

MTSS/RTI INTERVENTIONS FOR PRIMARY STUDENTS AT ACADEMIC RISK

ACADEMIC EFFECTS AND EVIDENCE GAPS



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INTRODUCTION

Learning difficulties in reading, writing, and mathematics are associated with adverse academic trajectories in primary education (Grigorenko et al., 2020). In response to the limitations of traditional identification models (Fletcher & Vaughn, 2009), Multi-Tiered Systems of Support (MTSS) and Response to Intervention (RTI) were developed as preventive frameworks based on early identification and tiered support. However, evidence regarding their effectiveness remains heterogeneous across domains and contexts (Neitzel et al., 2021), and research has mainly focused on academic outcomes, with limited attention to motivational or self-regulatory processes (Sailor et al., 2020).

OBJETIVES

To examine the effectiveness of MTSS/RTI interventions for primary students with learning difficulties or academic risk, focusing on academic outcomes in reading, writing, and mathematics and on factors associated with variability in intervention outcomes. The research question was structured using the SPICE framework (Table 1).

Table 1.
Review Framework (SPICE)

Component	Description
S – Setting	Primary education institutions in Europe and North America
P – Population	Children aged 6–12 with learning difficulties or academic risk
I – Intervention	Educational interventions implemented under MTSS or RTI frameworks
C – Comparison	Traditional instruction, control groups, or non-tiered interventions
E – Evaluation	Academic outcomes (reading, writing, mathematics) and, when reported, motivation or self-regulation

METHOD

PRISMA 2020 guidelines were followed and the protocol was preregistered in PROSPERO (Code: CRD420251057264). Studies were identified through Web of Science and Scopus (2013–2025) and screened by two independent reviewers (Krippendorff's $\alpha = .51 - .91$). Quantitative and single-case experimental MTSS/RTI intervention studies for primary students were included.

Sixteen studies met eligibility criteria (Table 2). Most interventions targeted Tier 2, and reading was the most frequently examined domain. Methodological quality was assessed using the MMAT (2018). Due to heterogeneity in designs and outcomes, findings were synthesised narratively.

Table 2.
Study Selection (PRISMA Summary)

Stage	<i>n</i>
Records identified	152
After duplicates removed	108
Title/keyword screening	48
Abstract screening	27
Full-text assessed	16
Studies included	16

RESULTS

Sixteen studies were included, most conducted in the United States (Figure 1). Interventions mainly targeted reading, with fewer studies in mathematics and only one in writing (Figure 2). Most interventions were implemented at Tier 2 level (Figure 3). Evidence was strongest for Tier 2 reading interventions, particularly for foundational reading skills (Table 3). Mathematics showed positive effects in some studies, while writing evidence was limited. Effect sizes and factors associated with outcome variability are presented in Tables 4 and 5.

Figure 1.

