



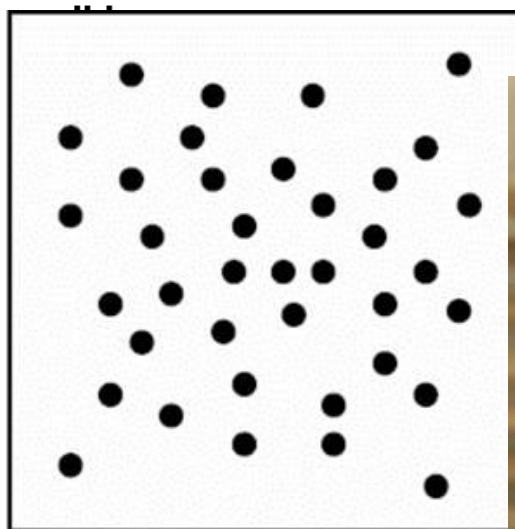
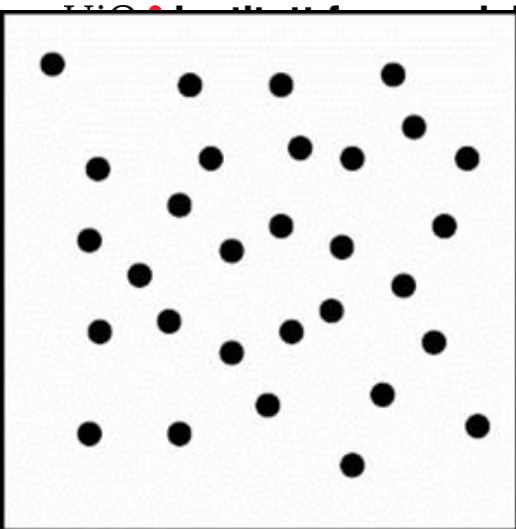
UiO • **Institutt for spesialpedagogikk**
Det utdanningsvitenskapelige fakultet

Hva kan være årsakene til at effekter av et tiltak, en intervensjon, opprettholdes eller fader ut?

Sammen om oppdraget, 6.november 2019







Tall og Tallsystem **Titallsystemet**

4 **3** **7** **8** **2**
 Titusenplassen Tusenplassen Hundrerplassen Tierplassen Enerplassen











Persistence and Fadeout in the Impacts of Child and Adolescent Interventions

Drew Bailey, Greg J. Duncan, Candice L. Odgers & Winnie Yu

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Fadeout

Avtakende effekt etterfulgt en intervensjon

En statistisk «artifact»

Ulike forklaringer

Constraining content hypothesis

Opplæringen etter endt intervensjon

Miljømessige årsaker til fadeout

Takeeffekt

Teaching Students What They Already Know? The (mis)alignment between mathematics instructional content and student knowledge in kindergarten

