CONFÉRENCE DE COMPARAISONS INTERNATIONALES

#cci_mixités

LA MIXITÉ SOCIALE, SCOLAIRE & ETHNOCULTURELLE A L'ÉCOLE

Increasing language instruction time *does* increase learning – but not for everyone

a randomized trial in classrooms with social and ethnic diversity

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CIEP

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Background

- The achievement of immigrants – and even second generation immigrants – in Denmark is still much below that of their classmates with Danish background
- (Andersen og Rambøll 2010; Nielsen og Rangvid 2012)

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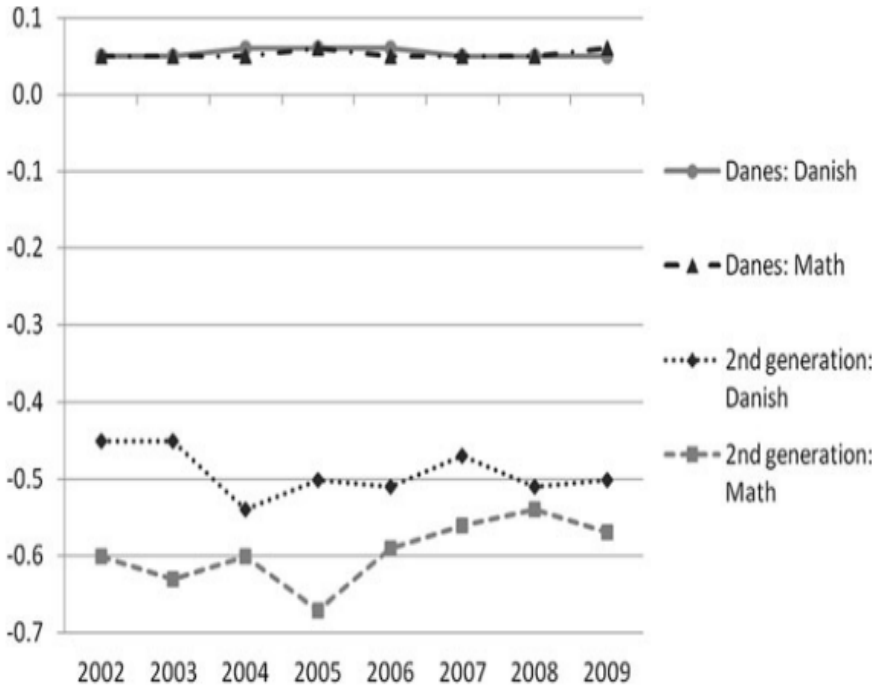


Figure 4 Average standardized grades in Danish and math for second-generation pupils and natives.

