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 problems, internalizing problems, and academic competence in a nationally representative sample of U.S. kindergarteners 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.

Introduction

Background
- Externalizing problems are undercontrolled style of behavior problems (e.g., aggressive, mpulsive behavior); Internalizing problems are overcontrolled type of behavior problems (e.g., depressed, anxious); These two domains of behavior roblems often co-occur.
- One theoretical approach to explain this co-occurrence is developmental cascade models, in which a sequence of direct and indirect associations among externalizing, internalizing, and functional difficulties in other domains (e.g., academic functioning) lead to multiple impairments over time (Masten & Cicchetti, 2010; Masten et al., 2015).
- Past studies testing developmental cascades b/w externalizing-internalizing typically used CLPM (e.g., van Lier et al., 2012), so did not appropriately disaggregate within- and between-person effects

Purpose of the Study
- Examine within-person cascade and transactional processes of externalizing problems, internalizing problems, and academic competence longitudinally from kindergarten to Grade 5 by appropriately disaggregating within- and between-person effects

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 analysis are generalizable to the national population of US children in kindergarten in the 2010-11 school year.

Measures: Externalizing and Internalizing problem subscales drawn from the Social Rating Scale (Teacher-reported); Directly assessed IRT-based Math and Reading scores

Method: Latent Curve Model with Structured Residual (LCM-SR: Curran et al., 2014, See Figure 1 for an example of bivariate LCM-SR where total 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 MLR estimation; adopted CFI ≥ .95, TLI ≥ .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).

Final Best-Fitting Models:
- For externalizing & internalizing: the intercept & linear slope factors were estimated; the variance of slope factors were fixed at 0.
- For academic outcomes: the intercept, linear, & quadratic slope factors were estimated; the variance of slope factors were fixed at 0.
- At the between-person level, the intercept factors were allowed to be freely correlated with each other.
- At the within-person level, all autoregressive and crosslagged parameters and within-time residual covariances were allowed to be freely estimated over time.
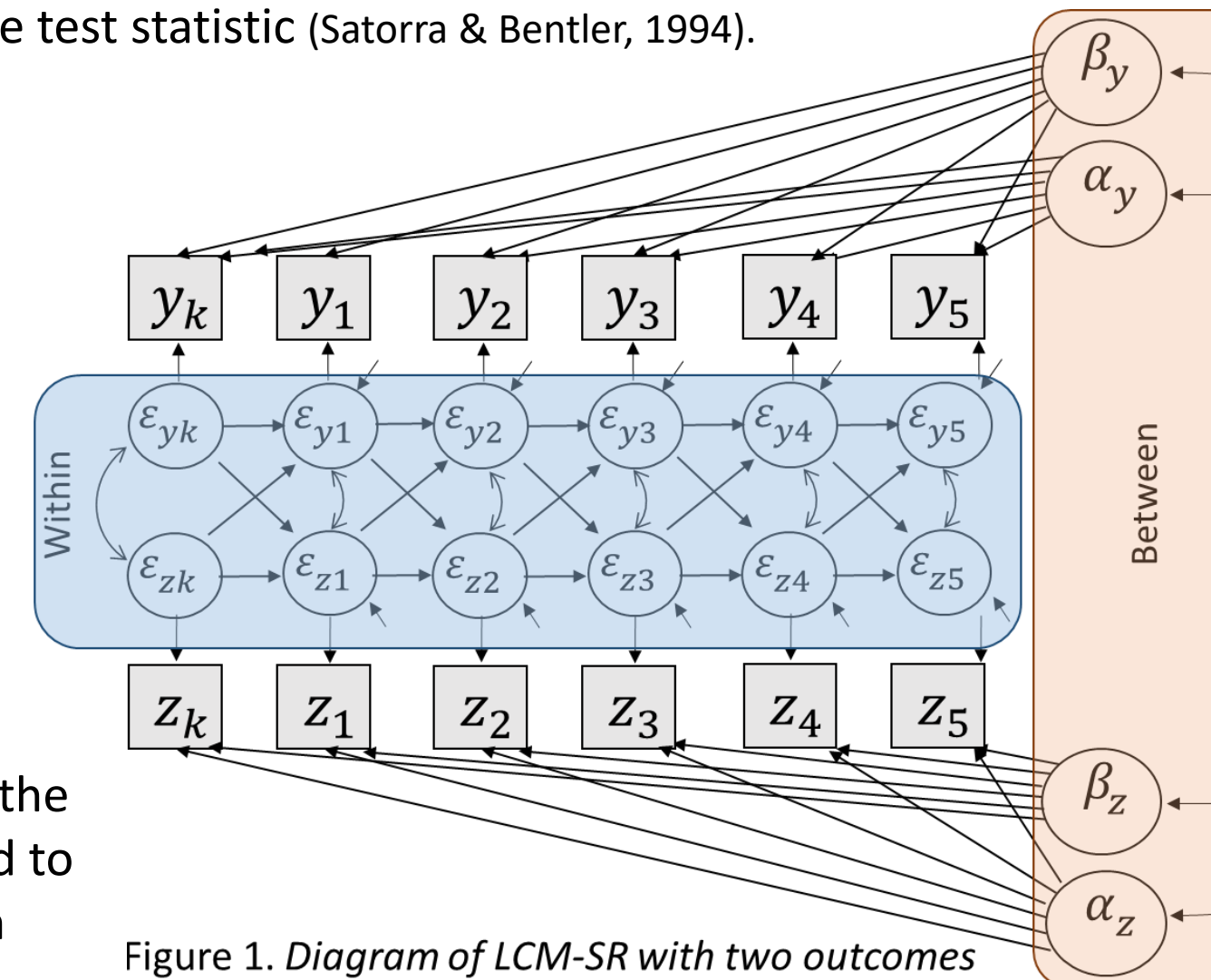- The final models showed good fit (e.g., CFI .97, RMSEA.05, SRMR .05)
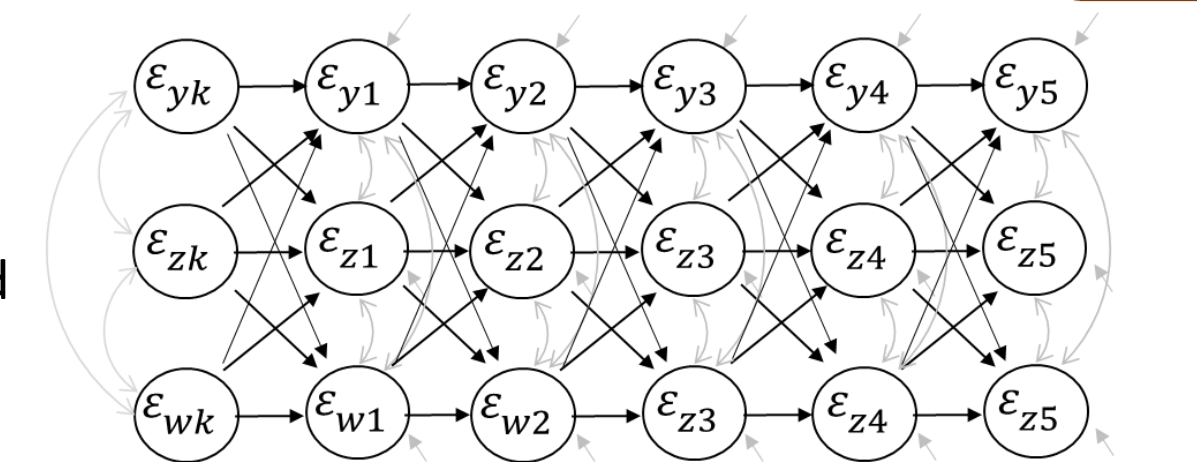

