Title: Understanding Unresponsiveness to Tier 2 Reading Intervention: Exploring the Classification and Profiles of Adequate and Inadequate Responders in First Grade

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Abstract Body – Paper 3

Limit 4 pages single-spaced.

Background / Context:
Description of prior research and its intellectual context.

There is substantial evidence to suggest that early identification of students at-risk of reading difficulties and subsequent intervention for those students may be related to positive learning outcomes. Response to Intervention (RTI) builds on this logic by shifting the focus in delivery of school services toward assessing risk and providing targeted instruction for students at high risk for poor reading outcomes (D. Fuchs, Fuchs, & Compton, 2012).

Recent studies sought to improve classification of which students need which tier of services, with the goal of ensuring that students assigned to Tier 2 or 3 can respond to intervention services. However, once students are assigned, there remain differences in how to define unresponsiveness in the ‘response to intervention’ framework. Classification criteria reported in past research varies between studies has resulted in little agreement about what constitutes adequate response to intervention (L. S. Fuchs et al., 2004; Good et al., 2001; McMaster et al., 2005; O’Connor & Klingner, 2010; Torgesen et al., 2001).

This lack of agreement makes it difficult to determine which students are responding to intervention services and how they differ from nonresponders. In short, the field needs a clearer definition of success.

Purpose / Objective / Research Question / Focus of Study:
Description of the focus of the research.

The purpose of the current study was to further our understanding of unresponsiveness to Tier 2 intervention. The objectives of the study were to (1) examine and compare the academic and cognitive profiles of first graders who responded adequately and inadequately to intensive small-group reading intervention (Tier 2), and (2) assess how these profiles differ based on the criteria used for classification of unresponsiveness.

It seeks to address what criteria should be used to determine whether a student is an adequate responder, and understand how responders and nonresponders differ.

Setting:
Description of the research location.

Participants were drawn from an earlier federally funded study examining the efficacy of RTI as a means to prevent and identify students with reading difficulties (Compton, Fuchs, Fuchs, & Bryant, 2006). Three cohorts came from consecutive years in 73 first grade classrooms in 15 schools in urban and suburban districts located in Nashville.
Population / Participants / Subjects:
Description of the participants in the study: who, how many, key features, or characteristics.

A total of 125 students who were enrolled in Tier 2 had complete data and are included in the current sample. Nearly half were female, 45% of students were White, 41% Black, 8% Hispanic, and 6% of students belonged to other ethnic groups. Sixty-six percent (n = 82) of students qualified for free and reduced lunch, and 14% (n = 17) had an individualized education program. This sample was selected from an earlier study. The Year 1 cohort (n = 712) represented a developmental sample of students followed from the fall of first grade through the end of fourth grade. We used first-grade word identification fluency (WIF) progress monitoring data and end-of-second-grade reading deficiency status to estimate WIF performance cut-points (i.e., level and slope) associated with end-of-second-grade reading deficiency. These WIF cut-points were used to categorize students as unresponsive to Tier 2 intervention in the Years 2 and 3 cohorts. The Years 2 and 3 cohorts (n = 624) were first-grade students involved in a randomized control trial (RCT) examining the efficacy of 14 weeks of supplementary intervention for students identified as unresponsive to Tier 1 instruction (Gilbert et al., 2013). However, the control group from this sample could not be included in this analysis because they received only Tier 1 services. This accounts, in part, for the decrease in sample size.

Intervention / Program / Practice:
Description of the intervention, program, or practice, including details of administration and duration.

The intervention was assignment to receive Tier 2 reading intervention and support services, in the form of tutoring sessions in the middle of the school year. Students received tutoring from trained research assistants in small groups (two to three students per group) for 45 minutes three times per week in addition to their classroom reading instruction. Treatment was considered Tier 2 because it comprised scripted, supplemental tutoring program that focused on phonological awareness, sight words, letter sounds, decoding, and reading fluency.

Research Design:
Description of the research design.

The control group for the original study, from which this sample is drawn, consisted of students receiving only Tier 1 reading instruction. This study focuses on responsiveness to Tier 2, so the comparison group for this analysis is students receiving Tier 2 intervention services. Although this is not an experimental control group, it allows for an exploration of the factors and outcomes associated with the group who responds to intervention services compared with those who do not.

Data Collection and Analysis:
Description of the methods for collecting and analyzing data.

Unresponsiveness to Tier 2 intervention was classified in two ways for the purposes of examining whether profiles of responders and nonresponders would differ depending on how
performance was operationalized. The sample of 125 students was first classified as responders or nonresponders based on a composite score of reading performance at the end of first grade. Summed weighted standardized scores for untimed word identification and word attack, timed sight word reading and decoding, and reading comprehension at the end of first grade were used to create this composite. The weighted factor for each of the word identification and decoding measures was .167 and .333 for the comprehension measure. Nonresponders were those whose scores were below the 16th percentile on this reading composite ($n = 23; 18.4\%$).

The second method of group classification was growth on the word identification fluency (WIF) progress monitoring data. At the end of the 14 weeks of Tier 2 tutoring, the locally normed WIF cut-points were used to identify nonresponders to Tier 2 instruction (intercept below $= 21.41$ words; slope below 16th percentile $= 0.67$ words/week). This procedure yielded 31 nonresponders ($24.8\%$) to Tier 2 intervention.

