

COGNITIVE DEFICITS AND ENHANCEMENTS IN YOUTH FROM ADVERSE CONDITIONS: AN INTEGRATIVE ASSESSMENT USING DRIFT DIFFUSION MODELING IN THE ABCD STUDY

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Introduction

Childhood adversity can lead to cognitive deficits or enhancements. Integrating **deficit** and **adaptation-based frameworks** is crucial for understanding how adversity shapes cognition. Two challenges currently prevent us from doing so:

1. The use of **raw performance measures** (e.g., response times), which conflate different stages of processing.
2. Adversity may lower or improve performance because it affects **general processes** or **specific abilities**.

Approach

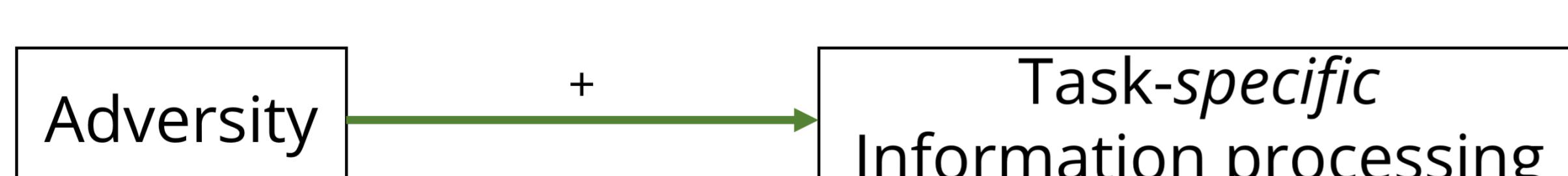
We investigate the effect of **household threat** and **material deprivation** on performance on four tasks measuring **inhibition**, **attention shifting**, **mental rotation**, and **processing speed** in the ABCD sample.

We address the challenges above in a two-step approach:

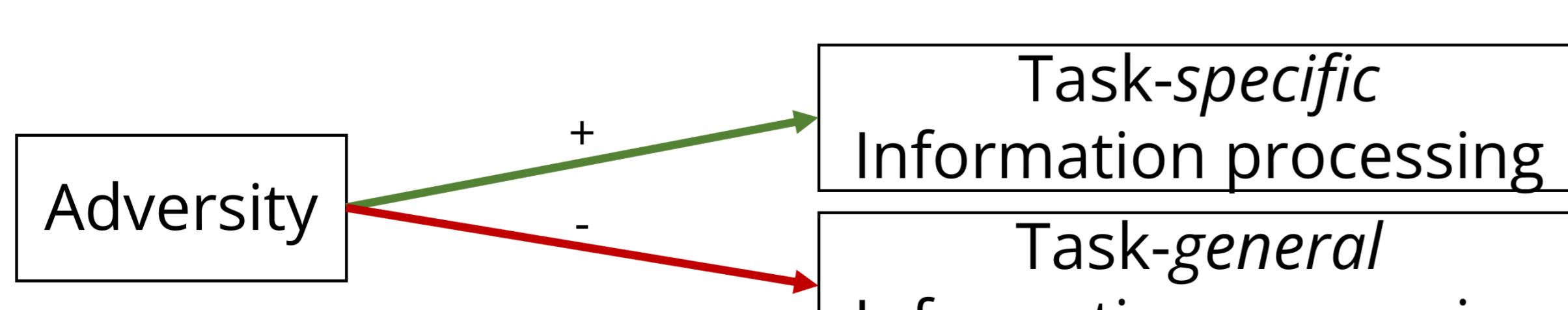
1. Use cognitive modeling to isolate **speed of information processing**, **preparation/execution speed**, and **response caution** for each task.
2. Use SEM to associate adversity with **task-specific processes** (i.e., unique to a specific task) and **task-general processes** (i.e., shared across tasks).

