Introduction

Background: Specific language impairment (SLI) is diagnosed on the basis of language ability. Morphosyntactic deficits are core components of SLI, although deficits in phonology are frequently observed, as well as impairments in fine, gross, and oral motor skill. However, the interactions between morphosyntactic, phonological, and motor deficits in children with SLI are still debated in the field. We hypothesize that these factors combined result in high levels of variability at the execution stage, which becomes a critical issue in the process of identification and intervention.

Objective: To determine whether and how two sources of variability, segmental and articulatory movement, interact in children with SLI. Currently, standard

Behavioral Data

Children (monolingual English speakers) with SLI (n = 12) and children who are typically developing (TD; n = 12), aged 4-6 years.

Children with SLI defined based on exclusionary criteria (Leonard, 2014):

- Normal hearing
- Performance in the normal range on the Columbia Mental Maturity Scale (CMMSS)
- Impaired performance on Structured Photographic Expressive Language Test—Normal hearing

Group (n=12)

- Children with SLI defined based on exclusionary criteria (Leonard, 2014): Impaired performance on Structured Photographic Expressive Language Test—Normal hearing

Objective: Fine/Gross Motor Assessment

Aiming & Catching

Clinical Implications:

- As compared to typically developing same-aged peers, children with SLI demonstrate predicted deficits in accuracy, and segmental and articulatory variability. However, when exploring the interactions among these areas, children with SLI appear to demonstrate differential developmental trajectories within each domain, with no single system implicating the others.
- One interpretation is that the relationship between these variables may be attributed to higher-order processes that support linguistic and non-linguistic functions such as sequencing, timing and co-ordination (Voools, Goffman, & Zeltman, in review).
- Given the different patterns of convergence when examining the time course for accuracy and variability, a new approach to analyzing the dynamics of phonological and motor skill is needed. Network science provides one such alternative, as it has the ability to capture and map patterns of variability in a dynamic and visually salient manner.

Discussion

References


Figure 3. Significant group differences in accuracy across sessions (p<0.001), Session effect (p=0.02) with some learning over time.

Figure 4. Significant group differences in accuracy across sessions. Session*group interaction (p<0.001), revealing narrowing of group differences by session 3.

Figure 5. No overall group differences in kinematic variability (p=0.32), but session*group interaction (p<0.001), revealing that groups converge by session 3.