

Mid-Phase Competition -- Absolute Priority 3 (STEM)  
Southern Methodist University  
S411B210032

## **Scalability, Capacity, and Learning Engagement (SCALE) for Fraction Face-Off**

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**Project Title:** Scalability, Capacity, and Learning Engagement (SCALE) for Fraction Face-Off  
**Type of Grant Requested:** Mid-phase

**Absolute Priorities:** Absolute Priority 1 addressed by replicating and extending an intervention with moderate evidence and Absolute Priority 3 by focusing on improving math outcomes. We address Invitational Priority 1 by accelerating learning of students experiencing mathematics difficulty (MD) through tiered interventions within a multi-tiered system of support (MTSS).

**Total number of students to be served in the project:** 1,600

**Grade level(s) to be served by the project:** Grades 4-8

**Your definition of high-need students:** Students with MD in grades 4-8 who have weak foundational knowledge, low proficiency, and who score significantly below typically achieving peers in terms of fraction knowledge. We recruit from communities across two states, including urban, suburban, and rural geographies and diverse groups (e.g., based on socio-economic status, race and ethnicity, disability diagnosis, English learner classification)

**Brief project description including project activities:** Across the five years of this project, we examine the effectiveness of *Fraction Face-Off* (FFO, Fuchs et al., 2013), a math intervention with moderate evidence (as determined by the What Works Clearinghouse). FFO is designed as a Tier 2 intervention for students in Grade 4 to be implemented in small groups over 36, 30-min sessions. We conduct randomized controlled trials with diverse student populations and settings to determine the extent to which FFO improves fraction knowledge and math outcomes of students experiencing MD in grades 4-8 as a Tier 2 and Tier 3 intervention.

In Experiment 1 (2022-23), we replicate efficacious findings of FFO (Fuchs et al., 2013), with 4th-grade students in diverse settings who are experiencing MD. Interventionists are randomly assigned to two conditions—FFO and business-as-usual (BAU). Pre- and post-tests are administered to interventionists and students. Follow-up data are collected in Years 2-4. In Experiment 2 (2023-24), we investigate if there are differences between in-person and virtual training for interventionists using FFO. Interventionists are randomly assigned to three conditions—FFO with in-person training, FFO with virtual training, and BAU. Teachers work with 4th-grade students experiencing MD as a Tier 2 intervention, and both interventionists and students take pre- and post-tests. Follow-up student data are collected in Years 3-4. In Experiment 3 (2024-25) and Experiment 4 (2025-26), we investigate the efficacy of FFO with 5th-grade students and middle school students experiencing MD, respectively. FFO is implemented as a Tier 3 intervention. There are two conditions—FFO with the best training package determined in Experiment 2 and BAU. Both interventionists and students take pre- and post-tests. In Experiment 3, follow-up student data are collected in Year 4.

**Summary of project objectives and expected outcomes:** In this project, we take a WWC-approved intervention and contribute rigorous evidence of effectiveness with new populations and setting for implementation within MTSS. We address a pressing need to accelerate learning for students experiencing MD in upper elementary and middle schools. We study mechanisms to efficiently and cost-effectively scale FFO and build capacity within school

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districts to use *FFO* to improve understanding of fractions and general mathematics so as to facilitate algebra readiness. We predict positive and significant results across grade levels for both interventionists and students compared to BAU. We predict that virtual training will be as effective as in person training at supporting fidelity of implementation.

**List all organizations partnering with this project:** Southern Methodist University is the lead organization, and American Institutes for Research is the external evaluator. University of TexasAustin and University of Missouri will serve as implementation partners to reach regional scale.