Abstract Title Page

Title: Recognition & Response: Developing and Evaluating a Model of RTI for Pre-K

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Abstract Body

Background / Context:
The Recognition & Response (R&R) model was developed and is being validated by a research team at the FPG Child Development Institute at the University of North Carolina at Chapel Hill. R&R has generated widespread attention in the early childhood field as a promising RTI model for pre-k (see entire issue of NHSA Dialog, Volume 12[3], 2009) and as one of the few to include a focus on improving children's academic learning (Greenwood et al., 2011). The R&R system is a framework for linking formative assessment to tiered instruction, designed for use with children who have a wide array of learning characteristics across a number of content areas. R&R has a dual focus on improving the quality of instructional practices for all children as well as providing additional supports for some children to ensure that every child succeeds in school. The key features of this RTI approach involve gathering information on children's skills to help teachers plan and organize instruction, providing research-based interventions and supports, and monitoring progress in learning. The Development and Innovation (IES Goal 2) study reported here builds on an existing line of research that is focused on further development and evaluation of the R&R model, including adaptations for mathematics instruction, the integration of learning and behavioral interventions/supports, and instructional practices to support dual language learners, in addition to the current emphasis on language and literacy instruction. The current study replicates an earlier small-scale quasi-experimental study that used a different sample of children and programs. The poster focuses on the recently completed Development and Innovation study, but presents findings from both studies.

Purpose / Objective / Research Question / Focus of Study:
The purpose of the Development and Innovation study was to design and evaluate the R&R model for use by pre-k teachers to address children's language/literacy skills. The study evaluated the feasibility, acceptability, implementation fidelity, and potential for improved classroom and child outcomes of this approach.

Setting:
One large school system in North Carolina with 75 inclusive pre-kindergarten classrooms, serving 1,168 at-risk 4-year-old students served as the study site. Eligibility for the district's pre-k program is determined by presence of risk factors, including assessed developmental delays, low household income, limited English proficiency, chronic health condition, or an identified disability. Of the preschool children enrolled, 53% are male, 82% receive free or reduced price lunch, and over 15% have identified special needs. The children are from diverse groups: African-American (46%), Latino (24%), White (15%), Multi-Racial (8%), Asian (6%), and Native American (1%).

Population / Participants / Subjects:
A total of 26 pre-kindergarten classrooms were included in the main study (Study 2). All pre-k teachers had at minimum a bachelor's degree and teacher licensure in birth-kindergarten or the equivalent. All four-year-old children from these 26 classrooms (n=366) were recruited to participate in the study. Of these children, nearly all were from low-income families, about half were girls and half boys, and 9% had IEPs. Results also are presented from an initial pilot study (Study 1) which included 24 pre-k classrooms and 357 4-year-old children in community-based

early childhood programs in Florida and Maryland. Three-quarters (75%) of the teachers in Study 1 had a bachelor's degree or higher, and about one-third of the children were from low-income families.

Intervention / Program / Practice:
R&R is a particular model of RTI designed for 3-5 year-old children enrolled in pre-k (Buysse & Peisner-Feinberg, 2010; Peisner-Feinberg, Buysse, Benshoff, & Soukakou, 2011; http://randr.fpg.unc.edu/). The key components of R&R are consistent with recommendations from IES Practice Guides for RTI in reading and math (Gersten et al., 2008; Gersten et al., 2009) and a forthcoming DEC/NAEYC/NHSA joint position statement. The key components of R&R are: (1) recognition, which involves gathering formative assessment information by screening all of the children and periodically monitoring the progress of some who need targeted interventions in early language, literacy, or math, and (2) response, which includes providing an effective core curriculum, intentional teaching, and targeted interventions linked to formative assessment results. (See Figure 1.)

(Insert Figure 1 here.)

***Recognition: Universal screening and progress monitoring*.** The recognition component consists of the systematic use of universal screening and progress monitoring assessments gathered by classroom teachers. Universal screening occurs three times a year on a fall-winter-spring schedule. Class-wide screening results are used to establish an initial baseline and to determine at all three points whether most children are meeting key benchmarks in learning and development (Tier 1) and whether some children need additional instructional supports (Tiers 2 and 3). Progress monitoring is used to assess children's responses to tiered interventions and make decisions about when adjustments to the intervention plan are needed.

