

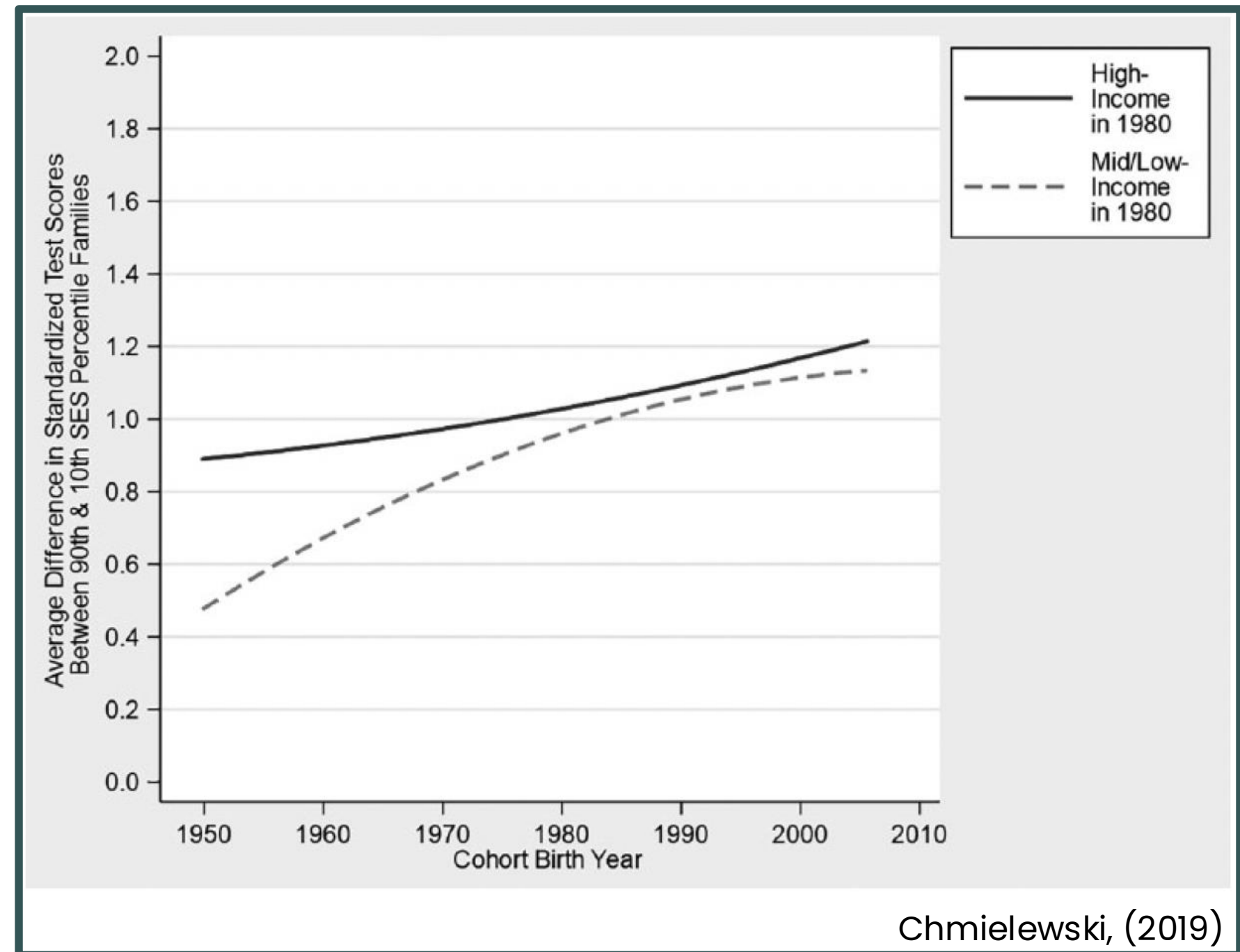
Do Changes in Family Income Matter for Academic Achievement?