Figure 1. Diagram of LCM-SR with two outcomes

Figure 2. Within-person part of LCM-SR with three outcomes

Result

Figure 3. Autoregressive & Crosslagged Parameters from LCM-SR with Externalizing Problems, _Math_ Competence, & Internalizing Problems
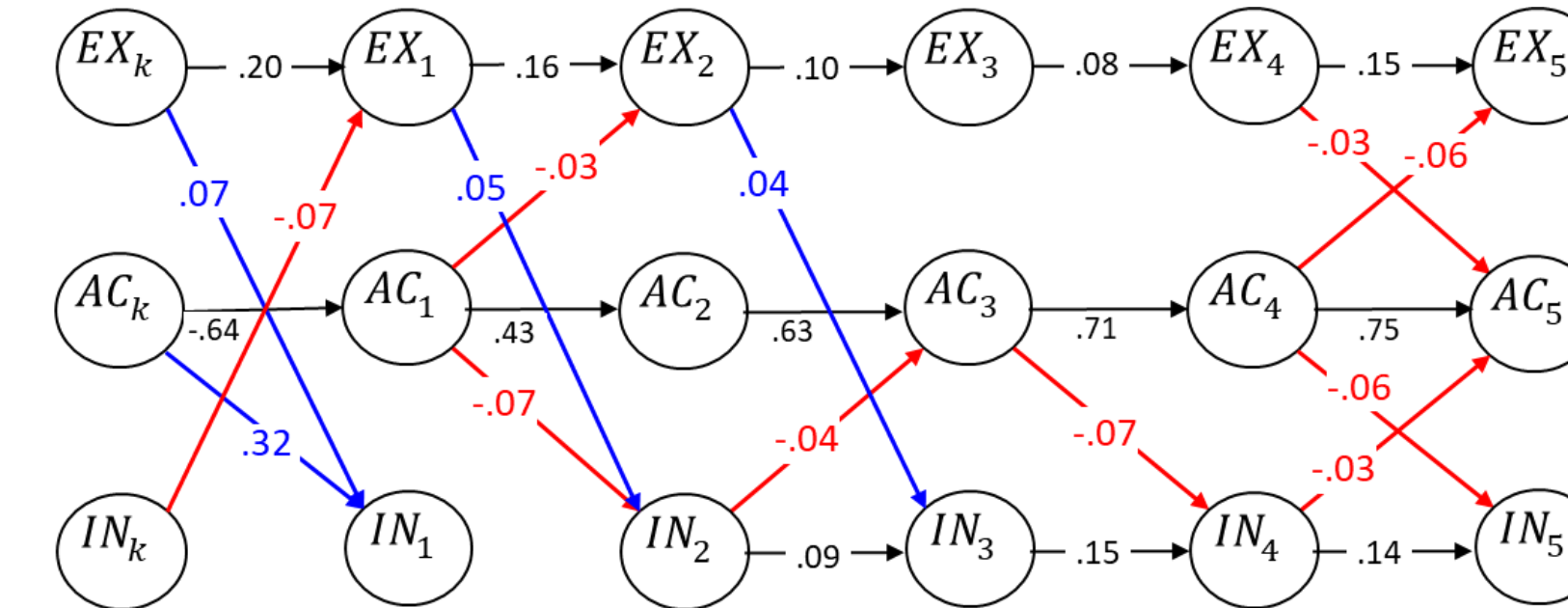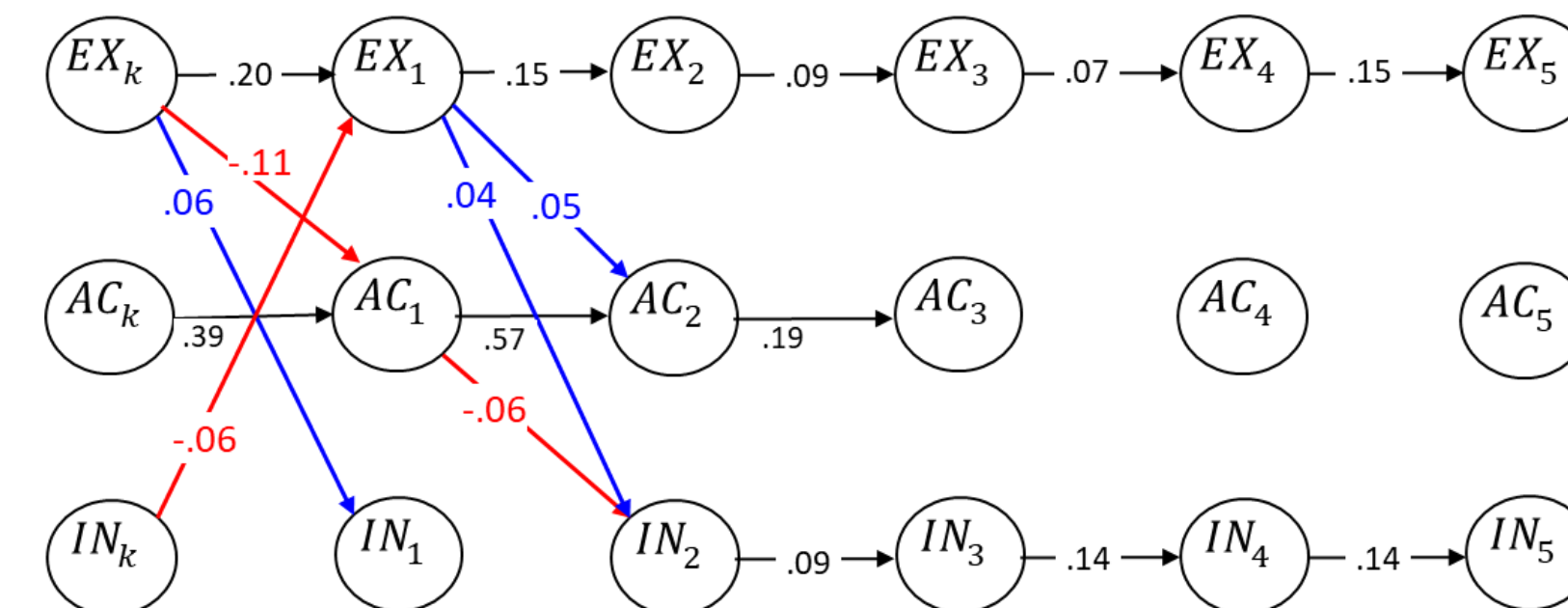

Figure 4. Autoregressive & Crosslagged Parameters from LCM-SR with Externalizing Problems, _Reading_ Competence, & Internalizing Problems

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

Observed Cascades among Externalizing, Math, and Internalizing
- Poorer Math at G1 → Higher EX at G2 → Higher IN at G3
- Higher EX at G1 → Higher IN at G2 → Poorer Math at G3
- Poorer Math at G1 → Higher IN at G2 → Poorer Math at G3 → Higher IN at G4 → Poorer Math at G5
- Lower IN at K → Higher EX at G1 → Higher IN at G2

Observed Cascades among Externalizing Reading, and Internalizing
- Higher EX at K → Poorer Reading at G1 → Higher IN at G2
- Higher IN at K → Lower EX at G1 → Lower IN at G2
- Higher IN at K → Lower EX at G1 → Lower Reading at G2

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