**Abstract Title Page – Paper 1**
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**Title:** To Wait in Tier 1 or Intervene Immediately A Randomized Experiment Examining First Grade Response to Intervention (RTI) in Reading

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**Abstract Body – Paper 1**
*Limit 4 pages single-spaced.*

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

Despite research about effects of assigning struggling readers to receive intervention services, there is little research and policy guidance for implementation of assignment practices, including *when* to assign students to receive small group intervention services. Prior debate raised concerns about whether RtI would become another type of wait to fail model, referring to historical criticisms of the IQ-achievement discrepancy model. One camp, represented by Vaughn and her colleagues, argued that immediate, intensive interventions may be the most appropriate for some students. Another emerging camp points to the advantage of waiting, noting that early screening assessments can be unreliable and potentially assign some students to intervention who would have responded to Tier 1 (a so-called false positive).

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

To address the debate about whether to wait to assign students to intervention services, this study tests the timing of that assignment. It experimentally introduces two models for assignment. First is called Dynamic RTI, which immediately refers grade 1 students with the weakest skills to the most intensive intervention supports (Tier 2 or Tier 3). The second model, called Typical RTI, starts all students in Tier 1 and after 8 weeks, decides whether students who did not respond to general instruction in Tier 1 should move to Tier 2. Specifically, the study asks:

1. What are the effects of Dynamic RTI and Typical RTI on student reading outcomes by the end of first grade?
2. Does assignment to specific tiers predict gains on standardized assessments and does this differ when comparing Dynamic and Typical RTI groups?

**Setting:**
*Description of the research location.*

The setting is seven schools in a school district in a mid-size city in the southeast in their first year of RTI implementation.

**Population / Participants / Subjects:**
*Description of the participants in the study: who, how many, key features, or characteristics.*

Approximately 500 students participated in the study; less than 3% were Limited English Proficient and student socioeconomic status varied across schools.

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

For typical RTI, all students began in Tier 1. In Dynamic RTI, we fast-tracked students immediately to Tier 2 or Tier 3 intervention depending on their reading skill profile. At the initial screening in September, students whose teachers reported they had severe reading difficulties *and* who scored below the 40th percentile at the school level for all four screeners were considered as initially eligible for Tier 3. The initial criterion for Tier 2 eligibility was teacher reports of severe reading difficulties *or* scoring below the 40th percentile at the school level for three out of four screeners. Local norms were used because we had one school with high SES; the 40th percentile was used as a cut point for low average performance.
Students who remained below the 40th percentile on three out of four measures and who also demonstrated slopes of growth less than the mean for the entire sample moved to a more intensive tier in the next eight week session (e.g., from Tier 2 to Tier 3 in Dynamic or from Tier 1 to Tier 2 for Typical). When students were successful (i.e., they scored above the 40th percentile and demonstrated slopes of growth at or above the mean) in a tier for two consecutive eight week periods, they were exited to a less intensive tier.

Interventions were provided by tutors (trained project research staff), and took place outside the regular reading classroom. For Tier 2, students received intervention twice a week for 30 minutes in groups of 4-7. For Tier 3, students received intervention four days a week for 45 minutes in groups of 1-3. In each 8-week session, tutors emphasized different skills.

**Research Design:**
*Description of the research design*.

This was a randomized control experiment with matched pairs of students within classrooms that were assigned to either Dynamic or Typical RTI. The only difference between conditions was *when* students were provided supplemental intervention sessions. Assessors were aware of which condition they were assigned to. To assign students to condition, we calculated z-scores on the screening assessments, averaged them, rank-ordered students within tier eligibility status within classroom, identified adjacent pairs in the ranking, and then randomly assigned one member of the pair to the Dynamic or Typical condition.

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

The quality of instruction in the whole class and in Tiers 2 and 3 was assessed by coding of videotaped sessions. Inter-rater reliability was 98.1%. Fidelity ratings, based on a checklist regarding the timing, pacing, master and error correction, for the tutors ranged from .77 to .98 ($M$ = .89).

Five assessments were used to screen students' skills and to monitor their progress. Assessments for initial screening included the Teacher Rating of Reading Problems (Speece and Case, 2011),

the Word Identification Fluency task, the Test of Word Oral Reading Efficiency (TOWRE; Torgesen, Wagner & Rashotte) and the AIMSWeb letter sound fluency test.

In addition, the team selected three norm-referenced subtests of the Woodcock Johnson-III (WJ-III;) (Woodcock et al., 2001) to assess word reading, decoding and comprehension; and we implemented the DIBELS oral reading fluency measure, where the score is the number of correct words read per minute.

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

The intent-to-treat effect was estimated using hierarchical linear modeling (HLM), because children were nested in classrooms. The unconditional model with the Spring Reading factor score revealed an intraclass correlation (ICC) of .250 (i.e., proportion of between classroom variance). Results of the analyses (see Table 1) revealed that students in the Dynamic RTI group had statistically significantly higher Spring Reading scores than did students in Typical RTI, with an effect size of .36, which is a moderate effect (Hill, Bloom,Black, & Lipsey, 2008) with practical importance.

