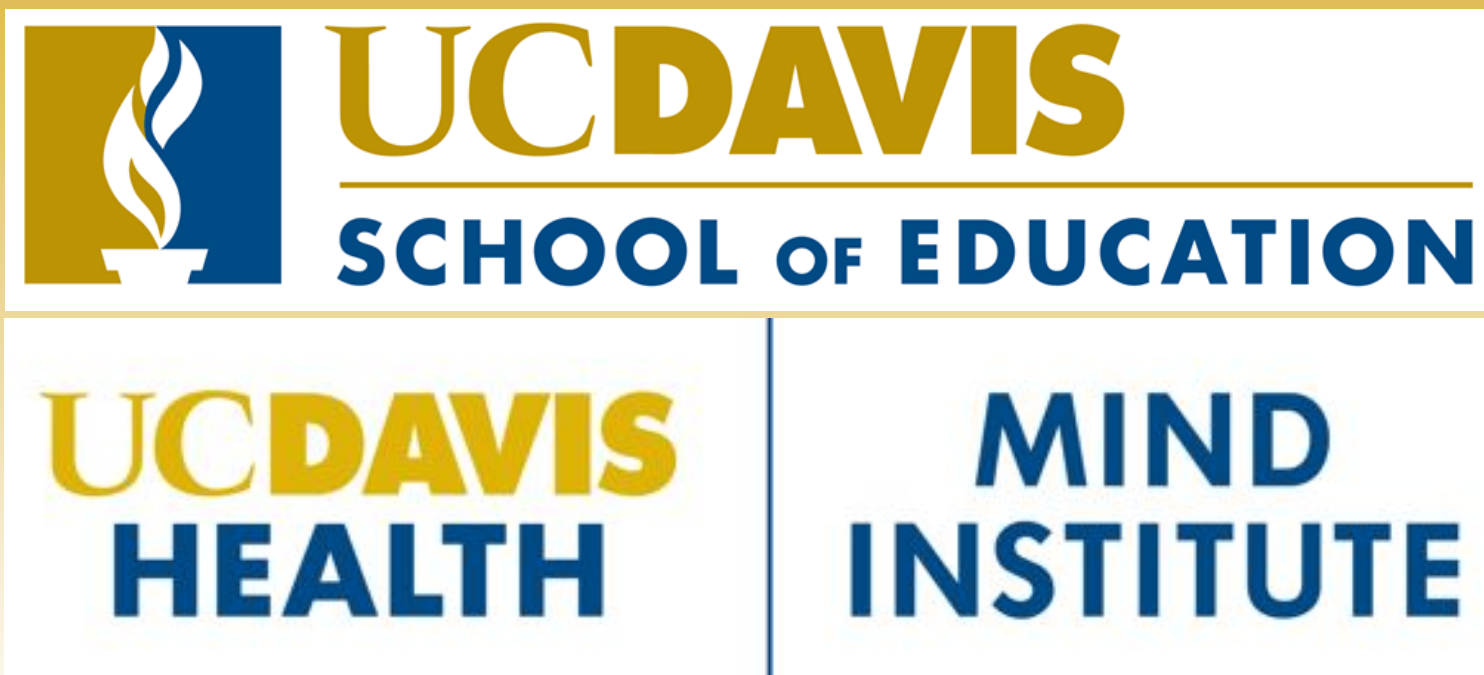




Measurements of Spontaneous Communication Initiations in Children with Autism in Preschool through Third Grade Classrooms

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Introduction

Study Purpose

Children with autism initiate communication at different rates and for different functions (Clifford et al., 2010; Hauck et al., 1995; Stone & Caro-Martinez, 1990). These differences can provide insight into the heterogeneity of the autism phenotype and expand our understanding of how communication manifests within different environments and how communication development can be supported in different environments. We have made great strides in understanding and measuring communication in young children with autism in clinical settings (Lord et al., 2000; Mundy et al., 1996; Wetherby & Prizant, 2002). Yet, there is still much to learn about how and why elementary-age children with autism spontaneously communicate within classroom settings and the developmental features that are associated with the frequency and function of their communication initiations. This study examines the frequency, function, and structure of initiating communication, along with its associative properties.

Research Aims

1. To examine the frequency and function of spontaneous communication initiations within a large sample of children with autism in preschool–3rd grade, as they engage with their teachers and peers during various structured and unstructured classroom activities.
2. To evaluate the structure of spontaneous communication within classroom activities using structural equation modeling (SEM).
3. To examine the predictive association between child features, including age, sex, autism severity, adaptive behavior, and receptive language and spontaneous communication.

Methods

Participants

The current study included preschool–3rd grade children with autism ($n = 112$) and their teachers ($n = 65$) across 16 districts in CA. The majority of videos were recorded in special education classes. See Table 1.