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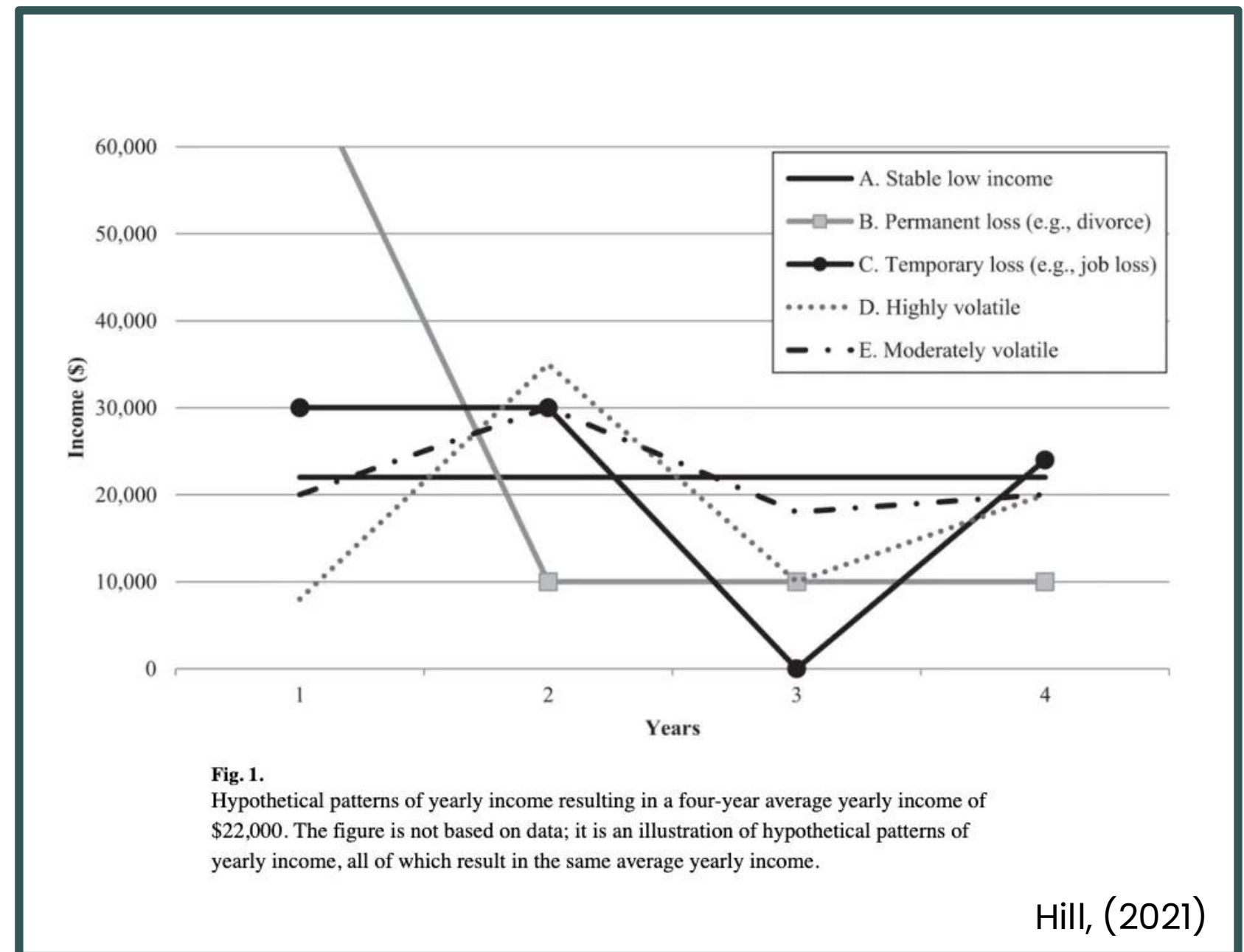
Introduction

- Equity is a core objective of educational systems around the world.
- Family income is persistently associated with children's academic achievement.
- A positive relationship between students' SES and academic achievement ($d = 0.22$ to 0.27) (e.g., White, 1982; Sirin, 2005; Harwell et al., 2017).
- Cross-sectional or between-family study approaches.



Introduction

- Family income is not static over childhood (Hill, 2021).
- Income instability has grown by approximately 30 percent between 1970 and 2008 (Dynan et al. 2012).
- The timing of economic disadvantage may matter for children's development (Duncan, et al., 2017).
 - Skill begets skills.
 - Carneiro et al., (2021) reported that family income during adolescence was at least as predictive of completed schooling as income in early childhood.