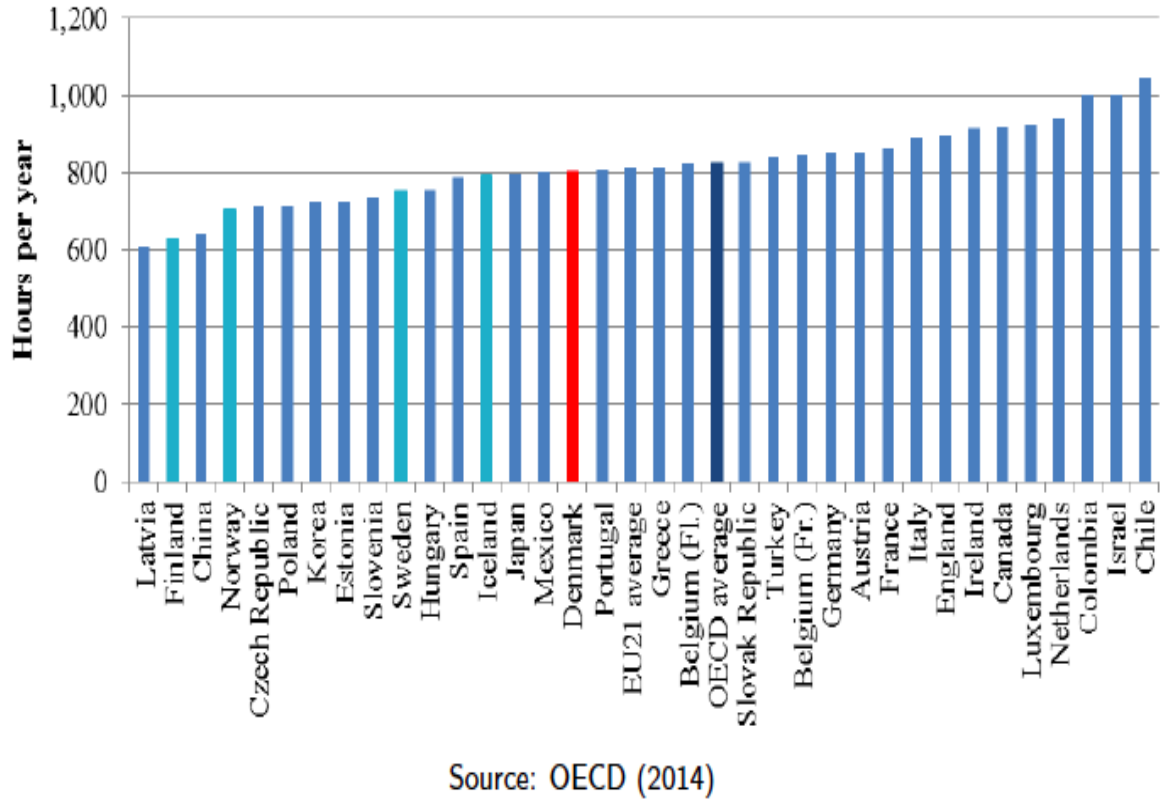
Initiatives to reduce the gap

- Ministry of Education: Research program using randomized trials
  - Class-interventions in mixed classes
    - Increasing instruction time in reading
    - Increasing instruction time with teaching program (language comprehension)
  - Group-interventions, bilingual students
    - General language comprehension program
    - Mother-tongue teaching

» Local government, City of Aarhus
- Bussing some bilingual students to increase diversity in schools

Increasing Instruction Time

- Large variation in instruction time across countries



Source: OECD (2014)

Figure: Total instruction time, compulsory general education, age 10

Increasing Instruction Time

Is it worth spending (more) time in school??

- Patall et al. (review, 2010): "Neutral to small positive effect of extending school time on achievement".
  - The effect is disputed (boredom, fatigue effects)
  - Weak designs
- Rivkin and Schiman (2013), Kikuchi (2014), Jensen (2013) and Parinduri (2014) uses observational data to identify effects on short-and long-run outcomes
- Fryer (2014) and Cortes and Goodman (2014) studies effects on test scores when combining increased instruction time with other interventions
- Meyer and van Klavern (2013) use RCT and find insignicant, positive eects ($N_{school} = 7$)

Randomized Trial

Simon Calmar Andersen, Maria Humlum & Anne Nandrup

Randomized Trial - Design overview

- 4th grade in Danish public schools with more than 10 % immigrant students
- 2 treatment groups, 1 control group.
- Outcome: Reading and behavioral problems
- Looking for heterogeneous effects on gender and immigrants

Treatments

Treatment 1: Increasing instruction time – no teaching program

- Four extra lessons (each 45 min.) a week, 16 weeks
- Average increase from 6.4 to 10.1 Danish lessons a week
- DKK 29,000 ≈ Euros 4,900
- High discretion: No requirements on how to spend extra time
- No explicit teaching material, inspirational idea catalogued
    - Differentiating instruction to the students in the classroom

Treatments

Treatment 2: Increasing instruction time – with teaching program on language comprehension

- Four extra lessons (each 45 min.) a week, 16 weeks
- Average increase from 6.4 to 10.1 Danish lessons a week
- DKK 29,000 ≈ Euros 4,900
- Low discretion: Detailed teaching program developed by national experts and research advisory board
    - Texts and exercises for each week

Outcomes

Reading

- Reading scores from national tests
  - Online, adaptive, standardized test
  - Results standardized to mean zero and unit variance
  - Subscales:
    - Language comprehension
    - Decoding
    - Reading comprehension
  - Response rate: 80%
- Note: Schools did not complete math tests as intended