Mimi Engel
Vanderbilt University

Amy Claessens
University of Chicago

Maida Finch
Salisbury University

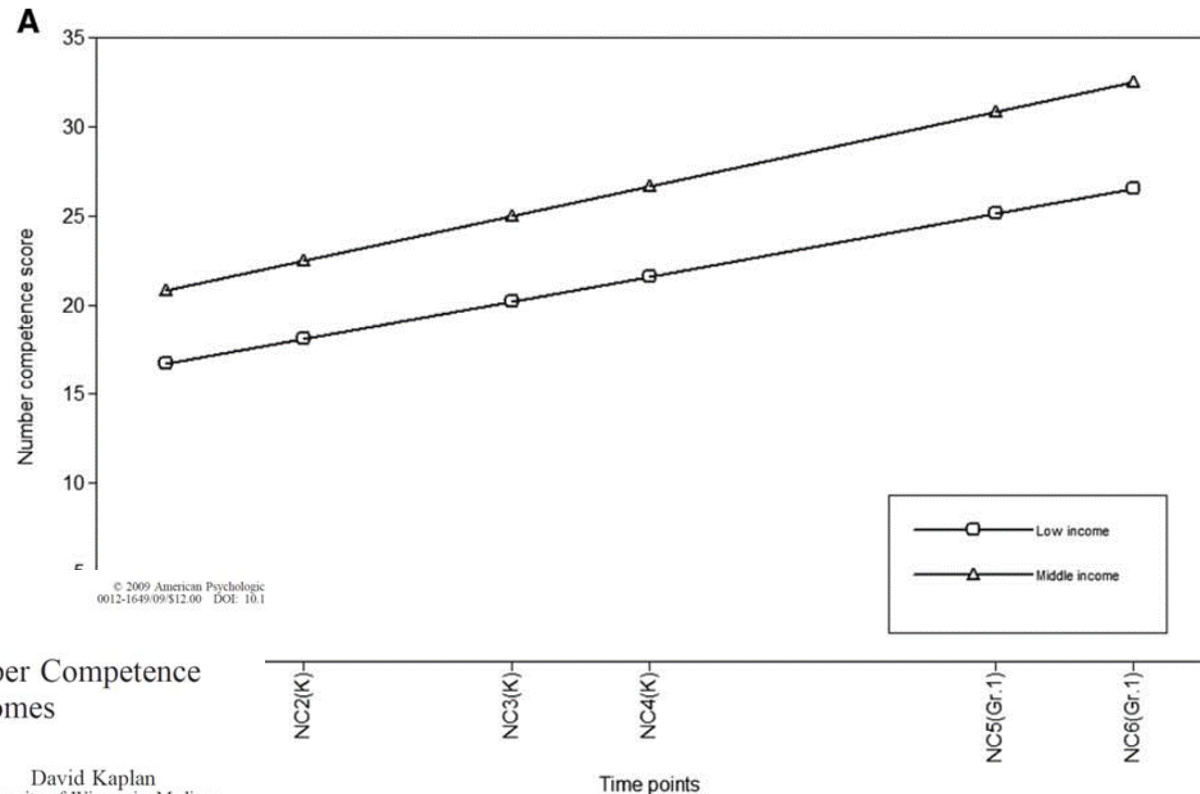
May 31, 2012

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Preexisting differences

Stabile variasjoner mellom barn

Sårbare elever



Early Math Matters: Kindergarten Number Competence
and Later Mathematics Outcomes

Nancy C. Jordan
University of Delaware

David Kaplan
University of Wisconsin-Madison

Chaitanya Ramineni and Maria N. Locuniak
University of Delaware

Modest transfer

Hvor mye er det mulig å endre?

Boosts er ikke nok

Implikasjoner



Journal of Research on Educational Effectiveness



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Testing the Immediate and Long-Term Efficacy of a Tier 2 Kindergarten Mathematics Intervention

Ben Clarke, Christian Doabler, Keith Smolkowski, Evangeline Kurtz Nelson, Hank Fien, Scott K. Baker & Derek Kosty


To cite this article: Ben Clarke, Christian Doabler, Keith Smolkowski, Evangeline Kurtz Nelson, Hank Fien, Scott K. Baker & Derek Kosty (2016): Testing the Immediate and Long-Term Efficacy of a Tier 2 Kindergarten Mathematics Intervention, Journal of Research on Educational Effectiveness, DOI: [10.1080/19345747.2015.1116034](https://doi.org/10.1080/19345747.2015.1116034)

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Planlegge en intervensjon





Grunnleggende ferdigheter (skill-building)