Introduction

- Increases in family income have positive effects on children's cognitive development and educational attainment (Cooper & Stewart, 2021).
- The relationship between family income and children's educational outcomes is likely to be contingent on characteristics of both the school system and society at large.
- In Norway, income changes have limited associations with educational outcomes.

Table 1 Results by study type and country, individual studies

Country/method	Negative results for at least one outcome	No significant results	Positive results for some outcomes, null for others	Positive results for all outcomes	Total
Studies by method					
RCTs		1	1	3	5
Quasi-experiments	3	5	4	17	29
Observational	1	2	3	14	20
Studies by country					
Australia			1		1
Canada			1	1	2
Germany	1				1
Mexico			1	2	3
Norway		1	1	4	6
Sweden	1				1
UK	1	2	1	4	8
US	1	5	3	22	30
US and Canada				2	2
All studies	4	8	8	34	54

Introduction

- How is income related to achievement?

- Family Income

- Books
- Educational materials
- Quality schools

- Family Stress

- Caregiving stress
- Family functioning
- Housing and school conditions

Duncan, et al., (2017)

- Publicly funded educational system
- Single track
- Redistribution schemes

- Unemployment schemes
- Parental leave
- Child benefits

Wiborg & Grätz (2022)

Research Question

To what extent are within-family changes in income associated with subsequent changes in students' academic performance over time ?



Methodology

01 Data

- National administrative registries in Norway
- Student cohorts that completed the Grade 5, 8, and 9 assessments in the 2014–2020 period for numeracy and 2016–2020 period for literacy were included in the analyses.
- Students were excluded if they did not participate in the Grade 5 assessment during the relevant observation period (numeracy: $n = 232,453$; literacy: $n = 286,941$).

	Numeracy ($N = 170,321$)	Literacy ($N = 57,315$)
Girls, n (%)	84,192 (49.4%)	28,529 (49.8%)
Boys, n (%)	86,129 (50.6%)	28,786 (50.2%)
Cohort 1 (2014), n	56,908	-
Cohort 2 (2015), n	57,048	-
Cohort 3 (2016), n	56,356	57,315
Grade 5 (years), mean age (SD)	10.2 (.29)	10.2 (.29)
Grade 8 (years), mean age (SD)	13.2 (.29)	13.2 (.29)
Grade 9 (years), mean age (SD)	14.2 (.29)	14.2 (.29)

Students with missing observations in Grade 8 (numeracy: $n = 1975$; literacy: $n = 577$) or Grade 9 (numeracy: $n = 4268$; literacy: $n = 1,421$) assessments were included in the analyses.

Methodology

02 Measures

Achievement Measures

- Norwegian national tests administered in Grades 5, 8 and 9
- IRT-based (corrected) proficiency scores ($M = 50$, $SD = 10$)