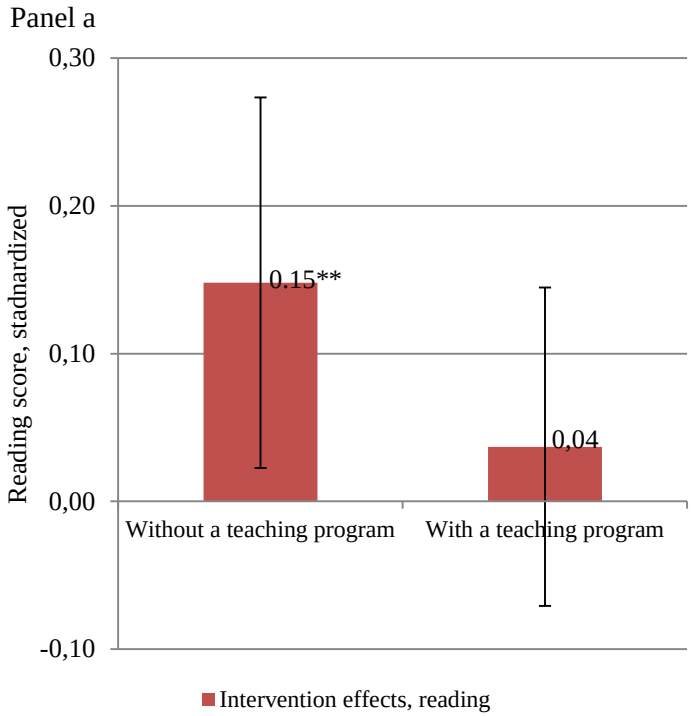
Outcomes

Behavioral difficulties

- Strength and Diculties Questionnaire (SDQ) (Goodman 1997)
  - Self-reported
  - Total difficulty score + Subscales
    - Emotional symptoms
    - Conduct problems
    - Peer relationship problems
    - Hyperactivity/inattention
    - Prosocial behavior (reversely coded)
- Response rate: 84:5%

Results - Reading

- *Average* treatment effects, intention to treat estimates



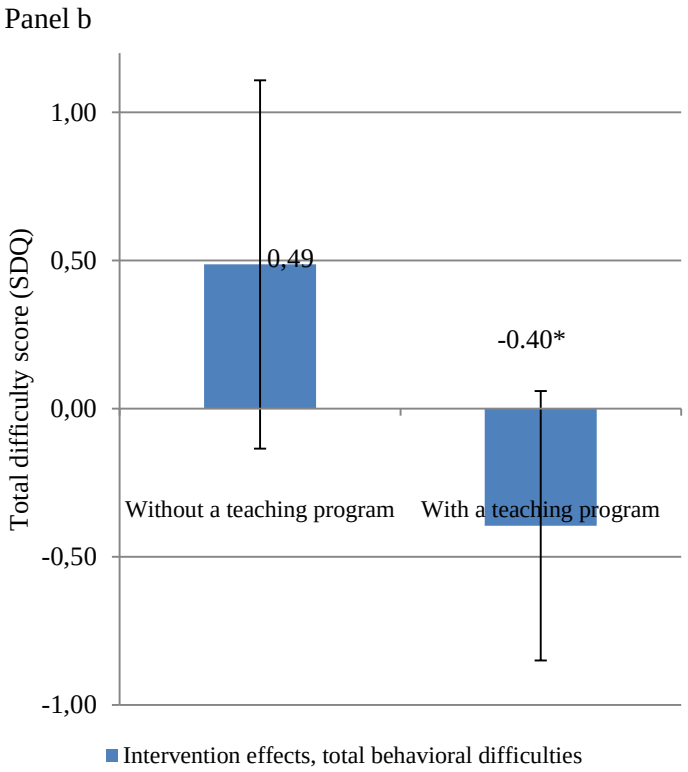
Results - Reading

- Heterogeneous effects

Panel a	(1)		(2)	
Reading grade 4	Boy	Girl	Non-Western	Danish + Western
Without a teaching program	0.141*	0.145*	0.037	0.193***
	(0.075)	(0.081)	(0.095)	(0.067)
Difference (interaction)	0.004		0.156*	
	(0.093)		(0.091)	
With a teaching program	-0.080	0.148**	-0.044	0.070
	(0.073)	(0.067)	(0.080)	(0.060)
Difference (interaction)	0.228**		0.114	
	(0.086)		(0.082)	