The measures for this study focus on reading at the word level. Four academic measures were used in the current study that assessed word identification and decoding skills (word identification, word attack, sight word efficiency, phonemic decoding). In addition, there were nine cognitive measures that measured skills related to rapid naming, phonemic awareness, language, nonverbal problem-solving, and attention. For the purposes of this study, we consider cognitive skills that focus on the students’ processing and do not involve reading.

Analysis of Variance for repeated measures yielded a profile analysis for each of the outcome measures. Two separate profile analyses were run to examine differences in unresponsiveness based on different criteria used to classify students as adequate and inadequate responders: end of first grade reading composite vs. progress monitoring WIF data.

Findings / Results:
Description of the main findings with specific details.

Two separate analyses were run for each of the academic and cognitive profiles, based on groups being identified using the two sets of classification described (i.e., reading composite and WIF). For each analysis, the between-subjects factor was response group (responders vs. nonresponders), and the within-subjects variables were the academic or cognitive measures.

The main effect for response group, referred to as the elevation effect, represents differences between groups averaged across all measures. Within profile analysis, the interaction between group and measures, referred to as the shape effect, represents differences in the shape of the profile across groups (see Tabachnick & Fidell, 2006).

Responders’ profiles differ from those of nonresponders when scores are averaged across domains, which is consistent with what we know about the characteristics of students who do not respond adequately to Tier 2 interventions (Al Otaiba & Fuchs, 2002; 2006; Fletcher et al., 2011; Nelson et al., 2003). Only the analyses comparing groups using the WIF classification revealed significant shape effects for academic and cognitive profiles. Effect sizes for the difference between nonresponding and responding students on all outcome variables are shown in the attached Table 1.
Conclusions:
Description of conclusions, recommendations, and limitations based on findings.

The limited sample size and absence of an experimentally determined control group present limitations for inference. However, the analysis shows that the choice of method to define unresponsiveness can influence which students appear unresponsive and consequently move to Tier 3 to receive more intensive services.
Appendices
Not included in page count.

Appendix A. References


The SNAP and the SWAN rating scales. Available from www.adhd.net


Appendix B. Tables and Figures
Not included in page count.

Table 1. Effect Sizes for Academic and Cognitive Outcomes, by type of classification method.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Nonresponders vs. Responders</th>
<th>Reading composite</th>
<th>WIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word identification(^a)</td>
<td></td>
<td>-2.137</td>
<td>-1.795</td>
</tr>
<tr>
<td>Word attack(^b)</td>
<td></td>
<td>-1.626</td>
<td>-0.895</td>
</tr>
<tr>
<td>Sight word efficiency(^c)</td>
<td></td>
<td>-1.977</td>
<td>-1.685</td>
</tr>
<tr>
<td>Phonemic decoding(^d)</td>
<td></td>
<td>-1.624</td>
<td>-1.169</td>
</tr>
<tr>
<td>Rapid letter naming(^e)</td>
<td></td>
<td>-0.824</td>
<td>-0.559</td>
</tr>
<tr>
<td>Rapid digit naming(^f)</td>
<td></td>
<td>-1.121</td>
<td>-0.799</td>
</tr>
<tr>
<td>Sound matching(^g)</td>
<td></td>
<td>-1.253</td>
<td>-1.396</td>
</tr>
<tr>
<td>Listening comp(^h)</td>
<td></td>
<td>-0.552</td>
<td>-0.200</td>
</tr>
<tr>
<td>Oral vocabulary(^i)</td>
<td></td>
<td>-1.195</td>
<td>-0.439</td>
</tr>
<tr>
<td>Vocabulary(^j)</td>
<td></td>
<td>-0.691</td>
<td>-0.420</td>
</tr>
<tr>
<td>Nonverbal problem-solving(^k)</td>
<td></td>
<td>-0.765</td>
<td>-0.401</td>
</tr>
<tr>
<td>Attention teacher(^l)</td>
<td></td>
<td>-0.926</td>
<td>-1.293</td>
</tr>
<tr>
<td>Attention tutor(^m)</td>
<td></td>
<td>-0.677</td>
<td>-0.743</td>
</tr>
</tbody>
</table>

Note. WIF = word identification fluency.
\(^a\) Woodcock Diagnostic Reading Battery (WDRB). \(^b\) Woodcock Diagnostic Reading Battery (WDRB). \(^c\) Test of Word Reading Efficiency (TOWRE). \(^d\) Test of Word Reading Efficiency (TOWRE). \(^e\) Comprehensive Test of Phonological Processing (CTOPP). \(^f\) Comprehensive Test of Phonological Processing (CTOPP). \(^g\) Comprehensive Test of Phonological Processing (CTOPP). \(^h\) Woodcock Diagnostic Reading Battery (WDRB). \(^i\) Woodcock–Johnson III (WJ-III). \(^j\) Wechsler Abbreviated Scale of Intelligence (WASI). \(^k\) Matrix Reasoning—Wechsler Abbreviated Scale of Intelligence (WASI). \(^l\) Attention subscale—Strengths and Weaknesses of ADHD Symptoms and Normal Behavior (SWAN). \(^m\) Attention subscale—Strengths and Weaknesses of ADHD Symptoms and Normal Behavior (SWAN).