

Elementary Schoolers' Development of Self-Regulation: Do Effortful Control and Executive Function Co-Develop?

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Self-Regulation

Executive Function (EF):

- Neurocognitive skills that underlie goal-directed thought and action (Zelazo et al., 2017)
- Working memory, cognitive (attentional) flexibility, inhibitory control
- Directly assessed with novel tasks
- Rapidly developing during infancy, early- and middle- childhood

Effortful Control (EC):

- Temperament theory (Rothbart & Bates, 2006):
 - Attentional Focusing, Inhibitory Control
- Indirectly assessed by adult (or self) report
- Theorized as a (relatively) stable individual trait

Purpose

Understand how behavioral and cognitive aspects of self-regulation co-develop during elementary school.

- Whether to expect that teachers will see children's self-regulatory behaviors normatively improving over time
- Whether children's development of self-regulatory behaviors in the classroom primarily reflect their internal cognitive capacities or if there are other contextual and personal factors at play
- Whether the extent to which internal cognition supports externally-observed behavior over time varies for different children

Data

Early Childhood Longitudinal Study, Kindergarten Class of 2010-2011 (ECLS-K)

Analytic Sample: $N = 7,735$

EF: Dimensional Change Card Sort (DCCS)

EC: Temperament in Middle Childhood Questionnaire (TMCQ)

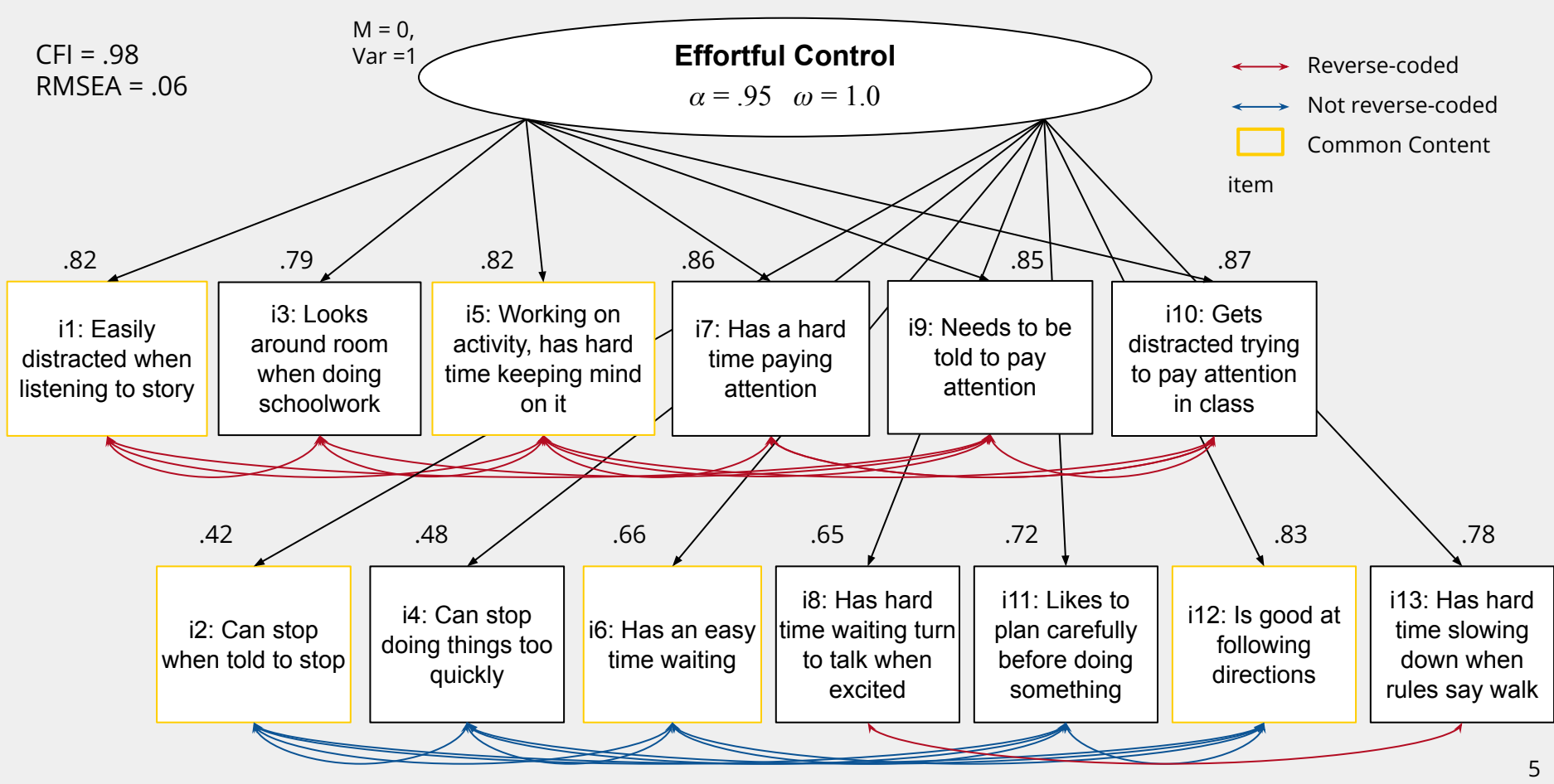
- Teacher reports of *Inhibitory Control* and *Attentional Focusing*
 - Likert-type (1-5)
- Equated to measure growth across time

