

Learning loss due to school closures during the COVID-19 pandemic

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RESEARCH ARTICLE

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Article

Figures & SI

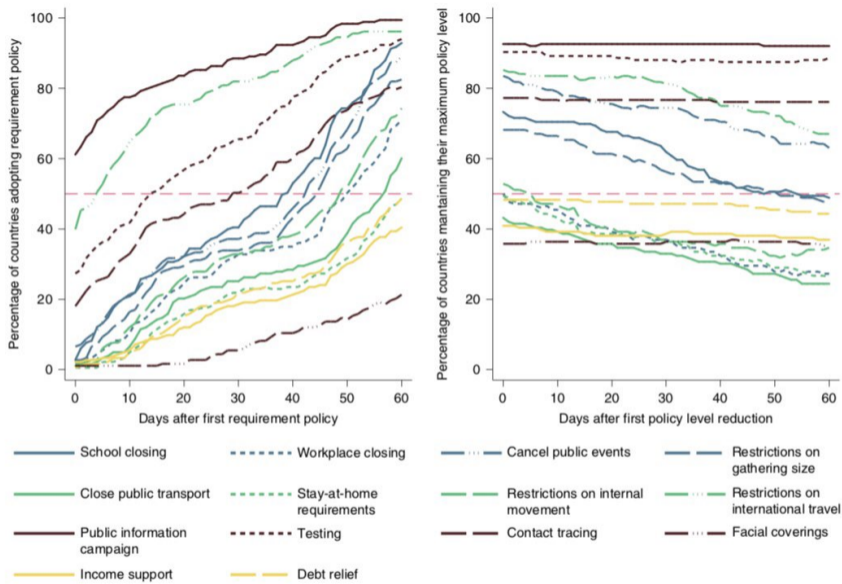
Info & Metrics

 PDF

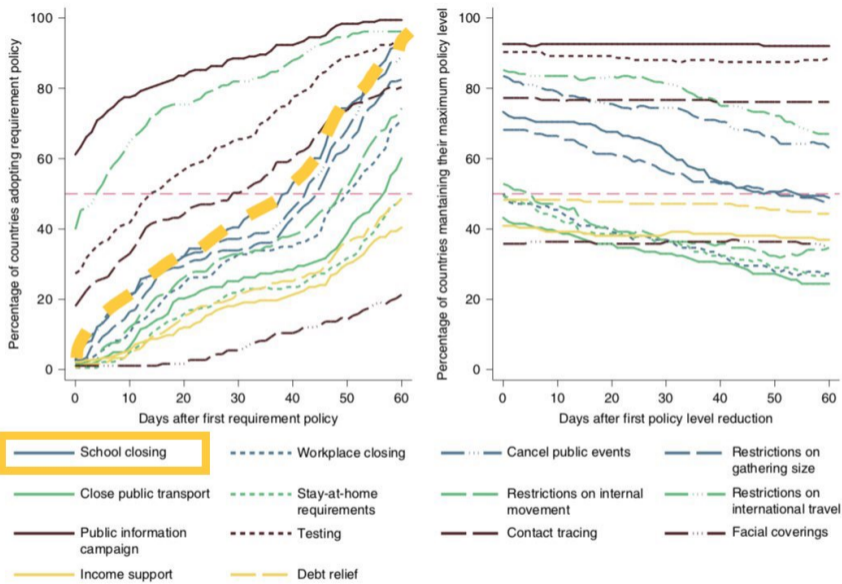
Significance

School closures have been a common tool in the battle against COVID-19. Yet, their costs and benefits remain insufficiently known. We use a natural experiment that occurred as national examinations in The Netherlands took place before and after lockdown to evaluate the impact of school closures on students' learning. The Netherlands is interesting as a "best-case" scenario, with a short lockdown, equitable school funding, and world-leading rates of broadband access. Despite favorable conditions, we find that students made little or no progress while learning from home. Learning loss was most pronounced among students from disadvantaged homes.

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Hale et al. (2021) "A Global Panel Database of Pandemic Policies (Oxford Covid-19 Government Response Tracker)." Nature Human Behaviour.