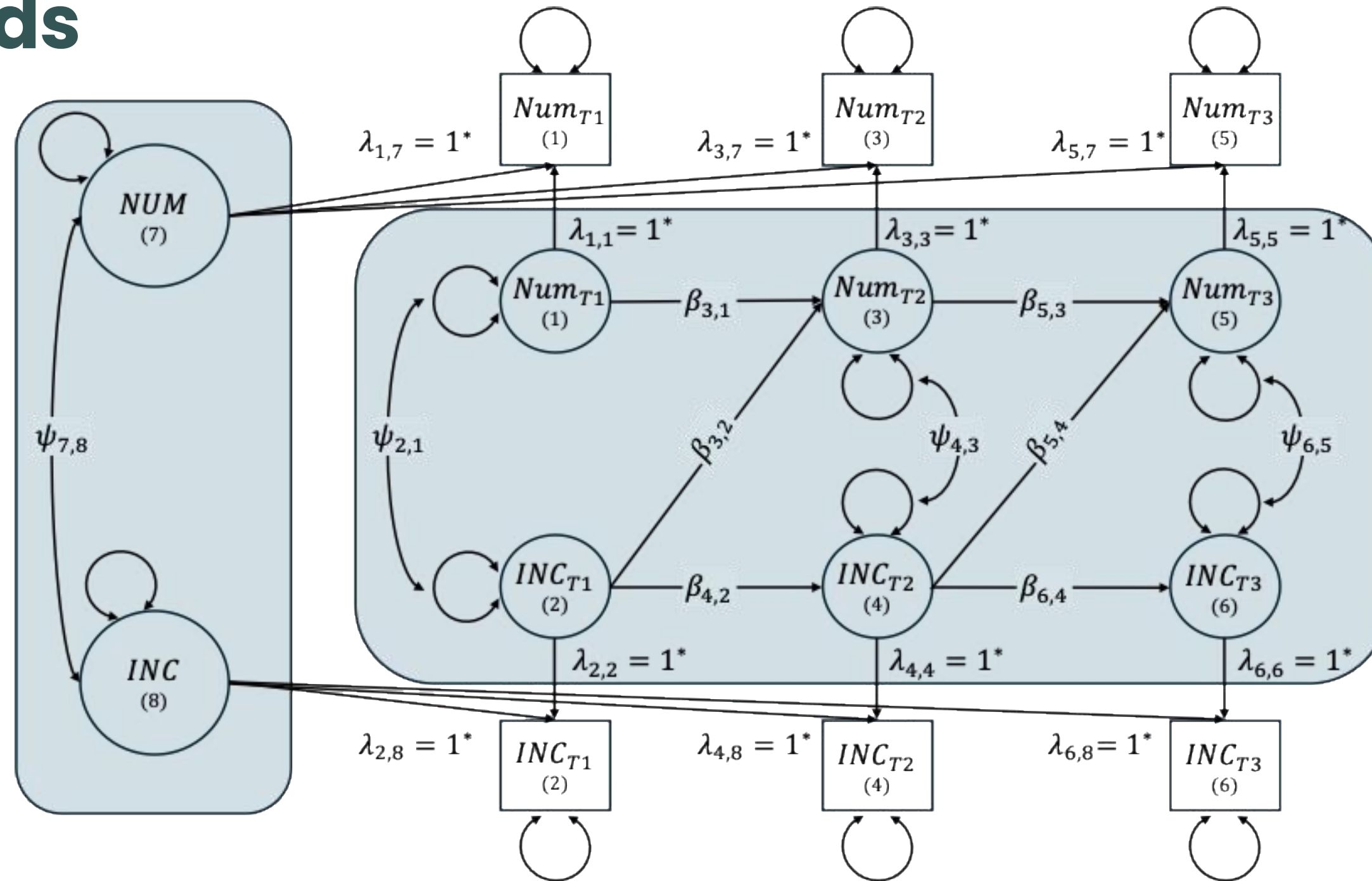
Family Income

- Family income was measured using the equivalized household income
- Log transformed scores were used in the analyses

Cohort	5th Grade Mean (SD)		8th Grade		9th Grade	
	Achievement $M (SD)$	Income (NOK) $M (SD)$	Achievement $M (SD)$	Income (NOK) $M (SD)$	Achievement $M (SD)$	Income (NOK) $M (SD)$
Numeracy						
Cohort 1: 2014 - 2018 ($n = 56,383$)	50.05 (9.5)	356,113.5 (244,505.5)	51.58 (9.81)	398,807 (352,613.1)	54.28 (9.6)	415,153 (349,118)
Cohort 2: 2015-2019 ($n = 56,159$)	50.58 (10)	367,425.6 (365,893.2)	51.70 (10.05)	405,648.4 (305,459.3)	54.10 (9.9)	423,519 (260,622)
Cohort 3: 2016-2020 ($n = 57,779$)	50.65 (10)	383,537.7 (298,772.8)	50.92 (9.66)	419,148 (282,238.2)	53.62 (9.89)	434,950 (1,157,684)
Literacy						
Cohort 1: 2016-2020 ($n = 57,315$)	50.07 (9.3)	384,305 (299,649)	51.11 (9.13)	419,646 (282,794)	54.37 (9.5)	435,717 (1,159,662)