TMCQ

Wave	5	6	7	8	9
Grade	2, F	2, S	3, S	4, S	5, S

DCCS:
Combined score* (1.25 - 10) =
Accuracy (1.25 - 5)
+
Reaction time (1 - 5)
*Only for children with Accuracy > .80%

Confirmatory Factor Analysis of EC



Objective

Explore the co-development of EF
and EC from 2nd-5th grade

1. To what extent are children's developmental trajectories of EC related to those of EF, when accounting for individual differences and within-person change?
2. Is there evidence of unobserved systematic heterogeneity (i.e., multiple latent subpopulations) in the co-development of EC and EF?

Analysis Plan

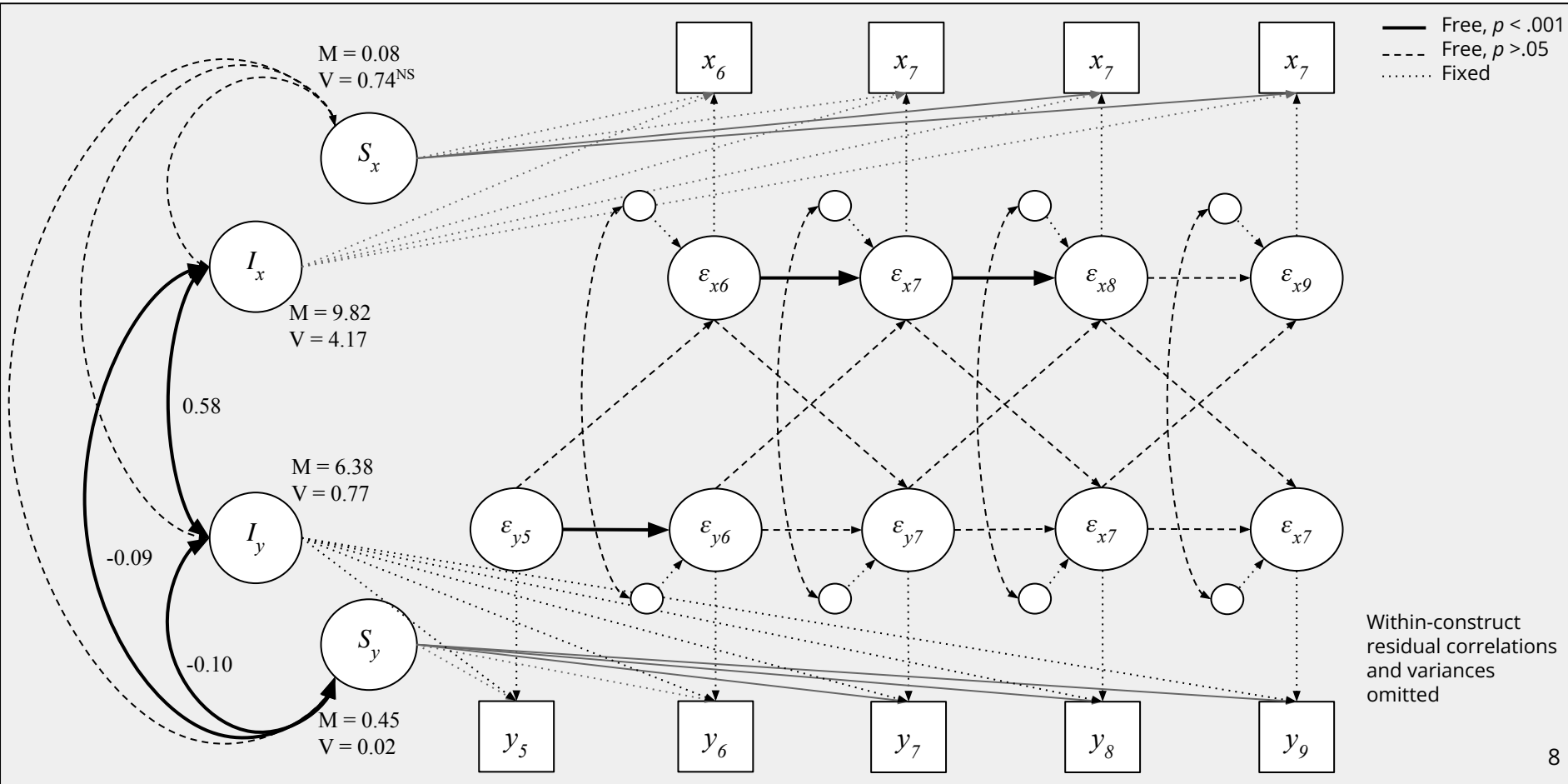
RQ1:

- Parallel-process latent growth curve model with structured residuals (LGC-SR; Curran et al., 2014)

RQ2:

- Multivariate Growth Mixture Model (MGMM; Wickrama et al., 2021)

RQ5: Parallel-Process LGC-SR of EC and EF, 2nd-5th Grade



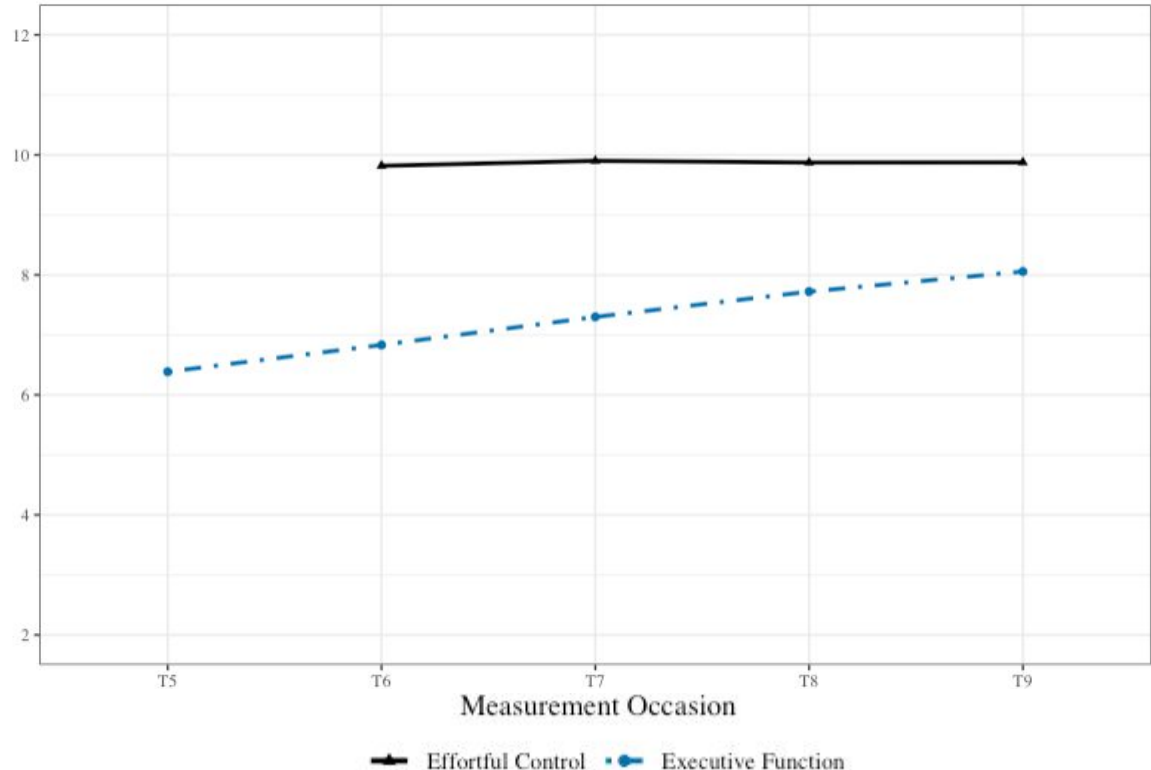
RQ5: Latent Growth Trajectories of EC and EF