Tier 2 students in the Dynamic RTI condition had significantly higher reading outcomes scores compared to students initially eligible for Tier 2 in Typical RTI, who by design only received Tier 2 if they did not respond to Tier 1 over the first or second session. Not surprisingly, students initially eligible for Tier 3 had the weakest scores over the school year, but students initially eligible for Tier 3 who received the Tier 3 intervention immediately because they were in Dynamic RTI achieved higher Brief Reading scores compared to Tier 3 students in Typical RTI who had to wait until the beginning of Session 3 (see Figure 1).

**Conclusions:**
*Description of conclusions, recommendations, and limitations based on findings*.

The study was conducted for a full school year and was unique relative to prior RTI investigations in allowing movement across tiers every 8 weeks in tandem with report card periods and in allowing fast tracking to Tier 3 for the most needy students.

Dynamic RTI protocols, such as the one used in this study, suggest that there is no reason to delay intervention, that any effect of false negatives is negligible, and that, broadly implemented, Dynamic RTI, including a foundation of effective Tier 1 instruction, can improve reading outcomes for all children.

As some districts may use versions of RTI that are similar to both conditions, our study may inform the controversy in the field of special education about ensuring RTI not become another wait to fail model (e.g., Denton et al., 2006, Fuchs et al., 2010, Vaughn et al., 2010). This finding extends prior the research (Compton et al., 2012; Gilbert et al., 2013; Vaughn & Fletcher, 2012; Vaughn et al., 2009) that multi-tier models have potential to improve reading growth and that not all students need to go through Tier 1 or Tier 2.

**Appendices**

*Not included in page count*.

## Appendix A. References


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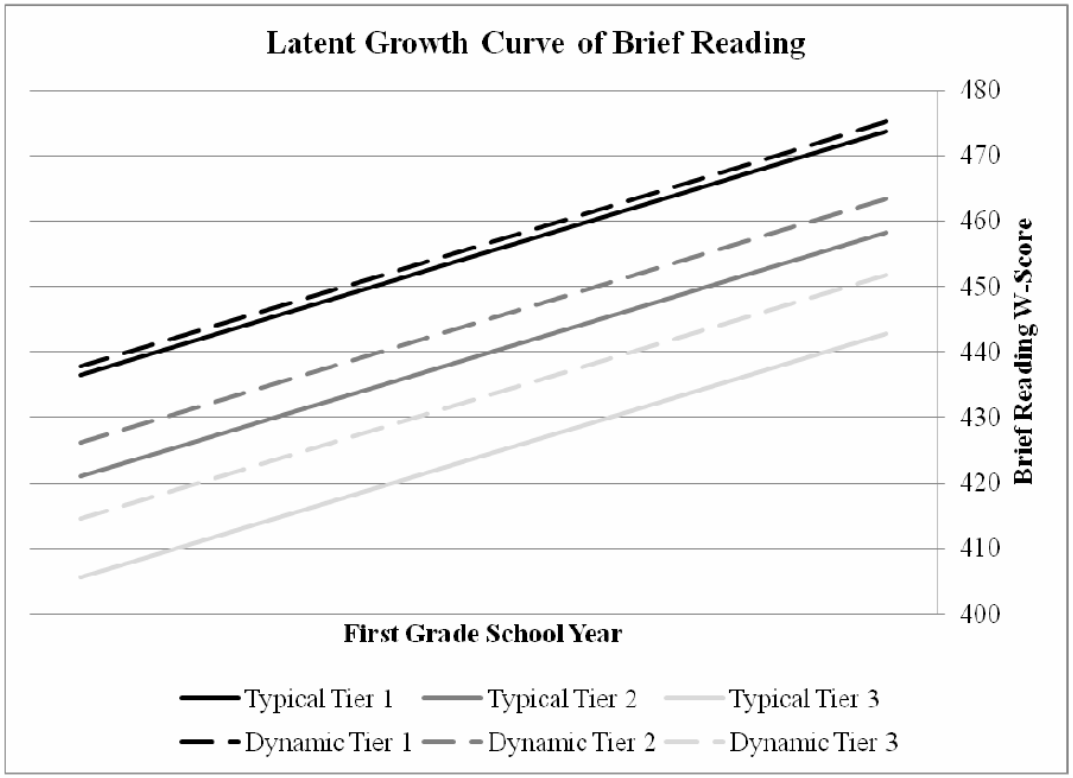
**Appendix B.**

**Table 1. HLM results of intent-to-treat analysis**

| Fixed Effect | Coefficient | SE | T-ratio | Df | *p*-value |
|---|---|---|---|---|---|
| Intercept | -0.10 | 0.10 | -1.07 | 33 | .294 |
| Dynamic RTI | 0.17 | 0.05 | 3.19 | 527 | .002 |
| | | | | | |
| Random Effect | Sd | Var. | Df | $\chi^2$ | P |
| Intercept | 0.50 | 0.25 | 33 | *201.73* | <.001 |
| Level 1 | 0.86 | .74 | | | |

*Note.* Deviance = 1342.56

**Figure 1. Growth Curve analysis**




*Note.* Latent growth of Brief Reading over the school year as a function of condition and initial tier eligibility.