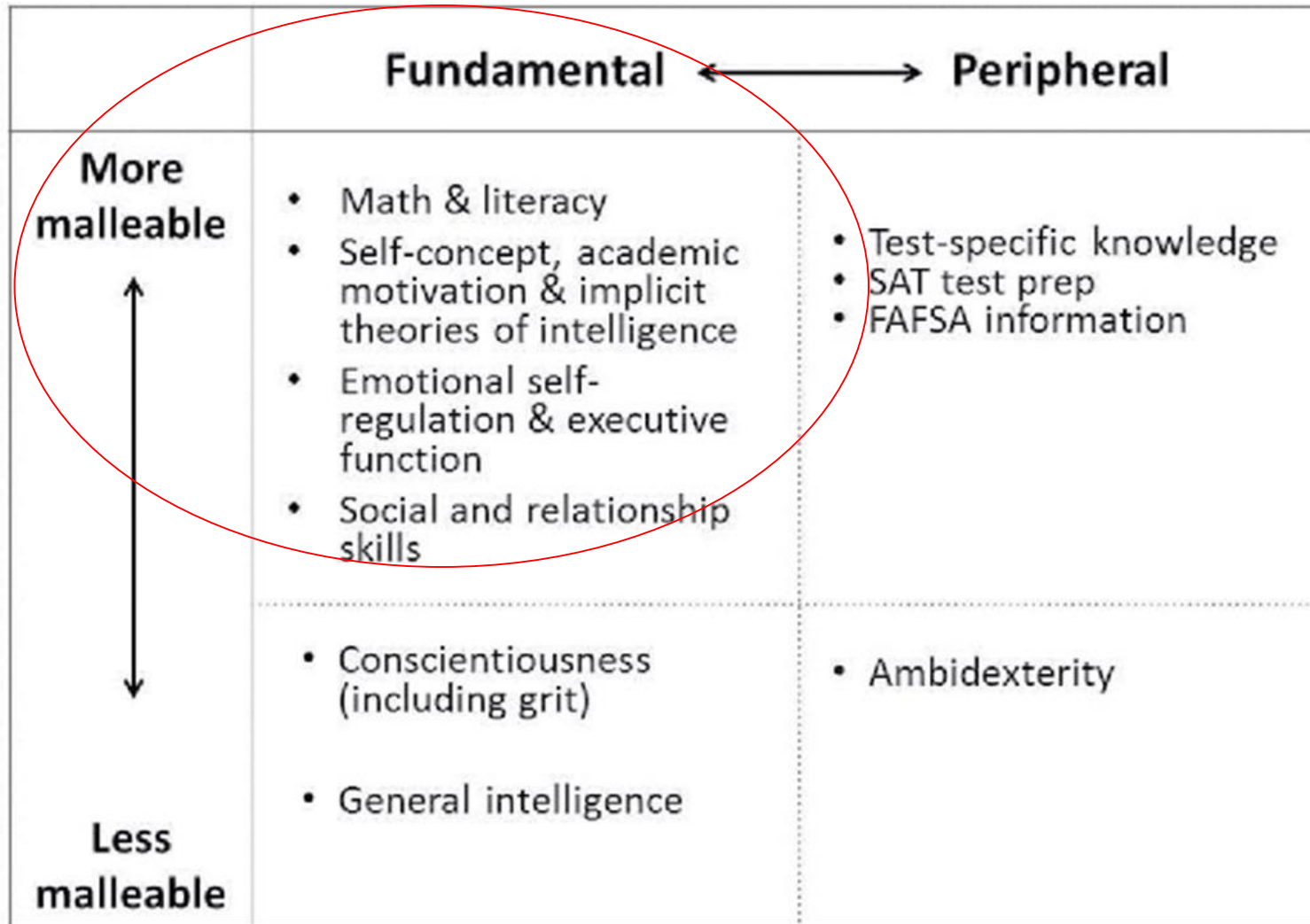
Trifecta

Malleable

Fundamental

Counterfactual

	Fundamental ← → Peripheral	
More malleable  	<ul style="list-style-type: none">• Math & literacy• Self-concept, academic motivation & implicit theories of intelligence• Emotional self-regulation & executive function• Social and relationship skills	<ul style="list-style-type: none">• Test-specific knowledge• SAT test prep• FAFSA information
Less malleable	<ul style="list-style-type: none">• Conscientiousness (including grit)• General intelligence	<ul style="list-style-type: none">• Ambidexterity



