

Maternal Autonomy Support in Infancy and Mathematics Skills Trajectories in Elementary School: The Moderating Role of General Cognitive Abilities

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Introduction

Mathematics performance in first years of school → strong predictor of future academic success & college enrollment (Duncan et al., 2007; Entwisle et al., 2005).

Maternal autonomy support & children's general cognitive abilities relate to mathematics performance,

- but longitudinal studies are limited (Geary, 2011; Johnson et al., 2011; Vasquez et al., 2017).

Interactional processes involving parenting and child characteristics

- rarely addressed in relation to mathematical development (Elliott & Bachman, 2018).

The **aim** of this study was to examine the **interactive processes** involving maternal autonomy support and children's cognitive abilities and how they predict *growth in mathematical skills* over the first three years of school.

Method

113 mother-child dyads (62 girls)
Low-risk community sample

General cognitive abilities (M = 12.57 months; Bayley, 1993)

- Mental Development Index of the Bayley Scales of Infant Development
- Assesses children's cognitive development

Maternal autonomy support (M = 15.52 months; Whipple et al., 2010)

10 min. videotaped mother-child interactions

Maternal behaviors coded for:

1. Appropriate help
2. Maternal verbalizations
3. Perspective taking
4. Supporting volition



Scores are averages of 3 tasks (2 puzzles, a tower of block)

Excellent inter-rater reliability (ICC=.96)

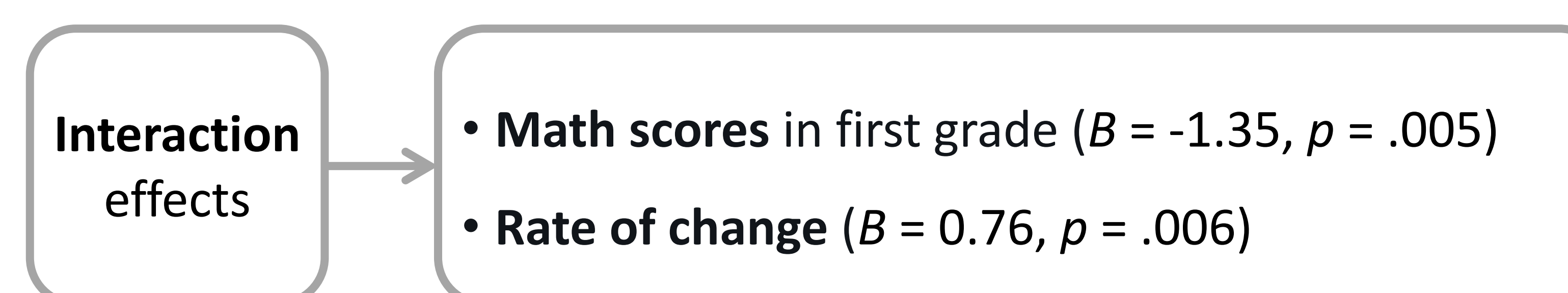
Mathematical skills (Grade 1, Grade 2, Grade 3; Weschler, 2008)

- Weschler Individual Achievement Test
- Mathematics reasoning subscale (0 – 67)