Methodology

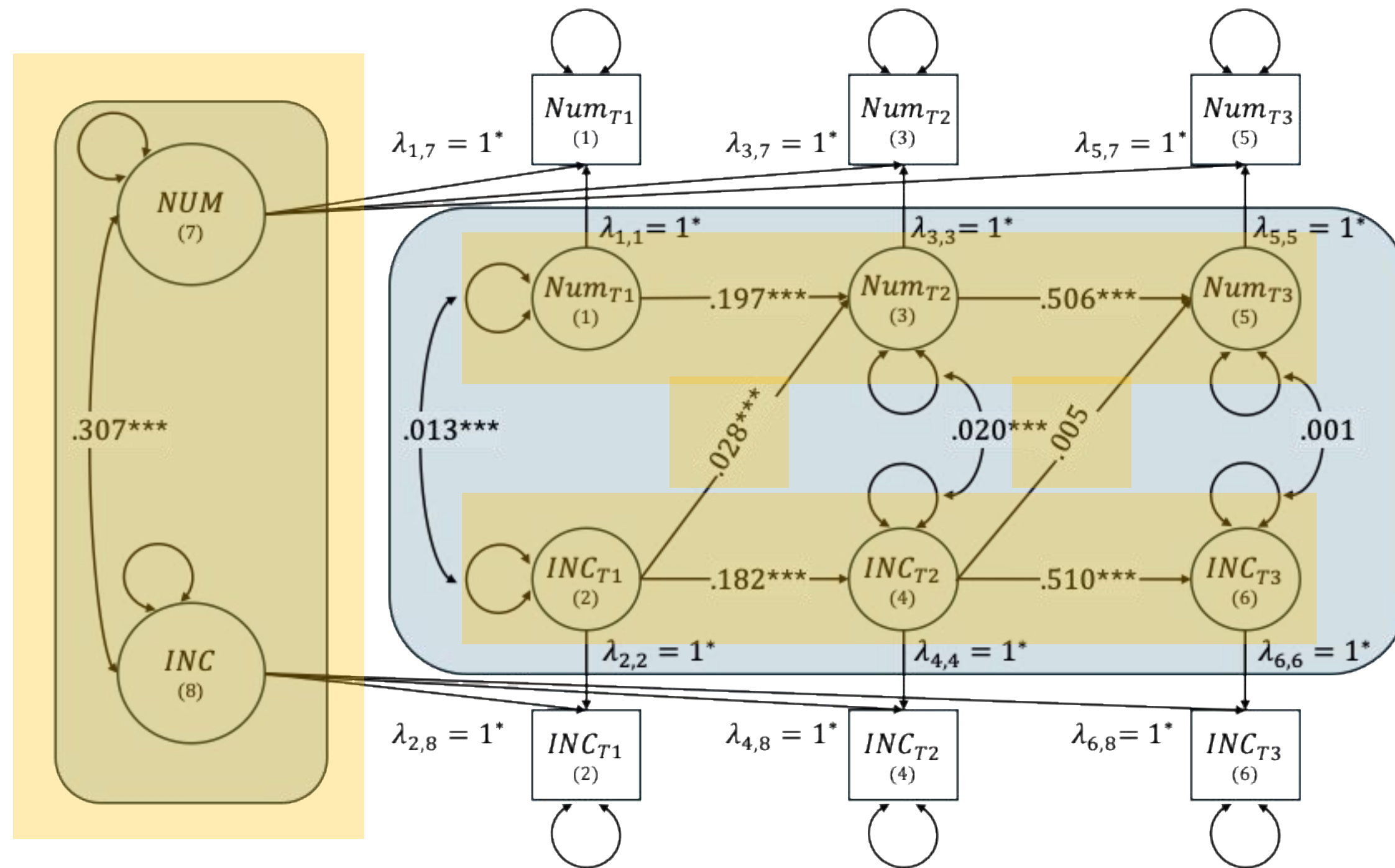
03 Methods



Hamaker et al., (2015)