Foot-in-the-door



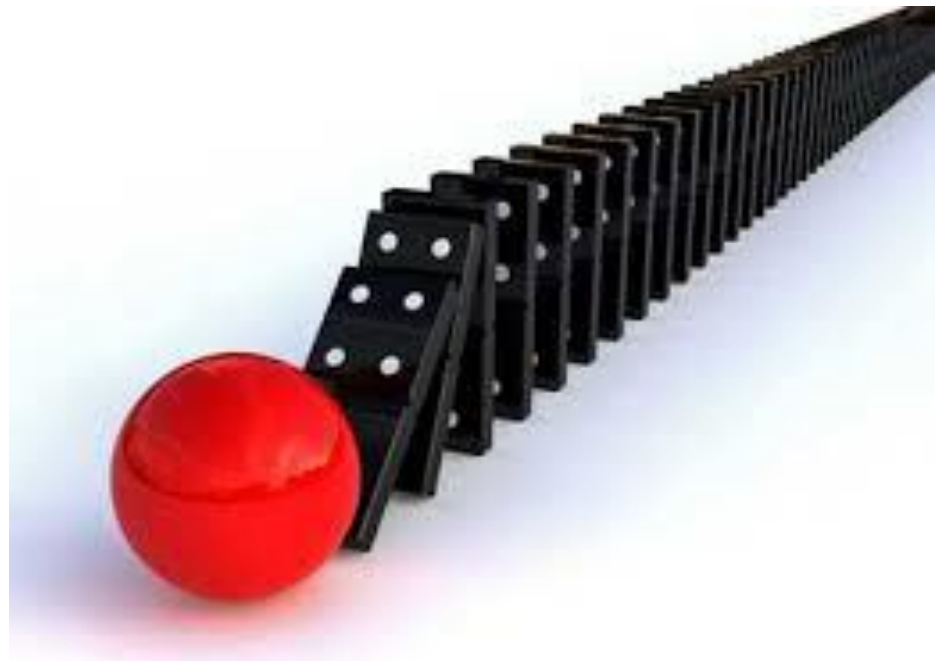
Foot in the door vs. skill-building

Skill-building

Identifisere og forbedre nøkkelferdigheter, f.eks. tidlige tallferdigheter

Foot in the door

Forebygge



Sustaining environments

Opprettholde effekten av tiltak

Hva gjør man når intervensjonen/tiltaket er avsluttet?

Tiltak for barn som er i risiko for å utvikle matematikkvansker

Kunnskap om matematikkvansker

Hva med avanserte ferdigheter hos

Journal of Educational Psychology
2013, Vol. 105, No. 3, 683–700

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0022-0665/13/\$12.00 DOI: 10.1037/eap0000040

Improving At-Risk Learners' Understanding of Fractions

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Instructional Research Group, Long Beach, California

Paul Changas
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The purposes of this study were to investigate the effects of an intervention designed to improve at-risk 4th graders' understanding of fractions and to examine the processes by which effects occurred. The intervention focused more on the measurement interpretation of fractions; the control condition focused more on the part-whole interpretation of fractions and on procedures. Intervention was also designed to compensate for at-risk students' limitations in the domain-general abilities associated with fraction learning. At-risk students ($n = 259$) were randomly assigned to intervention and control. Whole-number calculation skill, domain-general abilities (working memory, attention behavior, processing speed, listening comprehension), and fraction proficiency were pretested. Intervention occurred for 12 weeks, 3 times per week, 30 min per session, and then fraction performance was reassessed. On each conceptual and procedural fraction outcome, effects favored intervention over control (effect sizes = 0.29 to 2.50), and the gap between at-risk and low-risk students narrowed for the intervention group but not the control group. Improvement in the accuracy of children's measurement interpretation of fractions mediated intervention effects. Also, intervention effects were moderated by domain-general abilities, but not whole-number calculation skill.

Keywords: fractions, intervention, mathematics

Competence with fractions is considered foundational for learning algebra, for success with more advanced mathematics, and for competing successfully in the American workforce (Geary et al., 2008; National Mathematics Advisory Panel [NMAP], 2008; Siegler et al., in press). Yet, half of middle and high school students in the United States are still not proficient with the ideas and procedures taught about fractions in the elementary grades (e.g., National Council of Teachers of Mathematics [NCTM], 2007; NMAP, 2008). For these reasons, NMAP recommended that high priority be assigned to improving performance on fractions, a theme reflected in the Common Core State Standards (<http://www.corestandards.org/>). The focus of the present study was

improving and understanding the development of fraction competence for fourth graders at risk for poor outcomes. We assessed the efficacy of a 12-week intervention and examined the processes by which effects occurred to increase understanding about the development of competence with fractions. Only a handful of studies have assessed the efficacy of fraction instruction or intervention (Misquitta, 2011). Even fewer studies have examined the processes by which intervention effects occur. In this introduction, we explain our theoretical framework for designing the intervention and for providing insights into the processes by which its effects occur. We then summarize prior research on fraction intervention and explain how the present study extends the literature.