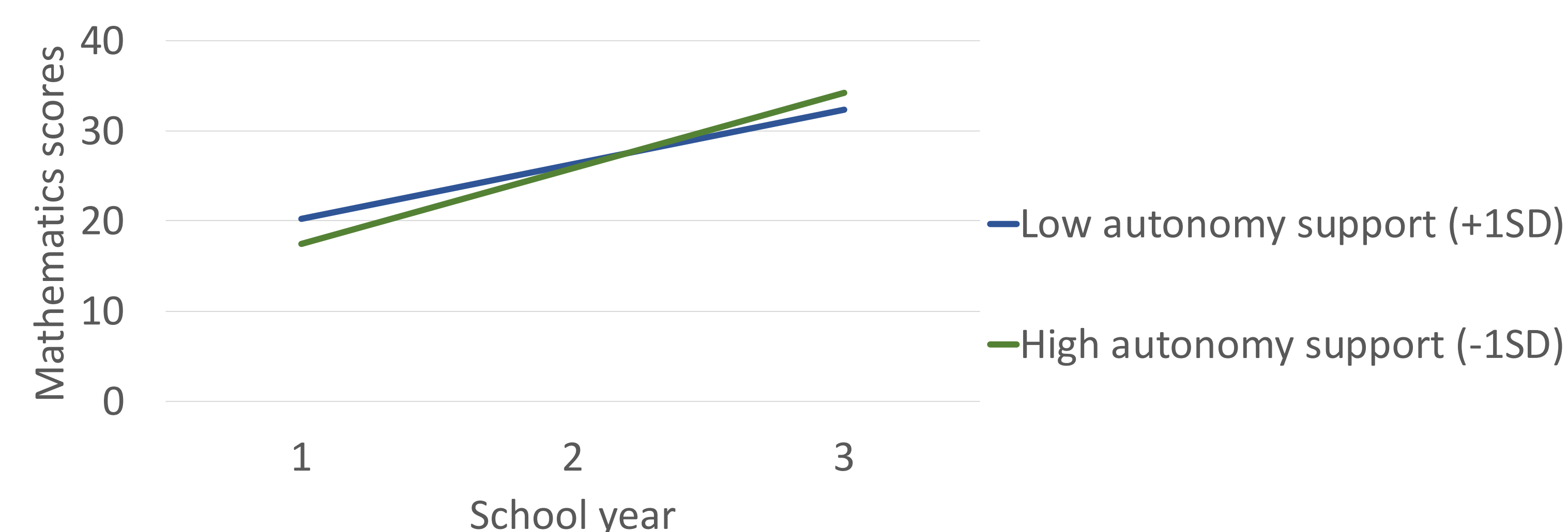
Results

- Growth curves analyses (Multilevel modeling in Mplus)
- Mathematics skills trajectories from 1st to 3rd grade
- Missing data: maximum likelihood estimation with robust standard errors

Neither autonomy support **nor** general cognitive abilities predict mathematics skills in grade 1 (intercept) or rate of change (slope), all $ps > .05$. However,



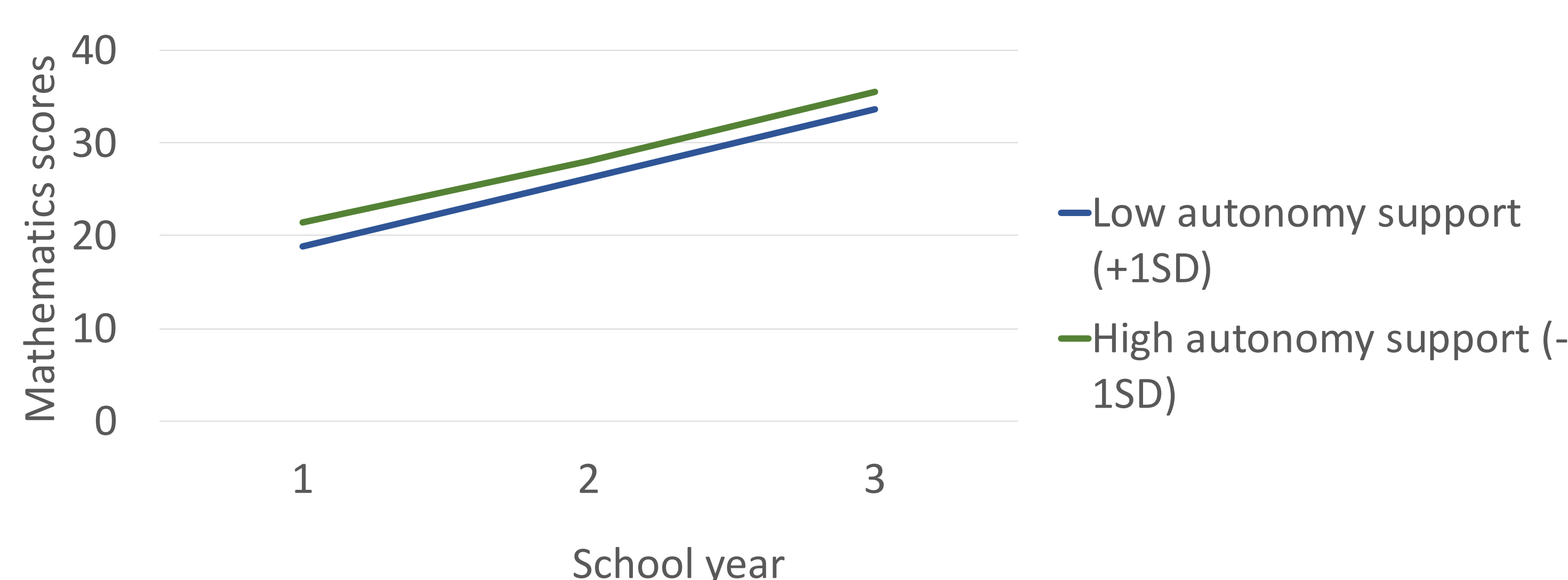
Among children with **higher general cognitive abilities**,



Autonomy support

- does not predict mathematics scores in first grade ($p > .05$),
- but predicts a **faster rate of change between first and third grades** ($B = 1.16, p = .008$).

Among children with **lower general cognitive abilities**,



Autonomy support

- does not predict the rate of change ($p > .05$),
- but predicts **higher mathematics scores in first grade** ($B = 1.31, p = .021$).

Discussion

Relation between early autonomy support and later mathematics skills → *depends* on children's initial cognitive abilities.

Maternal autonomy support **fosters**

- intrinsic motivation to learn
- effort and engagement
- better executive functions in children

which could, in turn, **promote** mathematical performance (Bindman et al., 2015; Grolnick et al., 1991; Pomerantz & Grolnick, 2017).

Further studies should address the role of **concurrent autonomy support** in mathematics performance during elementary school, especially with at-risk children.

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