Predictions from deficit and adaption-based frameworks

Adaptation-based framework: Adversity enhances specific abilities that solve real-world challenges ([Frankenhuis and Weerth 2013; Ellis et al. 2022](#)):

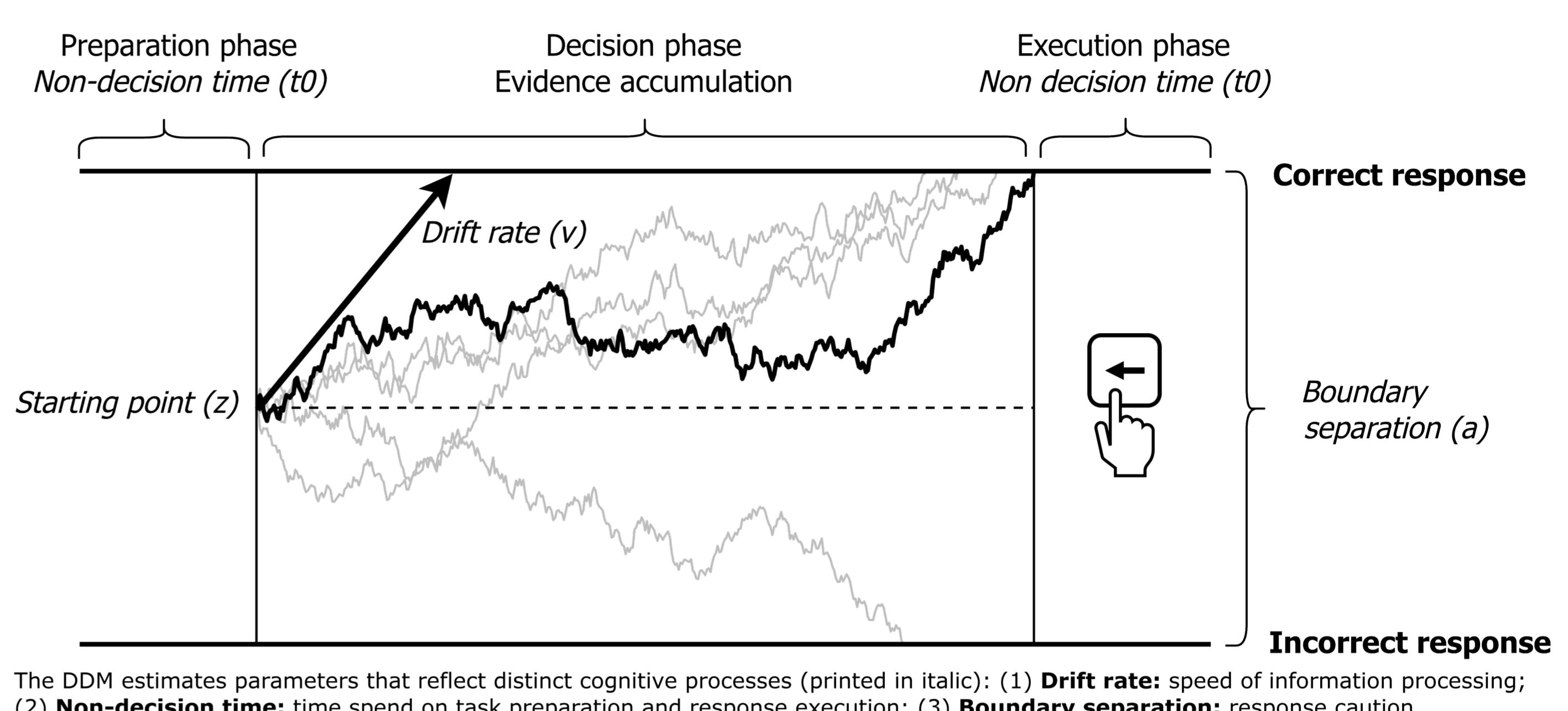


Deficit-based framework: Adversity can impair both specific abilities as well as general cognitive ability:

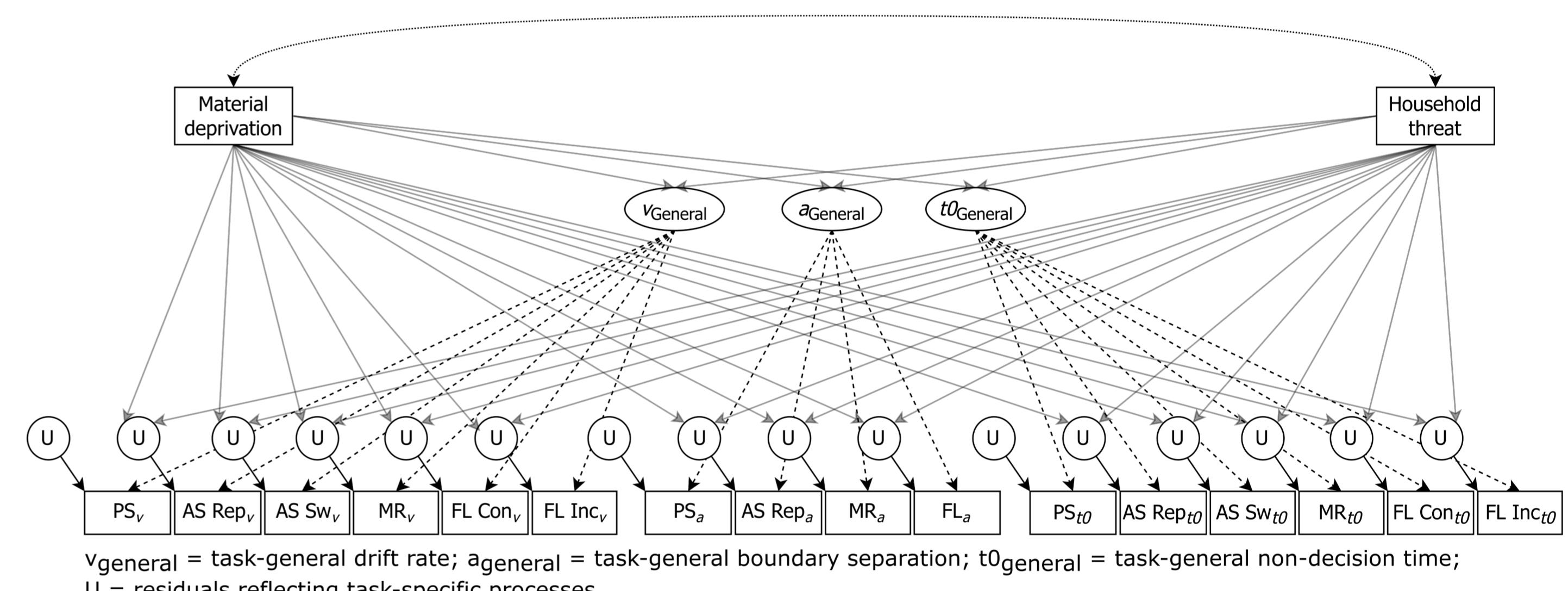


If adversity only affects preparation/execution speed or response caution, neither framework is supported.

Step 1: Isolate cognitive processes using Drift Diffusion Modeling



Step 2. Estimate whether adversity affects task-specific and/or task-general processes



Conclusion

Our findings will provide insights for theory and practice:

1. Is lowered/enhanced performance the result of differences in **ability-relevant processes** (e.g., attention shifting, inhibition) or **ability-irrelevant processes** (e.g., stimulus encoding, response caution)?
2. Should **interventions** focus on specific abilities (e.g., removing distractions from the classroom; providing targeted training) or on general abilities (e.g., use ecologically relevant stimuli to aid learning)?

Registered Report accepted pending data analysis at Developmental Science.



CODE & MATERIALS