Studies by Country

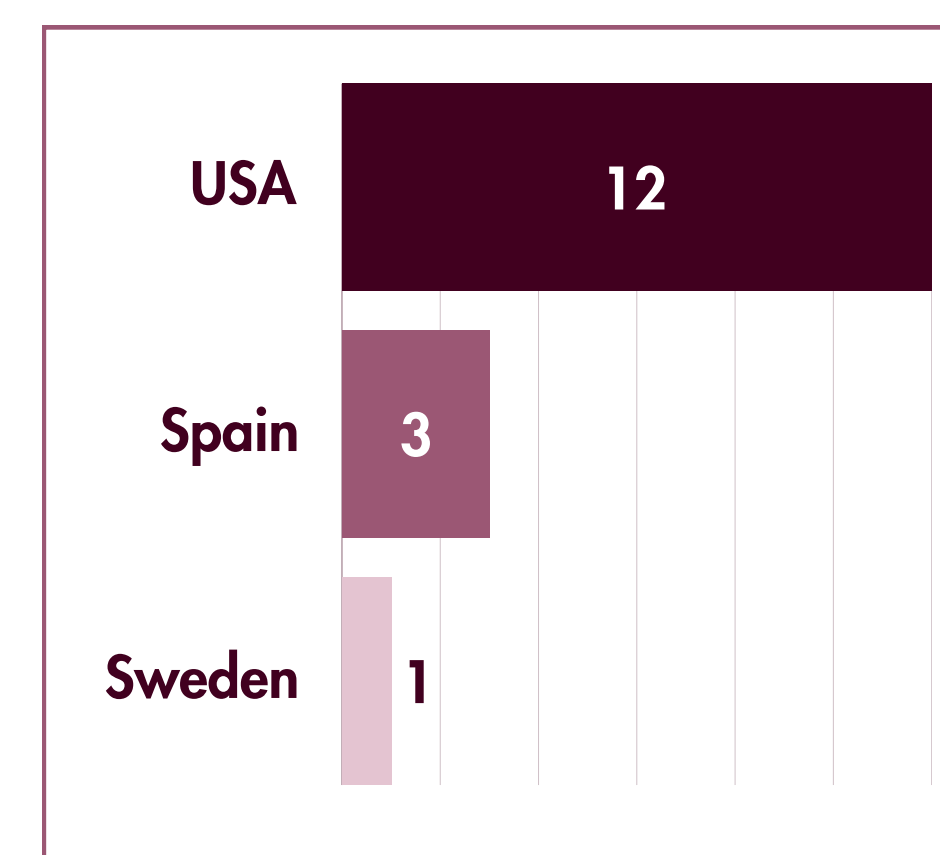


Figure 2.

Studies by Academic Domain

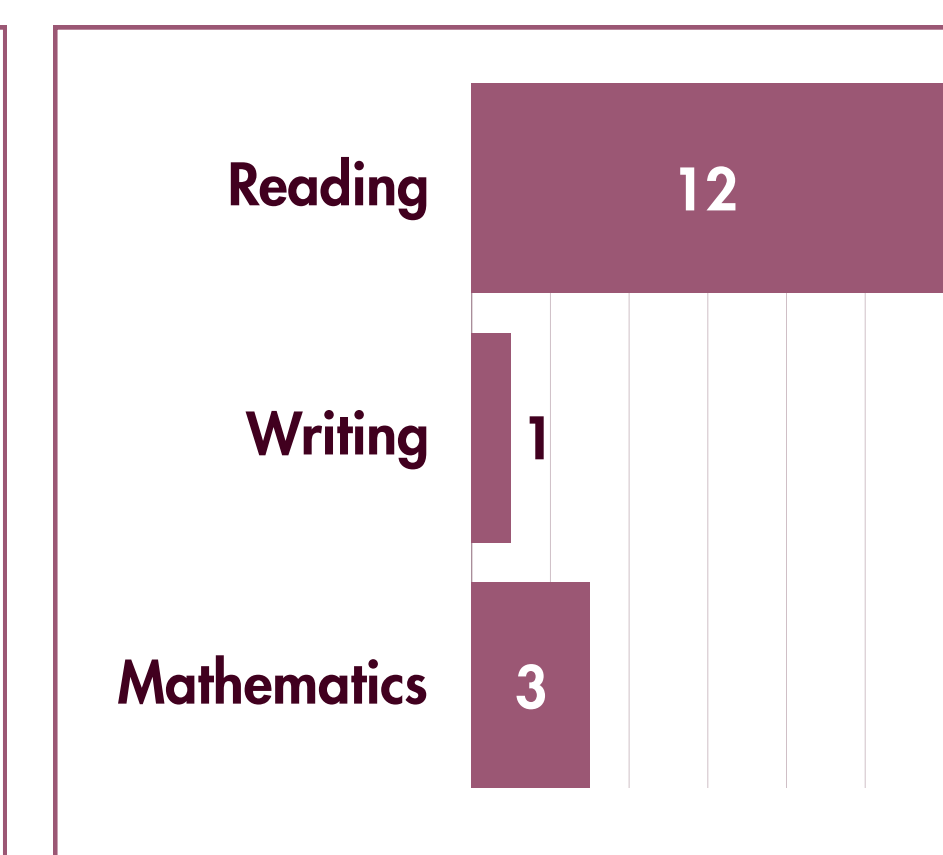
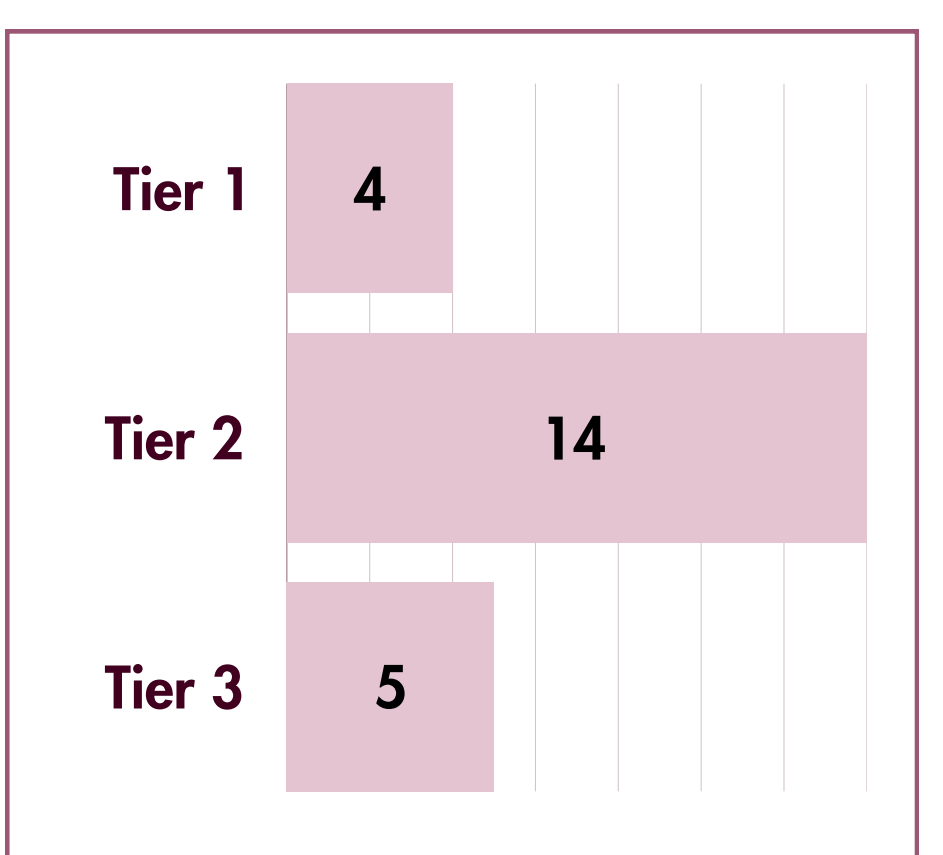