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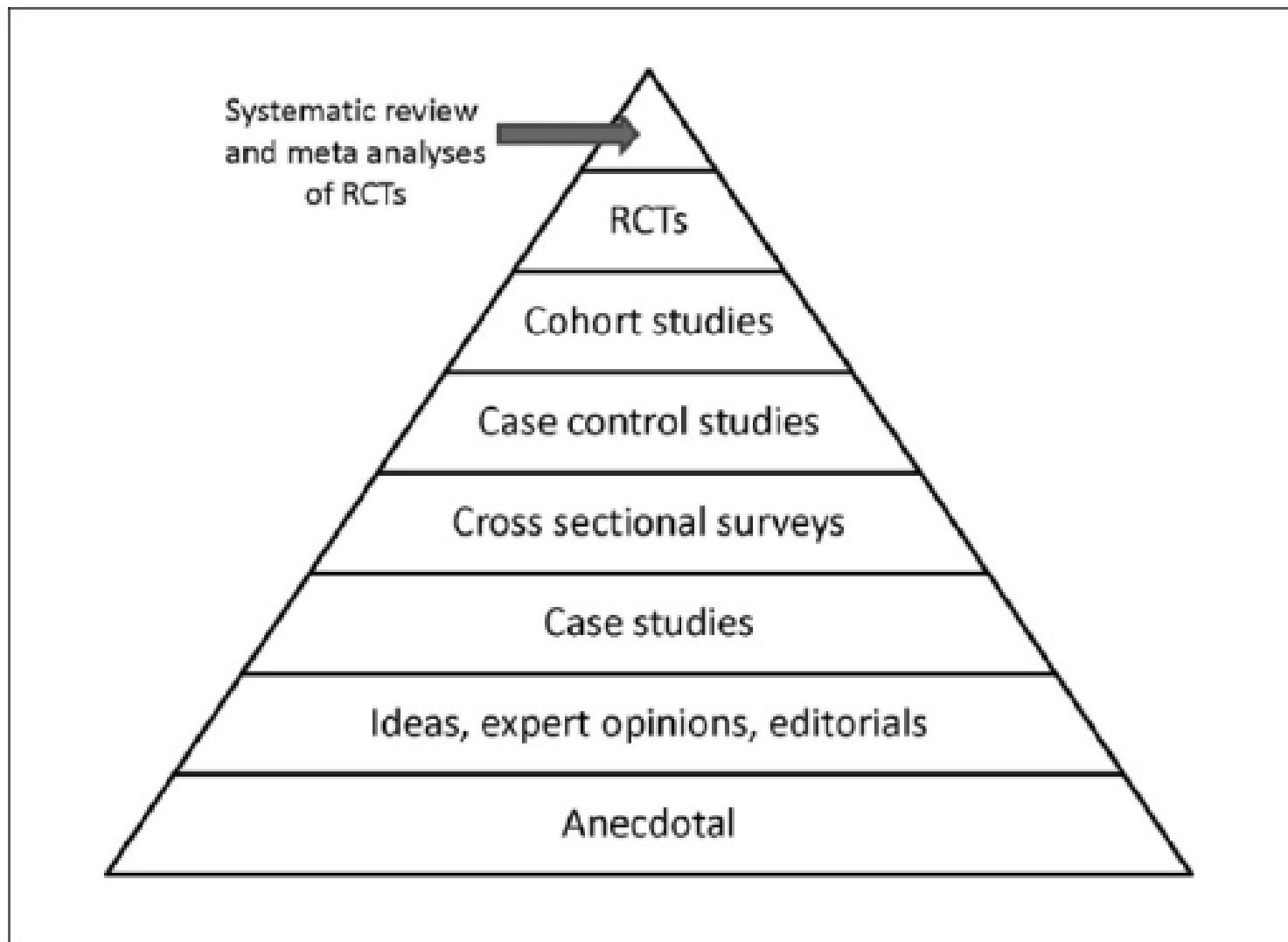
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Hva skal vi ha fokus på når vi lager tiltak for elever som strever i matematikk?