Results – Behavioral difficulties

- Average treatment effects, intention to treat estimates



Results – Behavioral difficulties

- Heterogeneous effects

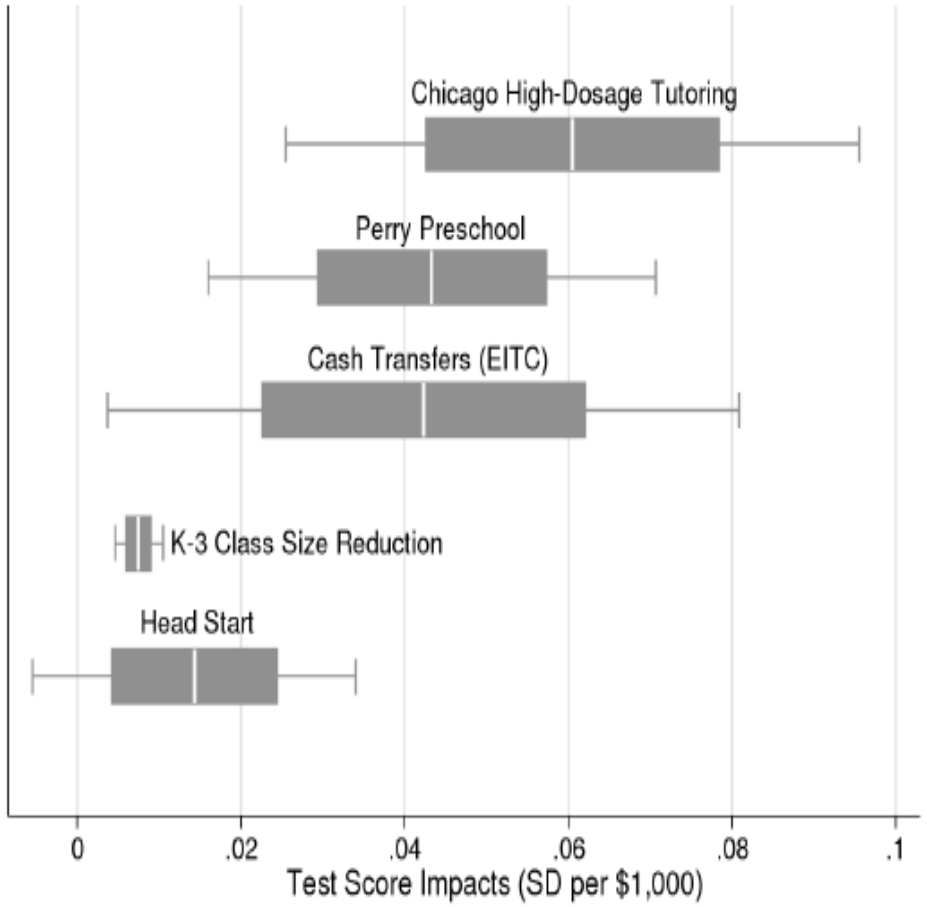
Panel b	(1)		(2)	
Total difficulties	Boy	Girl	Non-Western	Danish + Western
Without a teaching program	1.038**	-0.046	0.237	0.620
	(0.469)	(0.530)	(0.584)	(0.412)
Difference (interaction)	-1.084		0.383	
	(0.769)		(0.762)	
With a teaching program	-0.088	-0.625	-0.178	-0.535*
	(0.489)	(0.516)	(0.566)	(0.293)
Difference (interaction)	-0.537		-0.358	
	(0.900)		(0.699)	

Effect Size

- Cook et al. 2015 compare effect sizes per USD across different trials

- Increasing instruction time: App. 0.78 standard deviation (SD) per $1,000 per student

Figure 2:
Comparison of test score impacts per $1,000 of per child spending



Discussion

Why no positive effects on immigrants?

- Perhaps more instruction time = more of the same kind of teaching

=> students that already benefit, benefit from more of the same?

  - New randomized trial (no data yet):
  - More instruction time (no program) + monthly reading test to help teachers focus on those that do not benefit from more instruction

» Perhaps language comprehension too difficult for immigrants?

