A 2-2-1 Multilevel Mediation Model to Study Peer Effects on Language Growth
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Motivation
- Children and adolescent’s growth over an academic year is positively associated with skill levels of their classmates (Hanushek, Kain, Markman & Rivkin, 2001; Henry & Rickman, 2007; Mashburn, Justice, Downer & Pianta, 2009).
- It is beneficial for children to learn in classrooms in which they are surrounded by classmates who have relatively high skills in key areas of achievement, such as language, reading, and mathematics (Hanushek et al., 2001).
- It is still unclear whether peer effects manifest themselves through direct pathways, such as child-to-child interaction, or indirect pathways, such as teacher expectation and efficacy.

Research Question
- Do peer effects operate via direct or indirect pathways to influence preschool children’s language growth over an academic year?

Participants
- 725 preschool-aged children enrolled in 83 Early Childhood Special Education (ECSE) classrooms in multiple school districts in a single Midwestern state.
- 83 lead teachers
  - 99% females
  - About 94% White, 3% African American, 3% Native American, 1% Asian
  - 48 teachers (about 58%) had a Master’s degree or higher education level.
  - Teachers had an average of 12 years of teaching experience (SD = 9.2 years, range 0 to 32 years)
- The percentage of students with IEPs (Individualized Education Program) in each class varied. About one-half of the children in each class had IEPs (M = 56.16%, SD = 15.38%, range from 25% to 100)
- 725 children
  - 64.69% boys
  - Mean age was 4 years, 4 months (SD = 7 months) with a range of 2 years, 11 months to 5 years, 8 months.
  - Race/Ethnicity
    - About 64% White, 9% African American, <2% Latino, <2% Asian, 7% Other, and 17% missing.
    - Median income level of families was between $55,001 - $60,000 (About 19% of sample did not report income level)
  - 55.86% of children had an IEP
- Data structure
  - Level 1: 725 kids
  - Level 2: 83 classrooms
  - Number of kids per classroom ranges from 6-11 (M = 9.15, SD = 1.11)
  - ICC: 28%

Measures
- Children’s pragmatic language skills were measured at the fall and spring of the academic year using the Descriptive Pragmatics Profile (DPP).
  - This measure is completed by the teacher by responding to 26 description of specific language skills (e.g., asks for help from others; introduces new conversation topics) on a four-point scale (1=never, 4=always)
  - Internal consistency for our sample for both fall and spring scores were high at .97 and .97, respectively

Results
- Level 1
  - Child Reference Status
    - Created using the fall score of the DPP.
    - Reference status represent an individual’s child language skill relative to his or her peers (the DPP fall classroom median).
    - Child IEP (1=yes, 0=no)
- Level 2
  - Peers’ language skills (grand mean centered): based on the average of the language scores (using DPP).
  - Instructional Quality of the classroom
  - Classroom Assessment Scoring System PreK (Pianta, LaParo & Hamre, 2006)
  - Includes 10 subscales organized in 3 domains: Instructional Support, Emotional Support and Classroom Organization.
  - Current study only looks at Instructional Support, and Emotional Support.
  - Instructional Support composed of concept development, quality of feedback, and language modeling.
  - Emotional Support composed of positive climate, negative climate, teacher sensitivity, and regard for student’s perspectives.

Data Analytic Strategy
- We used Preacher, Zyphur, and Zhang (2010) approach to test mediation under a multilevel structural equation modeling (MSEM) framework (Muthén & Asparouhov, 2008)
- Mplus was used for analysis.
- To test for the indirect effect, we used Monte Carlo Confidence Intervals for Indirect Effects as described in Preacher and Selig (2012).

Conclusion
- None of the models provided evidence supporting the hypothesis that instructional quality moderates peer effects
- The pathway from instructional quality to the spring language score were positive and significant in both models.
- The pathway from peer effects to the spring language score were positive and significant in both models.

References

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