Does the Response to Intervention Approach Improve Academic and Disability Outcomes?

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Background

In 2004, the reauthorization of Individuals with Disabilities Education Act made Response to Intervention (RtI) an alternative means of identifying and serving children with disabilities (IDEA, 2004). RtI is a multi-step approach to providing interventions and monitoring within the general education setting, providing research-based instruction and behavioral support as well as screening of all students to identify those who may need systematic progress monitoring, data-driven decision-making, and intervention. Most states implement RtI (Berkeley, 2008). However, little is known about the effects of RtI on academic and disability outcomes on a national scale (Fletcher, & Vaughn, 2009; Fuchs, D. & Fuchs, L. S., 2006; Hauerwas et al., 2013).

Purpose:

The purpose of our study is to investigate the impacts of RtI on children's academic and disability outcomes as schools adopt RtI between kindergarten and fourth grade in a nationally representative data set of the Early Childhood Longitudinal Study of Kindergarten (ECLS-K: 2011).

Setting:

Our study focuses on students between kindergarten and fourth grade, excluding private schools as RtI is only implemented in public schools. We hypothesized that RtI will contribute to the prediction of children's academic and disability outcomes (Fletcher, & Vaughn, 2009; Fuchs, D. & Fuchs, L. S., 2006).

Participants:

We sample from ECLS-K 2011, approximately18,000 children followed from kindergarten to fourth grade across 1,330 schools in 90 counties. The sampled 942 schools are included in the study because of attrition. Table 2 shows the descriptive statistics of sampled schools (811 RtI schools and 131 non-RtI schools) at spring of first grade in the study. We used the primary sample unit to adjust the sample at first grade. RtI schools are more likely to be in rural and suburban settings, and less likely to be in the city. RtI schools have a larger student body, more ESL services, lower percentage of students receiving free and reduced-price meals, and lower percentage of students in special education.

Practice:

RtI implementation is the key variable in the study. The RtI method includes research-based instruction, behavioral support, screening process, and data-driven decision-making process. These components are carried out by classroom teachers, individual tutoring, RtI teams, specialists for children's special needs, and specific interventions for children. The RtI implementation and responsible workers vary across schools, but the goal of RtI implementation is unchanged. The process of RtI implementation might take as short as a semester or more than three years.

Research Design:

Our study uses a child fixed effect model to exploit two different sources of variation. First, there exists within-school variation, as not all schools implemented RtI between kindergarten and fourth grade, so children from different schools are subjected to different approaches. Second, there exists variation within children across time as policies changed, leaving some children exposed to RtI but others not (i.e. some schools implemented RtI earlier than others, leaving some children unaffected by RtI at these schools in their earlier years). Child fixed effects

account for unobserved time-invariant child factors that are correlated with child outcomes and the adoption of RtI. The study also employed time-varying child- and school-level controls (see Table 2) to verify the robustness of results.

Data Analysis:

The analyses for this paper utilize data from RtI implementation derived from the school administrator's survey in each spring grade after kindergarten. The outcome variables include direct assessments of mathematics and reading skills (IRT scale scores) collected at each wave. Reading and math scores are standardized in the regression models. Another outcome of the disability status is a composite variable coded 1 if the parent answered "yes" to at least one of diagnoses or therapy services, collected at all spring waves. A set of control variables are included in the study: time-varying individual-level data (e.g., age) from the direct child assessment and (e.g., poverty) from the parent questionnaire and school-level data (e.g. percentage of non-white students) from the school administrator questionnaire. We used two regression models for each outcome variable to estimate the results: the first model is child fixed effects with child controls; the second is child fixed effects with both child and school-level controls. We used Huber-White methods to adjust standard errors at the child-level to account for the lack of independence from the clustering of students over time. We also restricted the analysis sample to students with no missing values in dependent and independent variables and applied sample weights at first grade.

Results:

Descriptive statistics for all outcome variables are presented in Table 1. Children exposed to RtI are 3 (SE=.01, p <0.001) percentage points less likely to be identified with a disability by the end of fourth grade than children not exposed to RtI. RtI did not influence children's academic achievement in math or reading.

Conclusions:

The study's results have three implications. First, our study provides the first evidence of larger scale evaluations to inform the national trend of schools using RtI to improve student outcomes. Second, the findings for the effect of RtI on disability status provides insight into the important function of implementing RtI as a means to reduce misidentification of disability. Third, the results of RtI on disability status might also indicate that the implementation of RtI is overall effective (i.e. once children were identified as disabled, the number of children with disabilities decreased in RtI schools compared to non-RtI schools by the end of fourth grade).

The study has two limitations. No available data about RtI at the county or state-level can be used to address the policy exogeneity of the adoption of RtI. Future research might focus on county or state-level analyses to address this problem. Furthermore, the attrition of children in the ECLS-K study also raised concerns about the potential for systematic differences between our analysis sample and original sample. Future direction for this study will use more advanced strategies to deal with sample attrition.

References

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Appendix

Table 1. Fixed effects results of the introduction of RtI on student outcomes

	Response to intervention used	
	Model 1 Child fixed effects with child level controls and sample weights at 4th grade	Model 2 Child fixed effects with both child and school level controls and sample weights at 4th grade
Dependent variable		
Student identified with a disability	-0.03***(0.01)	-0.03***(0.01)
Math IRT Scores	-0.01(0.01)	-0.01(0.01)
Reading IRT Scores	-0.01(0.01)	-0.01(0.01)
Child observations	10470	9014
Total observations	40586	30048

Notes: Math and reading IRT scores were standardized. Robust Huber-White standard errors adjusted for clustering are in parentheses. *p<.05. **<.01. ***<.001.

Table 2. School-level descriptive statistics at spring of first grade by RTI status

	RtI schools		Non-RtI schools		p-value of difference
	Mean	SD	Mean	SD	
School Location					
Rural	0.21		0.15		0.04*
City	0.34		0.51		-0.06*
Urban	0.07		0.06		-0.01
Suburb	0.39		0.27		0.04*
School and District characteristics					
District poverty level	20.64	(0.39)	21.66	(0.99)	-0.00
School Size >500 students enrolled	0.59		0.53		0.13***
School received Title 1 funds	0.73		0.69		0.05
School provided ESL services	0.51		0.31		0.13***
Percentage of students receiving 504 Plan	0.73	(0.06)	0.67	(0.16)	0.01
Percentage of students receiving free and reduced-price meals >75%	0.23		0.27		0.08*
Percentage of students non-white > 75%	0.21		0.19		0.01
Percentage of students in special ed. > 10%	0.26		0.27		0.09**
Observations	811		131		

Notes: p-values represent the level of significance calculated from a series of t-tests comparing the mean values of each variable listed between the analysis non-RtI and the RtI sample schools. The sample schools were adjusted by using primary sample unit at fourth grade from the ECLS-K. All variables are dichotomous except for the district poverty level and percentage of students receiving a 504 Plan.