Child Participants Characteristics & Standardized Measures
Table 1

| | <i>n</i> | Mean | St Dev | Min | Max |
|-----------------------------|------------|-------|--------|------|-------|
| Age, | 112 | 6.18 | 2.04 | 3.15 | 10.74 |
| Sex (% Male) | 111 (81.3) | | | | |
| Autism Severity | 107 | 7.71 | 1.60 | 4 | 11 |
| Adaptive Behavior | 98 | 68.44 | 14.27 | 29 | 100 |
| DAS II (receptive language) | 109 | 36.5 | 23.25 | 7 | 153 |

Note. Missing data appeared at random. Autism severity was measured using the ADOS. Adaptive behavior was measured using the Teacher Vineland. Receptive language was measured using the DAS-II, an age equivalent score.

Observational Procedures and Measures

Archival videos were pulled from a longitudinal project evaluating the efficacy of a classroom-based intervention. Videos were coded at the level of the child using Noldus Observer® Video-Pro Software (XT 14; 2017) in a multiple-pass procedure. In pass 1, two trained observers coded the videos for activity and learning context, following procedures outlined by Sparapani and colleagues (2016). In pass 2, four trained observers coded communication initiations in a 2-step process.

- (1) Determine the qualification of the initiation and identified the form of the initiation as described on the Classroom Measure of Active Engagement (CMAE; Sparapani et al., 2016). Communication initiations include all instances when a child spontaneously directed language (oral, written, gestural, etc.) toward a peer or teacher for a particular function.
 - (2) Identify the function of the initiation.
- Once the video observations were coded, we systematically sampled 12-minutes from each observation in order to select a range of structured and unstructured activities across the length of the observation (from beginning, middle, and end). 16% of the observations did not have 12-minutes of time to sample (sampled time ranged between 5.55 to 11.21 minutes).

Results

Research Aim 1: Descriptive Statistics

Within the 12-minute sample of classroom activities, the children initiated 7.53 (9.42) instances on average. Children initiated communication for the function of commenting (or to comment; 3.49 instances) more frequently than all other communicative functions. Children communicated to advocate less often than other functions, although the average frequency for all communicative functions were less than 1.0 instance. Initiations were coded as directed toward peers, teachers, or everyone. Of the total initiation, children only initiated to their peers 8% of the time, compared to 85% of the time where initiations were directed toward adults (teachers and paraprofessionals). 7% of initiations were directed toward “everyone” in a group, making it difficult to observe who the child was communicating with. See Table 2.

Summary Statistics for Initiating Communication Functions

Table 2

| Communicative Functions | Mean | St dev | Max ¹ |
|--------------------------------|------|--------|------------------|
| Protesting | 0.96 | 3.00 | 25.0 |
| Requesting | 0.81 | 1.25 | 6.0 |
| Initiating Social Routines | 0.43 | 1.11 | 7.0 |
| Advocating | 0.22 | 0.72 | 5.0 |
| Seeking Predictability | 0.25 | 0.69 | 4.0 |
| Commenting | 3.49 | 4.86 | 20 |
| Using Repair Strategies | 0.36 | 0.86 | 4.0 |
| Seeking Information | 0.36 | 0.94 | 5.0 |
| Securing Attention | 0.29 | 1.01 | 7.0 |
| Giving | 0.34 | 0.82 | 5.0 |
| Total Initiations ² | 7.53 | 9.42 | 52.0 |

Note: $N = 112$. All data represents count data. 18% of children did not initiate communication at all in any activity.

¹Minimum for all variables is 0.