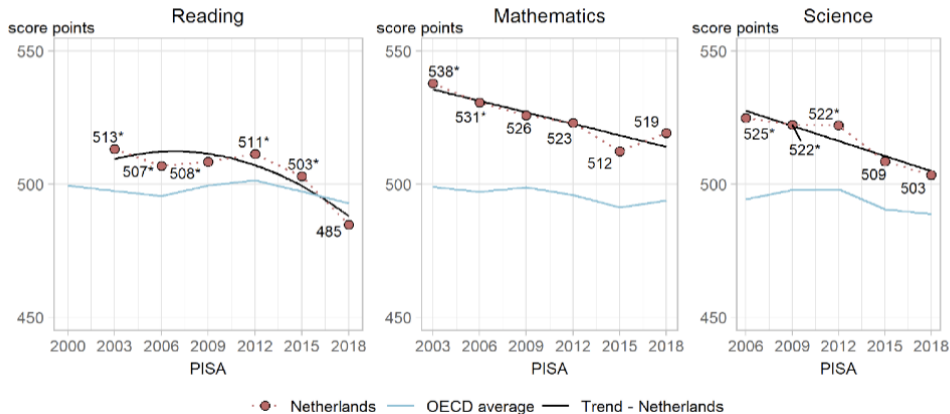
Hale et al. (2021) "A Global Panel Database of Pandemic Policies (Oxford Covid-19 Government Response Tracker)." Nature Human Behaviour.

Motivation

- ▶ We are interested in the effects of school shutdowns on children
- ▶ We focus on cognitive learning loss, or lack of learning during school closures using rich data from the Netherlands where schools were closed for eight weeks
- ▶ Learning loss can be expected due to a lack of instruction time and sub-optimal circumstances for learning relative to normal times
- ▶ As with many non-pharmaceutical interventions, data to study the consequences of school closures have been limited

Empirical challenge

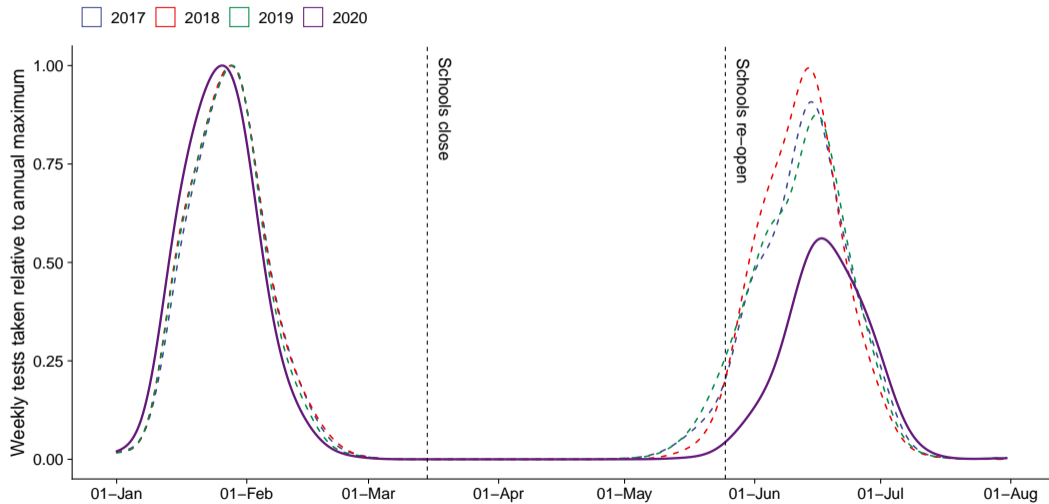
- ▶ Causal inference requires data *before* and *after* school closures, a credible control group, and ways of adjusting for attrition



This paper

- ▶ The Dutch educational system features rigorous twice yearly testing, allowing individual students to be assessed
- ▶ We have obtained access to a representative 15% sample of all primary schools in the Netherlands (N=350,000 students)
- ▶ Rich set of covariates allows us to study heterogeneity by student characteristics (e.g. SES) and subject (Maths & Arithmetics, Spelling, Reading Comprehension)

Timeline



Baseline specification

Compare achievement pre- and post-lockdown:

$$\Delta y_i^{2020} = y_i^{2020,post} - y_i^{2020,pre}$$

Do the same for 3 previous years, $control \in \{2017, 2018, 2019\}$:

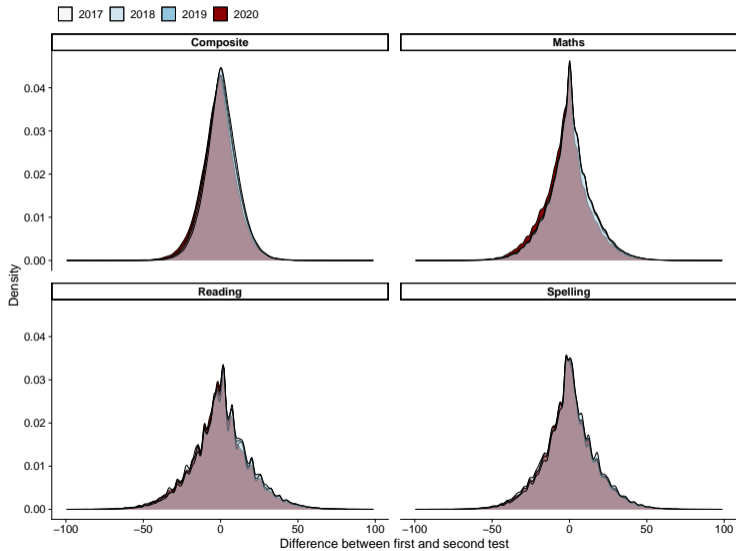
$$\Delta y_i^{control} = y_i^{control,post} - y_i^{control,pre}$$