Figure 3.

Studies by MTSS/RTI Tier



Note. Some studies included interventions across multiple tiers

Table 3.

Distribution of Evidence Across Academic Domains

Academic domain	Studies (n)	Predominant tier	Key outcomes
Reading	12	Tier 2	Gains in decoding and word reading; mixed comprehension results
Writing	1	Tier 2	Improvements in handwriting, spelling, fluency
Mathematics	3	Tier 2	Positive effects in calculation and word problems
Motivation / self-regulation	0	—	Not assessed

Table 4.

Reported Effect Sizes in Representative Studies

Academic domain	Outcome focus	Reported effect sizes
Reading (word-level)	Decoding, word identification	Small-moderate ($d \approx 0.34-0.40$; $\eta^2 p \approx .12-.17$)
Reading comprehension	Global comprehension	Mixed ($g \approx 0.08-1.22$)
Mathematics	Calculation, word problems	Moderate-large ($g \approx 0.38-1.67$)
Writing	Handwriting, spelling, fluency	Significant gains (no standardised effects)

Table 5.

Factors Associated with Outcome Variability

Factor	Summary
Intervention tier	Mostly Tier 2 interventions
Implementation fidelity	Higher fidelity linked to better outcomes
Intervention intensity	Greater intensity → stronger skill gains
Student risk profiles	Outcomes varied by baseline level
Data-based decision making	Progress monitoring guided instruction

DISCUSSION

This review synthesises the current evidence on MTSS/RTI interventions in primary education across Europe and North America. Findings most consistently support improvements in foundational academic skills, particularly decoding and some mathematics outcomes, whereas evidence for reading comprehension and writing remains limited or heterogeneous. The absence of motivational or self-regulatory outcomes highlights a gap in the empirical operationalisation of MTSS. Moreover, the predominance of Tier 2 interventions and the concentration of studies in North America limit generalisability and highlight the need for stronger methodological designs and consistent effect-size reporting.

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