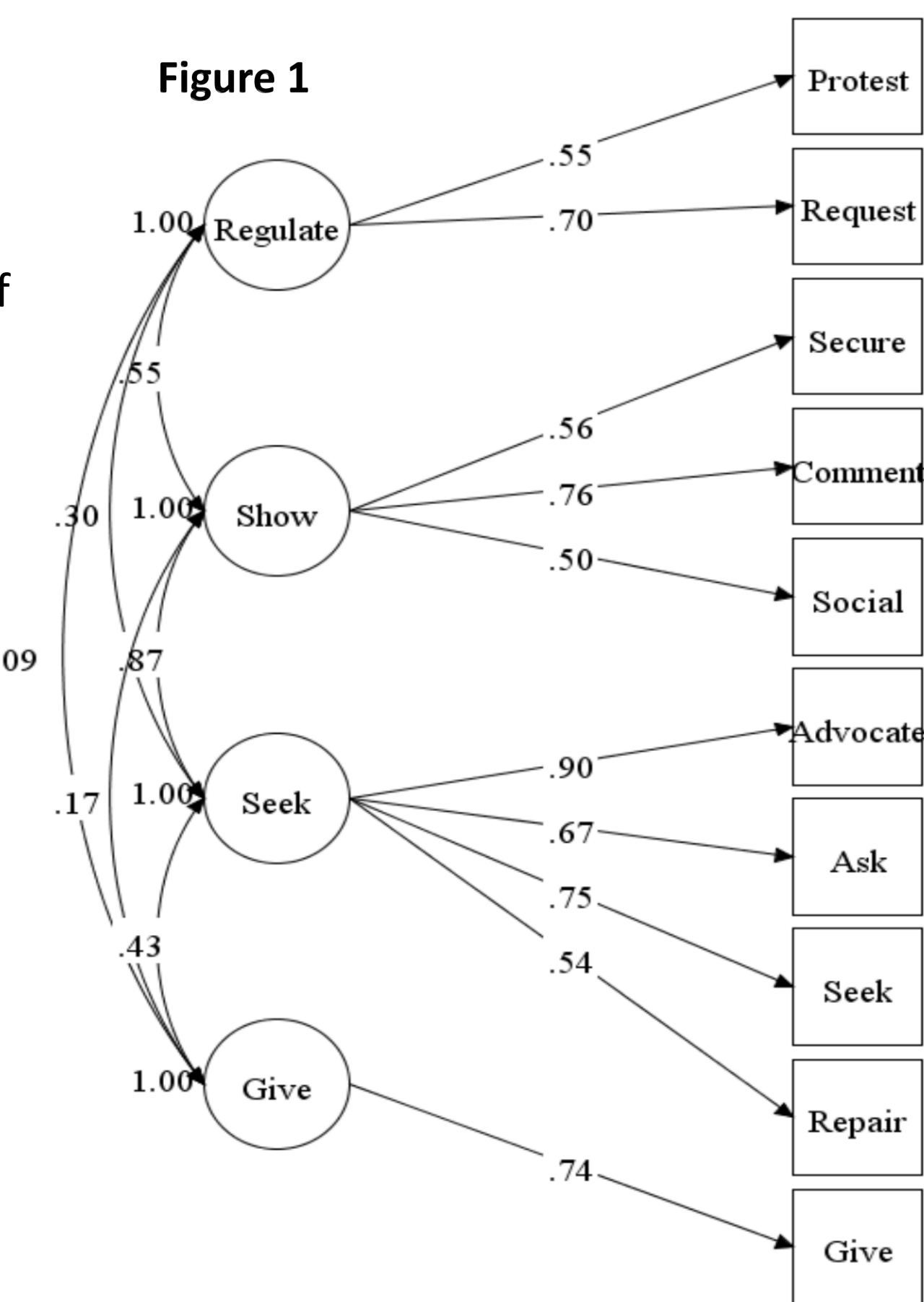
²The total sum for all initaitions is 843.

Research Aim 2: Confirmatory Factor Analysis (CFA)

In order to better understand the dimensionality of spontaneous communication within classrooms, we evaluated four competing models drawn from the literature. The 4-factor model evidenced excellent fit to the data, (RMSEA = 0.03 [0.00–0.08]; CFI = 0.98; $\chi^2/df = 0.92$) and the best relative fit compared to the competing models ($p < .05$). See Figure 1. The four factors consisted of: (1) Regulating the Behavior of Others (protesting, requesting), Showing or Focusing Attention to Oneself (initiating social routines, securing attention, commenting), Seeking Information (advocating, seeking predictability, using repair strategies, seeking information), and Giving (giving). See Figure 1.

Research Aim 3: Structural Equation Modeling (SEM)

The SEM model evidenced good fit to the data [RMSEA = 0.03 (0.00–0.07); CFI = 0.96; $\chi^2/df = 0.92$]. Overall, we observed differential associations between child features and the spontaneous communication latent factors, indicating that different child features significantly predict or influence different types of communicative intentions. Students’ receptive language skills explained a significant amount of variance to the Directing Attention to an Object or Event ($\beta = 0.45$; $p < 0.01$) and Giving latent factors ($\beta = 0.63$; $p < 0.001$). Whereas autism severity (less severe symptomology) explained a significant amount of variance to the Giving latent factor ($\beta = -0.30$; $p < 0.05$), and sex (female) explained a significant amount of variance to the Seeking Information latent factor ($\beta = 0.21$; $p < 0.05$). The path coefficient for adaptive behavior on the Showing or Focusing Attention to Oneself latent factor was positive and approaching significance ($\beta = 0.30$; $p = 0.09$). The child features did not contribute significant variance to the Regulating the Behavior of Others ($p > 0.05$).



Conclusions and Future Directions

Using observations of preschool–3rd grade general and special education classrooms, this study examined the frequency and function of spontaneous communication initiations in structured and unstructured activities within a large sample of children with autism. Our findings showed that children with autism exhibited a limited range of communicative functions overall and infrequently initiated communication to their peers (8%); 18% of the sample of children did not initiate communication at all. Helping educators to evaluate and support children’s communication may be an area for professional development. However, understanding whether and how classroom communication, including interactions with peers, is related to social and academic outcomes for children with autism is an area for future research. In defining the structure of spontaneous communication, this study expands on past studies and provides initial evidence for conceptualizing the measurement of communication for learners with autism in classrooms. Finally, these data provide insight into specific child characteristics, such as being female, that predict how and why children with autism communicate in classrooms.

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