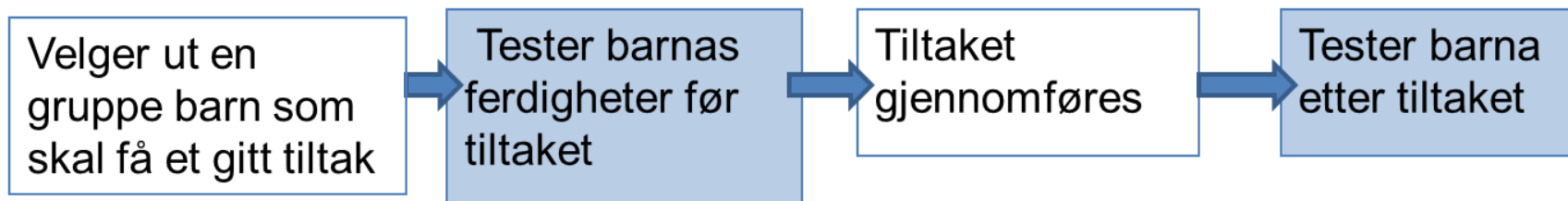
Hvordan holde effekten av et tiltak ved like?

Hva skal vi være kritiske til når vi leser forskning om intervensjoner?

Hva kjennetegner forskning vi kan «stole på»?