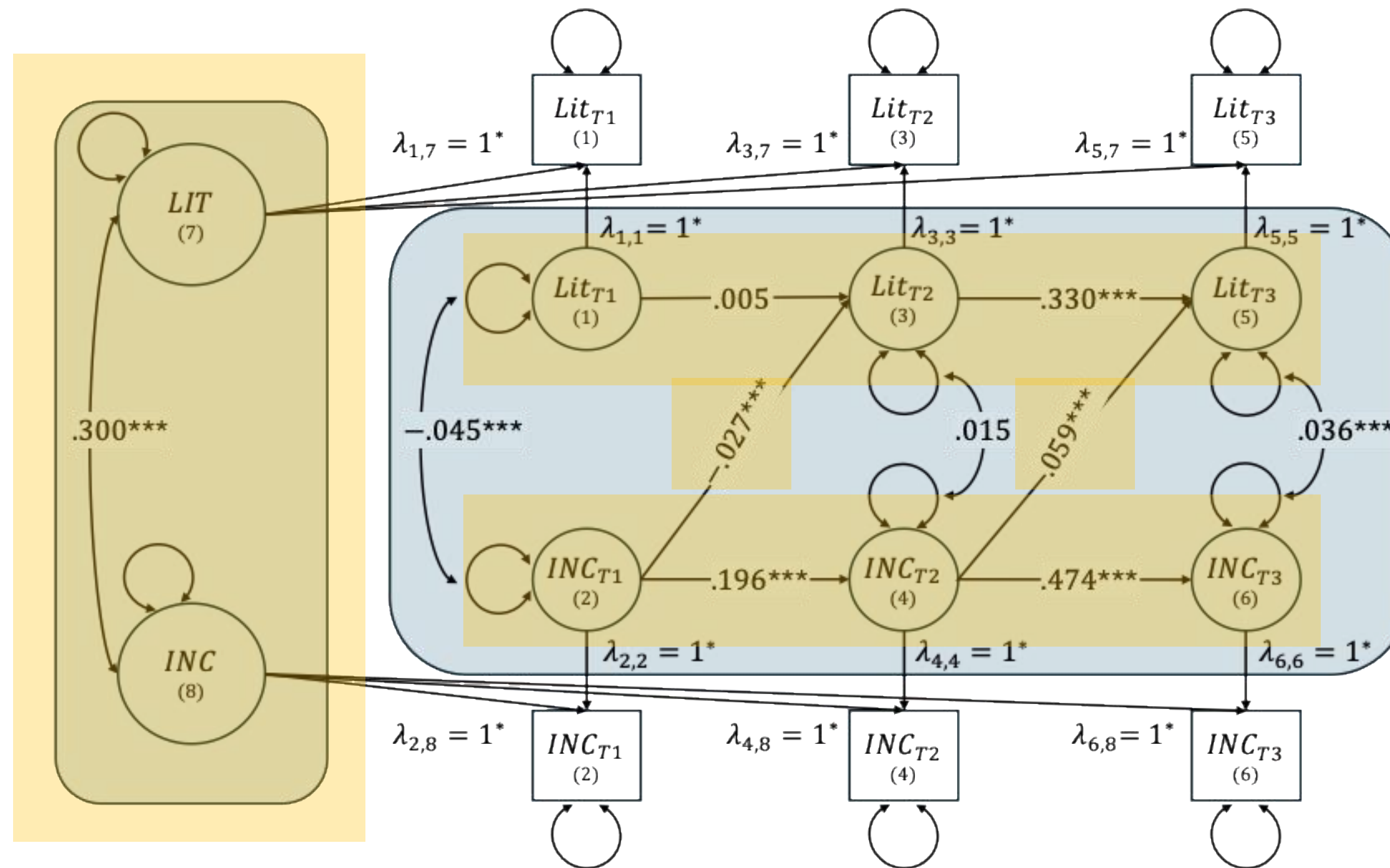
Results

Random-intercept cross-lagged panel model (RI-CLPM): Numeracy and Family Income



Results

Random-intercept cross-lagged panel model (RI-CLPM): Literacy and Family Income



Findings

- Family income is moderately associated to school achievement.
- Short-term income fluctuations are weakly associated with changes in academic performance.
 - Varied across domains and time points
 - Welfare policies ?
 - Timing ?
 - Ceiling effects?



Limitations

- Scores are not linked across applications.
- Unobserved time-varying confounders.
- Timing and spacing of observations.



CONCLUSIONS

- Short-term income fluctuations are weakly associated with changes in academic performance.
- Stable long-term socioeconomic conditions might have a greater influence on shaping educational inequalities in Norway.