Regress with an indicator T_i for treatment year:

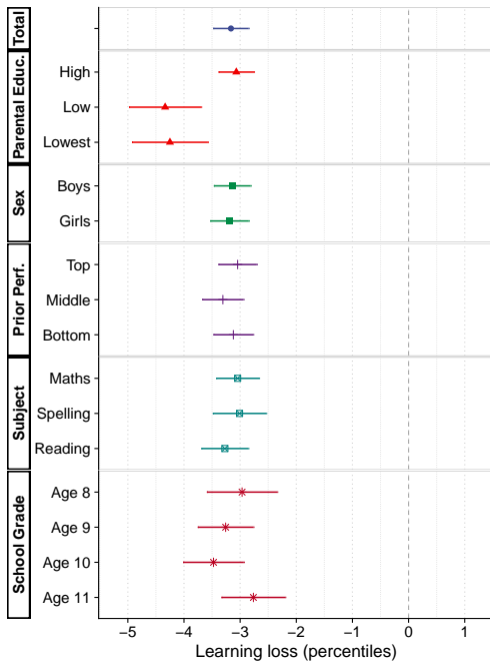
$$\Delta y_i = \beta_0 + \mathbf{X}'_i \gamma + \beta_1 T_i + \epsilon_i$$

($\mathbf{X}'_i \gamma$ includes time elapsed between testing dates and a linear trend in year. Standard errors are clustered at the school level.)

Raw difference



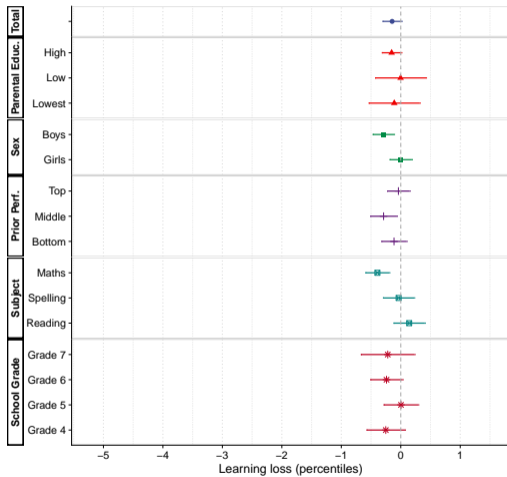
Main results



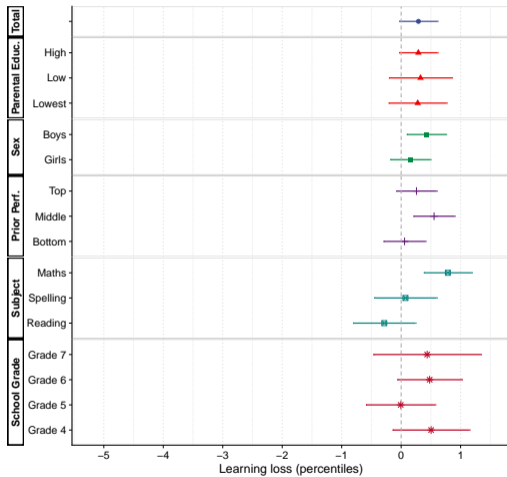
Main results

- ▶ Results confirm worries about the uneven toll of COVID-19 on children and families
- ▶ In contrast, no marked differences by student gender, school grade, subject domain, or prior performance

Placebo analysis



(a) 2018 as treatment year



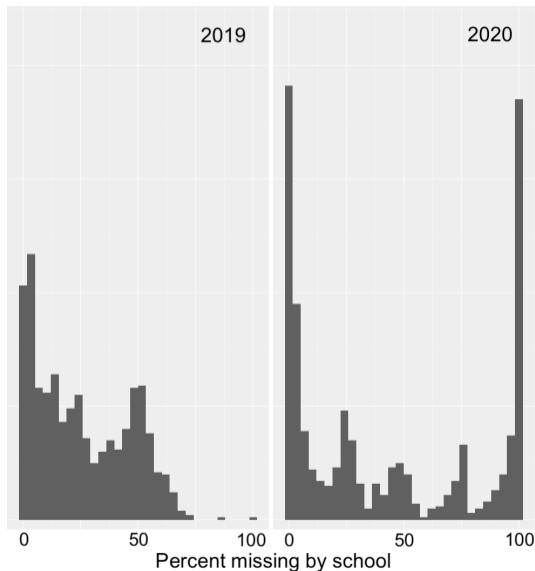
(b) 2019 as treatment year

Sample attrition

We address this by:

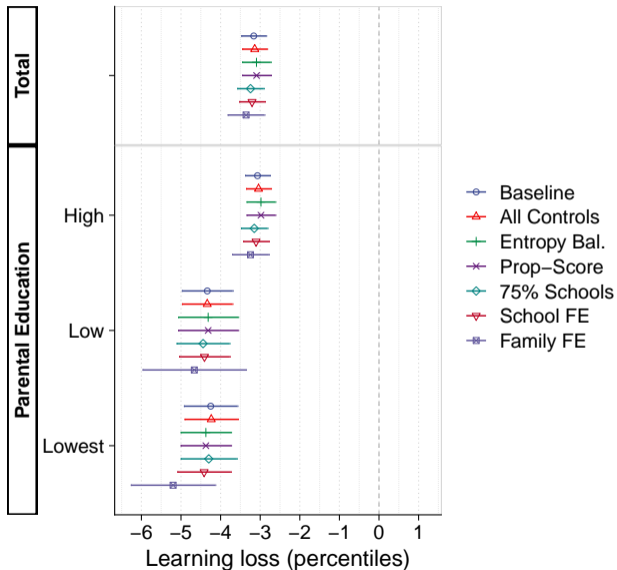
- ▶ Regression adjustment
- ▶ Only schools that test $\geq 75\%$
- ▶ Propensity score weighting
- ▶ Entropy balancing
- ▶ School fixed effects
- ▶ Family fixed effects

Controls: parental education, student sex, prior performance, school-level economic disadvantage, proportion immigrant background, school denomination



Sample attrition

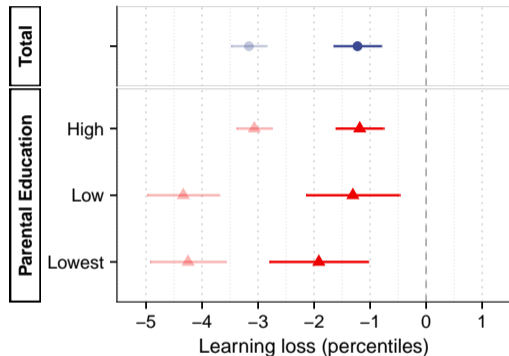
Effects nearly identical across specifications, with slightly larger effects for school- and sibling fixed effects



Mechanisms

Do these results reflect knowledge learned, or more transient “day of exam” effects?

- ▶ Students may be unaccustomed to school setting or under stress
- ▶ Social distancing could alter testing environment
- ▶ Teachers may have put less emphasis on testing under lockdown



We inspect performance on tasks not designed to test curricular knowledge

⇒ Effects shrink by two thirds, implying knowledge learned is the main channel

Effect sizes

- ▶ We find about 3 percentile points lost on standardised tests (or 0.08 SD)
- ▶ Based on standardised annual learning, this means students lost between 15-20% of a school year
- ▶ This learning gap coincides with schools operating at about 10%-30% efficiency during the first shutdown, meaning students learned significantly less than otherwise would've been expected

How do these results compare to projections and what can we learn from these results?

- ▶ NL has highest rate of broadband adoption in Europe: more than 90% even among the poorest quartile of households
- ▶ Short lockdown compared to countries where schools stayed closed throughout summer (UK, US, Canada, Italy, Mexico, Chile, Turkey...)
- ▶ Strong policy response: in March 2020, Ministry of Education devoted €2.5m for remote learning devices to students, another €3.8m in June 2020
- ▶ EU Commission and World Bank projected similar (0.06-0.07 SD), albeit slightly lower losses for countries like the Netherlands, leading to concerns of shutdowns on less prepared countries

Discussion

- ▶ School shutdowns due to Covid-19 have been the largest disruption to education the world has seen
- ▶ Based on our results, these disruptions will have had dire consequences for learning with students learning close to nothing relative to normal years
- ▶ Losses were even more concentrated among students from less-educated homes. In the lower categories of parental education, we found effects up to 55% larger

Further research is necessary to better understand the size and extent of our findings

- ▶ Other features might have affected observed losses, for instance home situation, stress or differences in testing environment meaning losses are slightly lower
- ▶ Other important dimensions like non-cognitive development and mental health may also play a role in these estimates
- ▶ First shutdown may have been more severe due to the abrupt nature of the first shutdown
- ▶ We are currently studying the long run impact over a 12-month period, which includes a second, shorter shutdown in winter 2020

Thank you!

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School-level variation