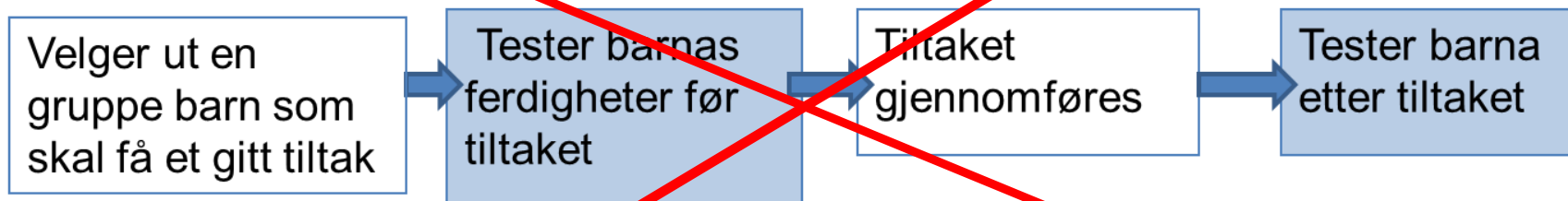


Oppbygning av studie



Figur 1. Pre-posttest design med en gruppe

Oppbygning av studie

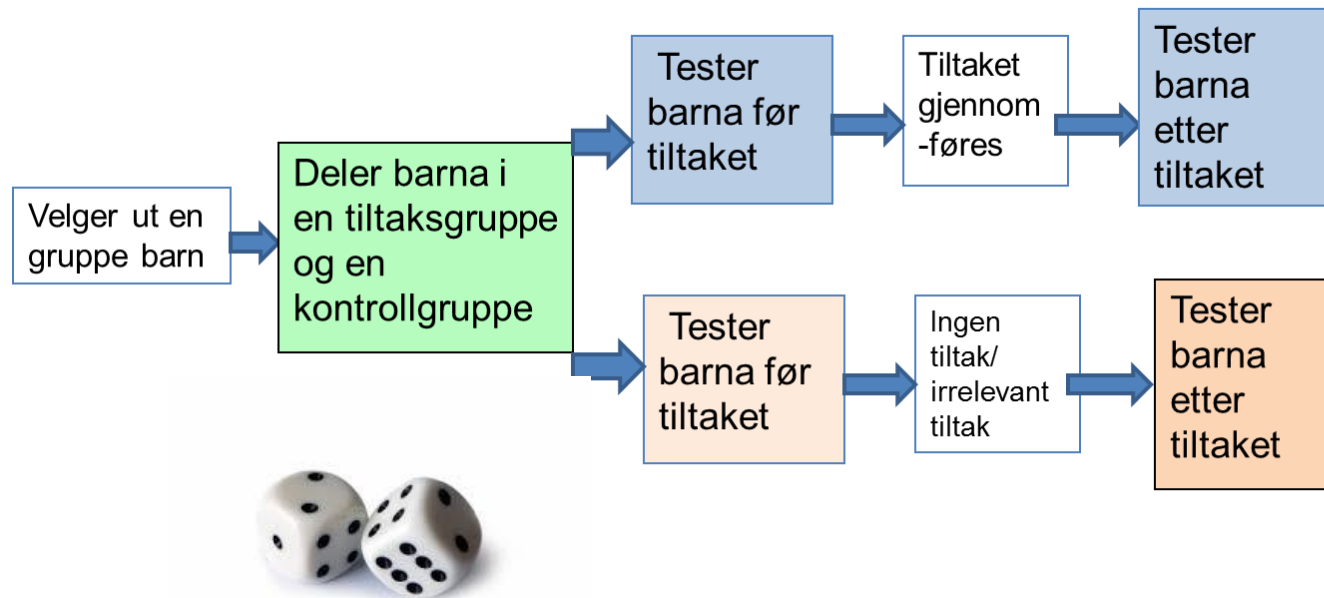


Figur 1. Pre-posttest design med en gruppe

Oppbygning av undersøkelse



Figur 2. Studier med kontrollgruppe



Effects of First-Grade Number Knowledge Tutoring With Contrasting Forms of Practice

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Christopher Schatschneider
Florida State University

Carol L. Hamlett, Jacqueline DeSelms,
Pamela M. Seethaler, Julie Wilson,
Caitlin F. Craddock, Joan D. Bryant,
and Kurstin Luther
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Paul Changas
Metropolitan-Nashville Public Schools

The purpose of this study was to investigate the effects of 1st-grade number knowledge tutoring with contrasting forms of practice. Tutoring occurred 3 times per week for 16 weeks. In each 30-min session, the major emphasis (25 min) was number knowledge; the other 5 min provided practice in 1 of 2 forms. Nonspeeded practice reinforced relations and principles addressed in number knowledge tutoring. Speeded practice promoted quick responding and use of efficient counting procedures to generate many correct responses. At-risk students were randomly assigned to number knowledge tutoring with speeded practice ($n = 195$), number knowledge tutoring with nonspeeded practice ($n = 190$), and control (no tutoring, $n = 206$). Each tutoring condition produced stronger learning than control on all 4 mathematics outcomes. Speeded practice produced stronger learning than nonspeeded practice on arithmetic and 2-digit calculations, but effects were comparable on number knowledge and word problems. Effects of both practice conditions on arithmetic were partially mediated by increased reliance on retrieval, but only speeded practice helped at-risk children compensate for weak reasoning ability.

Keywords: mathematics, practice, fluency, arithmetic, word problems

Supplemental materials: <http://dx.doi.org/10.1037/a0030127.supp>

Intervention for First Graders With Limited Number Knowledge: Large-Scale Replication of a Randomized Controlled Trial

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Chuck Wilkins[†]

Edvance Research, Inc.

Joseph Dimino

Instructional Research Group

Replication studies are extremely rare in education. This randomized controlled trial (RCT) is a scale-up replication of Fuchs et al., which in a sample of 139 found a statistically significant positive impact for Number Rockets, a small-group intervention for at-risk first graders that focused on building understanding of number operations. The study was relatively small scale (one site) and highly controlled. This replication was implemented at a much larger scale—in 76 schools in four urban districts; 994 at-risk students participated. Intervention students participated in approximately 30 hours of small-group work in addition to classroom instruction; control students received typical instruction and whatever assistance the teacher would normally provide. Intervention students showed significantly superior performance on a broad measure of mathematics proficiency.

KEYWORDS: replication, scale-up, elementary mathematics, small-group intervention, at-risk students

Building Kindergartners' Number Sense: A Randomized Controlled Study

Nancy C. Jordan, Joseph Glutting, Nancy Dyson, Brenna Hassinger-Das, and Casey Irwin
University of Delaware

Math achievement in elementary school is mediated by performance and growth in number sense during kindergarten. The aim of the present study was to test the effectiveness of a targeted small-group number sense intervention for high-risk kindergartners from low-income communities. Children were randomly assigned to 1 of 3 groups ($n = 44$ in each group): a number sense intervention group, a language intervention group, or a business-as-usual control group. Accounting for initial skill level in mathematical knowledge, children who received the number sense intervention performed better than controls at immediate posttest, with meaningful effects on measures of number competencies and general math achievement. Many of the effects held 8 weeks after the intervention was completed, suggesting that children internalized what they had learned. There were no differences between the language and control groups on any math-related measures.