Significant association between baseline EF and EC (Cov = .62, $r = .34$),

Significant but small association between baseline EC and growth in EF (Cov = -.11, $r = -.34$)

Marginally significant, inconsequentially small association between growth in EF and growth in EC (Cov = .02, $p = .09$; $r = .08$, $p = .03$)

Bivariate LGC-SR of EC and EF: AR(1), no CL



RQ6: Multidimensional Growth Mixture Models

Class 1: 15%

Relatively low EC, curvilinear increases in EF

No significant association between EF and EC

Class 2: 23%

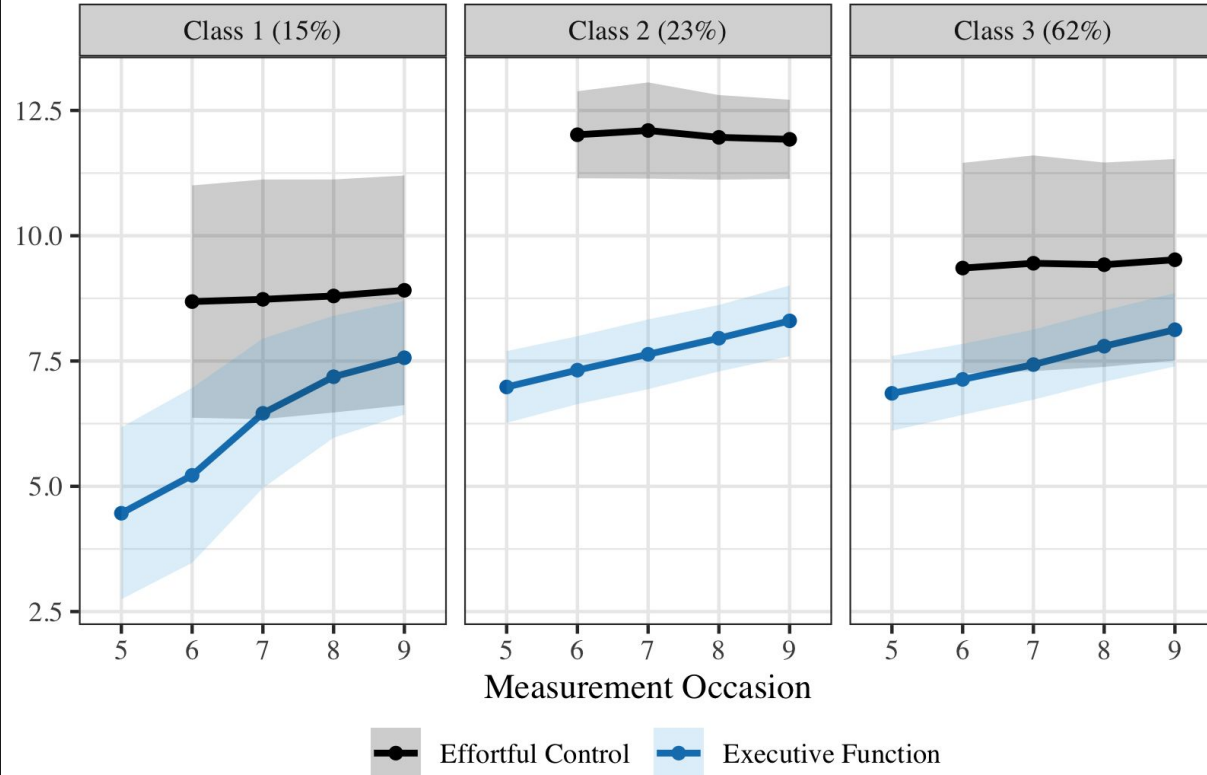
Above average EC, linear increases in EF.

Positive relation between baseline EC and baseline EF (Cov = .03, $r = .22$).

Class 3: 62%

'Normative' trajectories: stable, near-mean EC, linear increases in EF.

Positive relation between baseline EC and baseline EF (Cov = .14, $r = .20$).



Discussion

- Teacher-reports of EC likely reflect the classroom context.
- Self-regulation in one domain does not appear to support development in the other.
 - These conclusions remain consistent across all means of examining individual variation.
- Self-regulation is complex!
 - Just because children have the capacity to regulate their cognition, doesn't mean they will regulate their behavior in the classroom setting.

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Thank you!