Within-Person Analysis of Developmental Cascades of Externalizing Problems, Academic Competence, and Internalizing Problems from Kindergarten to Fifth Grade

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Abstract
We examined cascade processes of externalizing problematic behaviors, internalizing problems, and academic competence in a nationally representative sample of U.S. kindergartners followed through Grade 5 using LCM-SR. We found evidence for a cascade from externalizing to internalizing problems via reading difficulties, but only between kindergarten and Grade 2. We also found evidence of cascades from math difficulties to subsequent internalizing problems to subsequent math difficulties from Grade 1 to Grade 5.

Method
Data: Early Childhood Longitudinal Study: Kindergarten Cohort of 2010-11. Analytic Sample: 7,972 children with teacher-reported data and child direct assessment data from six rounds of data collection (i.e., springs of kindergarten, 1st, 2nd, 3rd, 4th, and 5th grades). Analyses were weighted so the results of the analyses are generalizable to the national population of US children in kindergarten in the 2010-11 school year. Measures: Externalizing and Internalizing problems subscales drawn from the Social Rating Scale (Teacher-reported); Directly assessed IRT-based Math and Reading scores

Model: Latent Curve Model with Structured Residual (LCM-SR): Curran et al., 2014. See Figure 1 for an example of bivariate LCM-SR where the variance in each observed repeated measure is separated into between- and within-person components and cross-lagged relations are estimated based on the within-person component; See Figure 2 for the within-person part of LCM-SR with three outcomes; used MCL estimation; adopted CFI ≥ .95, RMSEA ≤ .06, and SRMR ≤ .05 as criteria for indicating good-to-excellent fit (Hu & Bentler, 1999); compared nested models using the Satorra-Bentler scaled chi-square test statistic (Satorra & Bentler, 1994).

Result
- Observed Cascades among Externalizing Reading, and Internalizing Problems
- Figure 1. Diagram of LCM-SR with two outcomes
- Figure 2. Within-person part of LCM-SR with three outcomes
- Figure 3. Autoregressive & Crosslagged Parameters from LCM-SR with Externalizing Problems, Math Competence, & Internalizing Problems
- Figure 4. Autoregressive & Crosslagged Parameters from LCM-SR with Externalizing Problems, Reading Competence, & Internalizing Problems

Discussion
Summary & Discussion
- Found evidence for bidirectional relations b/w externalizing and internalizing problems only in the earliest grades: positive paths from externalizing to internalizing and a negative path from internalizing to externalizing.
- Math difficulties (relative to reading) appear to play more important and consistent roles in developing behavior problems, especially internalizing problems.
- Evidence for cascades from Grade 1 math difficulties to Grade 2 internalizing problems which then cascaded on Grade 3 math difficulties and so forth → Suggest the importance of interventions to break this repetitive cycle.
- Evidence for a cascade from externalizing to internalizing problems via reading difficulties (but only b/w K-2) → Suggest that the cascades from externalizing to internalizing problems via reading difficulties may occur in the earliest grades but not in later elementary school age.

Next Step
- Need to test for gender invariance

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Note: Only significant parameter estimates are displayed. Blue arrows represent positive, significant crosslagged paths. Red arrows represent significant negative crosslagged paths.