association between CCS scores and standardized-assessment communication scores, as well as the sensitivity of CCS scores to changes in communicative behavior over time, using scores of children with IDDs from a sample of remotely-collected video recordings of unstructured parent-child interactions.

**Method**: As part of a larger, ongoing study, five-minute video recordings of unstructured parent-child free play sessions were collected via remote video conferencing software from families’ homes. For the current analysis, participants who spoke in phrase speech were excluded. Data analysis is ongoing, but to date, data from 18 parent-child dyads (children aged 2 to 12 years, mean = 4.9 years, 61% male) with two sessions approximately 13-18 months apart have been coded with a modified version of the CCS using a 15-second partial interval system. The mean CCS score across all intervals (CCS mean) and across the three intervals with the highest scores (CCS optimal) were calculated for each observation. Raw scores from the Developmental Profile 4 (DP-4; Alpern, 2020) communication subscale were available for 15 participants, with the time between administration of the DP-4 and the CCS observation varying between 4 and 26 months. Analyses included non-parametric correlations between scores on the CCS and DP-4, and average change in CCS scores between observations.

**Results**: At the first observation (T1), CCS mean scores ranged from 2.2 to 7.0 (SD = 1.75), and CCS optimal scores ranged from 3 to 11 (SD = 3.2). Raw communication scores on the DP-4 ranged from 4 to 23 (mean = 15.1). At the second observation (T2), CCS mean scores ranged from 2.4 to 11.0 (SD = 2.9), and CCS optimal scores ranged from 3.0 to 12.0 (SD = 0.5). A total of 13 participants had higher mean CCS scores at T2 relative to T1, with the average change being 1.3 points. Similarly, 13 participants had higher CCS optimal scores at T2 relative to T1, with an average increase of 1.2 points. The correlation between CCS and DP-4 scores was .402 (p = .069) for CCS mean scores, and .556 (p = .016) for CCS optimal scores.

**Discussion:** These results indicate that CCS mean and optimal scores collected in this context are moderately correlated with DP-4 scores. In addition, the majority of children in this sample showed increases in CCS mean and optimal scores across timepoints, suggesting that the CCS is sensitive to changes in communicative behavior over time in this context. While these findings support the validity of the modified version of the CCS used in this study, the small sample size and large variation in time between DP-4 administrations and CCS observations are limitations of this study. Future research is needed in order to further examine these correlations and strengthen the validity of the CCS as a measure of communication complexity in unstructured, remotely-collected video observations of parent-child interactions.

**References:**

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