Keywords: at risk, mathematics, number sense, low income, intervention

Kindergarten achievement has far-reaching consequences. Kindergarten test scores are associated with college attendance, earning potential, and financial management, even when background characteristics are held constant (Chetty et al., 2010). Kindergarten mathematics, in particular, matters for long-term outcomes. Independent of cognitive ability and social class, kindergarten math concepts (e.g., knowledge of numbers and ordinality) are powerful predictors of adolescent learning outcomes across content areas (Duncan et al., 2007). Although most kindergarten math curricula

norm as early as preschool (Clements & Sarama, 2008), a gap that does not attenuate during the school years (National Mathematics Advisory Panel, 2008). Minority African American and Latino children are disproportionately represented among the lower social classes (Royer & Walles, 2007), resulting in large racial disparities in mathematics achievement.



Testing the Immediate and Long-Term Efficacy of a Tier 2 Kindergarten Mathematics Intervention

Ben Clarke, Christian Doabler, Keith Smolkowski, Evangeline Kurtz Nelson, Hank Fien, Scott K. Baker & Derek Kosty

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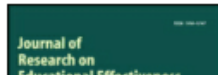
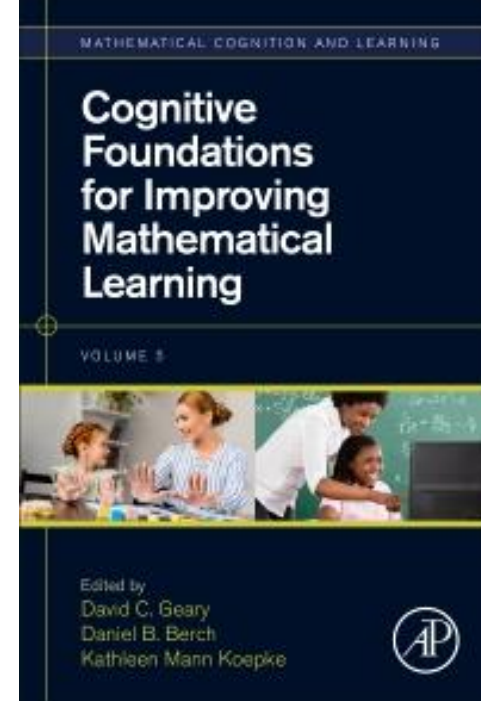
Fadeout in an Early Mathematics Intervention: Constraining Content or Preexisting Differences?

Drew H. Bailey, Tutrang Nguyen, Jade Marcus Jenkins, Thurston Domina, Douglas H. Clements, and Julie S. Sarama

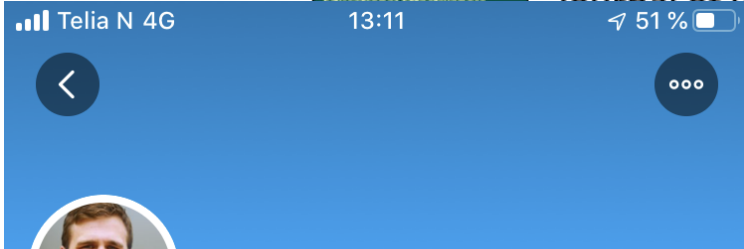
Online First Publication, August 8, 2016. <http://dx.doi.org/10.1037/dev0000188>

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One course, many outcomes: A multi-site

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Early Mathematics Intervention Change the Underlying Children's Learning?

Douglas H. Clements, Julie Sarama, Christopher B. Wolfe, & Drew H. Bailey

W. Watts, Douglas H. Clements, Julie Sarama, Christopher B. Wolfe, & Drew H. Bailey (2017) Does Early Mathematics Intervention Change the Underlying Children's Learning?, *Journal of Research on Educational Effectiveness*, [10.1080/19345747.2016.1204640](https://doi.org/10.1080/19345747.2016.1204640)

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