  - New randomized trial (no data yet):
  - Teaching program (language comprehension) at 5th grade

Initiatives to reduce the gap

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- » Local government, City of Aarhus
  - Bussing some bilingual students to increase diversity in schools

Bussing policy in Aarhus, Denmark

2005/2006: Legislative change allows for

- Language test of children with Danish as their second language
- If need for language support: Decide what school the child should attend in order to assure the best language support environment possible
- The City of Aarhus was the first in Denmark to use this opportunity

Bussing policy in Aarhus, Denmark

Children with a need for language support are enrolled by the municipality in one of two types of schools

- Two “local” schools with extra lessons (8-16 every day). Have a large majority of bilingual children.
- Schools with a maximum of 20 % children with a language support need.
  - For some children this implies going to school far from home.
  - A school bus service (free of charge) is provided for those children

Bussing policy - Evaluation

After four years of bussing the City of Aarhus evaluated the effects of the policy (both linguistic and social).

- The majority of children enrolled in schools far from home are doing socially well; they have good friends, participate in after-school activities etc.
- Their Danish language develops at a faster rate than children that have not been part of the bussing policy.
- The parents are satisfied with the new schools; both socially and academically.
- When need for language support is no longer present, parents choose to let their children stay in the schools far from home.
- The greatest challenge is the bus drive that sometimes includes conflicts.

Extra slides

Randomization, Balance & Model

- Schools with 10% bilingual students in grade 4 invited
- 126 schools signed up
- Two-stage stratified cluster randomized trial, based on
  - share of non-Western immigrants
  - grade 2 reading score (national test)

» Balance: Almost no significant differences, but slightly better pre-test in treatment 2

» OLS with clustered std.err., baseline achievement and strata indicators. Robust to hierarchical linear modeling

Attrition

	(1) No test		(2) No SDQ	
	Coeff.	S.e.	Coeff.	S.e
No teaching program	0.016	(0.074)	-0.091	(0.060)
With a teaching program	-0.009	(0.072)	-0.094	(0.057)
Students				
Test score, reading grade 2	-0.030	(0.019)	-0.023 *	(0.012)
Missing test score, reading grade 2	0.198 ***	(0.070)	0.064	(0.048)
Test score, math grade 3	0.025 *	(0.013)	-0.005	(0.011)
Missing test score, math grade 2	0.148 *	(0.088)	0.143 **	(0.057)
Non-Western background	-0.070	(0.064)	-0.155 **	(0.072)
Immigrant	0.040	(0.079)	0.063	(0.088)
Descendant	0.053	(0.062)	0.139 *	(0.072)
Ie-type missing	0.266	(0.170)	-0.239 *	(0.139)
Born in the second quarter	-0.034	(0.029)	-0.011	(0.026)
- third quarter	-0.031	(0.026)	-0.028	(0.022)
- fourth quarter	-0.010	(0.039)	-0.044	(0.031)
First-born	0.000	(0.021)	0.036 *	(0.020)
Girl	0.008	(0.022)	0.006	(0.020)
Single mom	0.058 **	(0.026)	0.056 **	(0.024)
No. of siblings	-0.021 *	(0.012)	-0.003	(0.010)
Missing fam-type	-0.135 *	(0.075)	-0.017	(0.089)
The mothers				
Mother's logearnings	-0.000	(0.002)	-0.002	(0.002)
Mother's age	0.003	(0.003)	-0.002	(0.003)
Mother, ≤high school	0.018	(0.046)	0.006	(0.046)
Mother, vocational	0.017	(0.045)	-0.018	(0.045)
Mother, higher	-0.009	(0.056)	-0.022	(0.052)
The fathers				
Father's logearnings	-0.001	(0.002)	-0.001	(0.002)
Father's age	-0.002	(0.002)	0.003	(0.002)
Father, ≤high school	-0.007	(0.051)	-0.031	(0.057)
Father, vocational	0.001	(0.054)	-0.051	(0.056)
Father, higher	0.054	(0.053)	-0.024	(0.054)
Constant	0.181	(0.120)	0.264 **	(0.112)
Observations	1,931		1,931	
Adjusted R-squared	0.0316		0.0369	

Notes. The propensity of not attending the test/answering the survey is modeled by a linear probability model. Select covariates are shown. Cluster-robust standard errors are in parenthesis, *** p>0.01, ** p>0.05 and * p>0.1.