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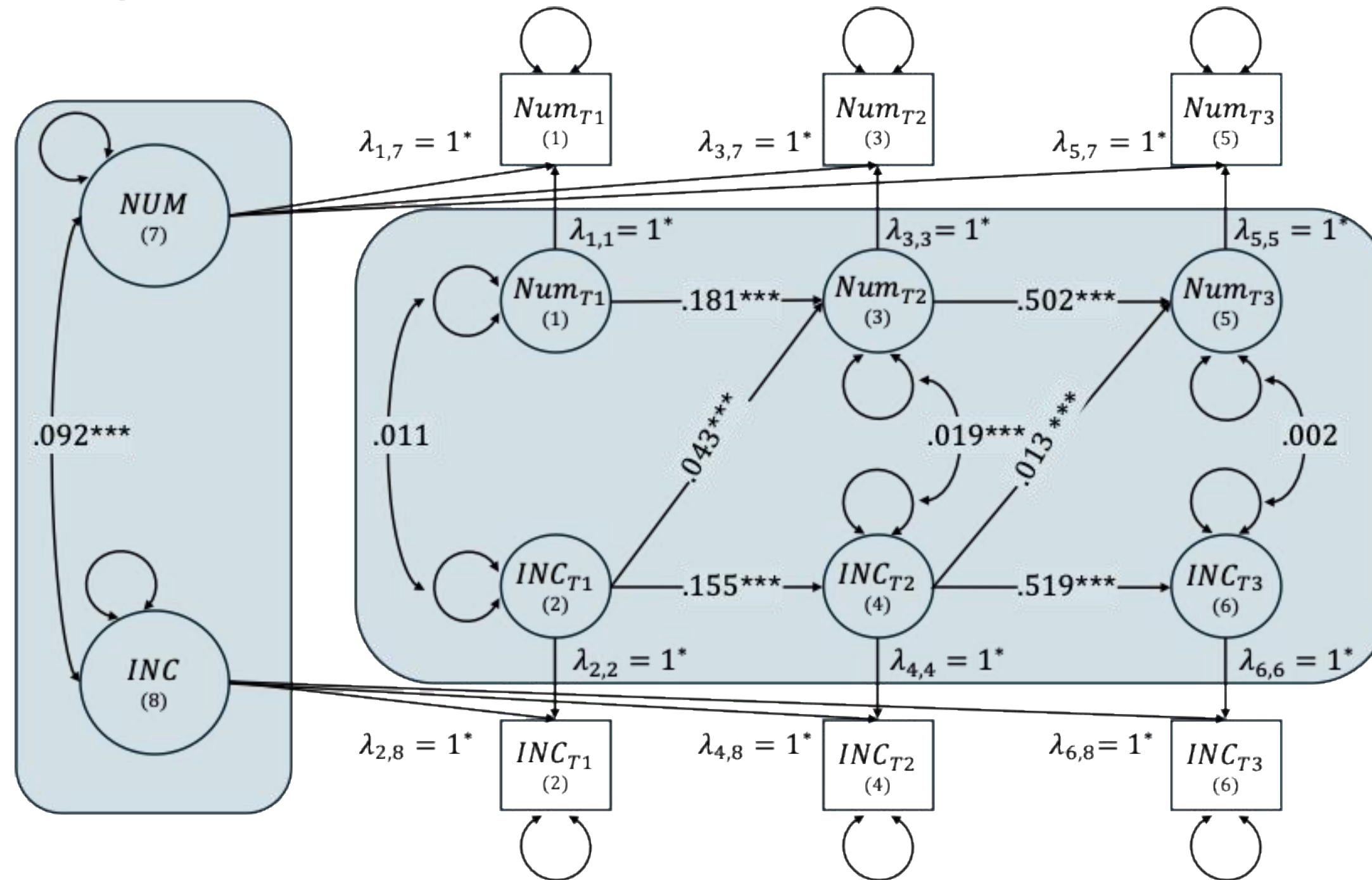


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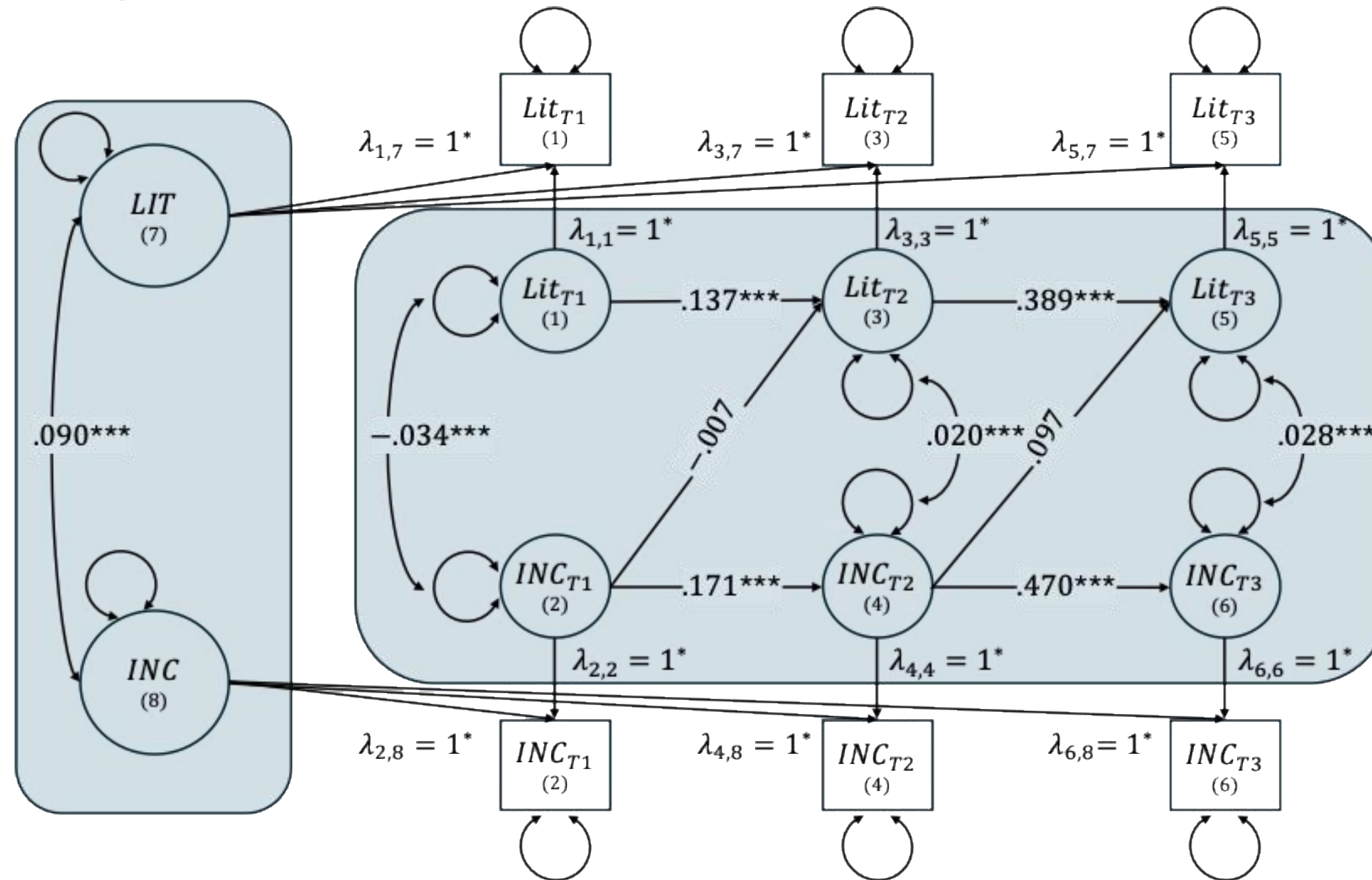
Results

Random-intercept cross-lagged panel model (RI-CLPM): Numeracy and Family Income (Rank standardized)



Results

Random-intercept cross-lagged panel model (RI-CLPM): Literacy and Family Income (Rank standardized)



Results

Random-intercept cross-lagged panel model (RI-CLPM): Numeracy and Family Income (Cohort three only)