***Response: Research-based core curriculum, intentional teaching, and targeted interventions*.** The response component refers to the core instruction offered to all children as well as the targeted interventions that are provided for some children who require additional instructional supports based on assessment results. The tiers are additive: all children receive Tier 1; some children receive Tiers 1 and 2; and a few children receive Tiers 1, 2, and 3. Tier 1 involves providing an effective core curriculum, along with intentional teaching of key school readiness skills. In Tier 2, teachers enhance learning for some children through explicit, small-group instruction (15 minutes per day over 8-10 weeks) using a research-based curriculum, similar to a lesson format or standardized treatment approach. These small-group lessons are augmented by embedded learning activities which extend opportunities for developing these skills through tailored environmental arrangements and curricular modifications. Tier 3 consists of more intensive, research-based scaffolding strategies (e.g., response prompting, modeling, peer supports) for a few children who require further supports to learn. Tier 3 supports are provided in the context of Tier 1 instruction and Tier 2 interventions (small-group lessons and embedded learning activities) which these children continue to receive. Collaborative problem solving is a data-based decision-making process used to plan various levels of instructional supports and assess how well children respond to them.

Research Design:
For both Study 1 and Study 2, teachers implemented the R&R model in the area of language and literacy development, including the assessment and instruction/intervention components. Study 1 took place over one semester and included one intervention period (fall only), while Study 2 included two intervention periods (fall and spring) over the entire school year. A quasi-experimental design was used comparing target children (those who received the tiered interventions based on universal screening scores) to a comparison group of their classmates (the children in their classrooms who did not receive the tiered interventions). In addition, subgroup comparisons were made between the target children and a restricted comparison sample of children who scored in the bottom half of the class (based on the universal screening scores), in order to compare the growth of target children who received the tiered interventions to an initially more similar group of comparison children who did not receive the interventions.

Data Collection and Analysis:
Four types of data are reported: (1) implementation fidelity—observations and documentation of tiered instruction, (2) teacher ratings of social validity (feasibility and usability of R&R system and components), (3) formative assessments using a standardized measure (mCLASS:CIRCLE letter knowledge, vocabulary, and phonological awareness), and (4) child assessments using norm-referenced measures (PPVT-4 receptive language, EVT-2 expressive vocabulary, TOPEL print knowledge and phonological awareness). Descriptive analyses were conducted to examine levels of implementation fidelity and ratings of social validity. Random-intercept hierarchical linear models analyses were used to examine differences between target children and comparison children in pre- to post-intervention growth in language and literacy skills; these models adjusted for classroom, for state (for Study 1), and for children's age (for non-normed measures).

Findings / Results:
Results from these studies provide evidence of the feasibility of implementation and usability of the R&R model, with Study 2 findings similar to those from Study 1. Observations of the tiered interventions showed that teachers could implement this component with high fidelity across the two studies. Mean scores on the implementation fidelity rating were 97% and 91% (Study 1 and Study 2), based on multiple (3-5) observations of each teacher conducting the Tier 2 interventions. In addition, teacher ratings indicate that they found the R&R system feasible and useful. In both Study 1 and Study 2, respectively, the vast majority of teachers rated the components as easy to use (assessment: 88%/90%; intervention: 96%/77%) and helpful (assessment: 96%/100%; intervention: 92%/90%), and indicated that they would recommend the R&R system to colleagues (92%/84%).

These studies also showed positive evidence of the promise of R&R for improving children's language and literacy skills, both in terms of formative assessments (mCLASS:CIRCLE) and norm-referenced measures (PPVT-4, EVT-2, TOPEL). Table 1 presents findings from both Study 1 and Study 2. Target children made significantly greater gains than comparison children in language and literacy skills in both studies, with effect sizes predominantly in the moderate range for significant comparisons (range=.34-.74). In Study 1, target children made greater gains in letter knowledge, vocabulary, and phonological awareness based on the mCLASS:CIRCLE, and on the print knowledge scale of the TOPEL. For the other two norm-referenced measures

(PPVT-4 receptive language and TOPEL phonological awareness), target children made the same amount of gain as their classmates.

In Study 2, target children made greater gains in vocabulary (mCLASS:CIRCLE), receptive language (PPVT-4), and expressive language (EVT-2), and made similar gains on the other formative assessment and norm-referenced measures (mCLASS:CIRCLE and TOPEL). For Study 2, a set of follow-up analyses were conducted with a restricted comparison group (i.e., only children who scored in the bottom half of the class on the first mCLASS:CIRCLE universal screening assessment), in order to compare the growth of target children who received the tiered interventions to an initially more similar group of comparison children who did not receive the interventions. As seen in Table 1, the restricted comparison group was initially more similar to the target group than the full comparison group, based on fall scores on all measures. A similar pattern of results was found as with the full comparison group, indicating greater growth for target children than comparison children, although effect sizes were reduced with the restricted sample comparison (e.g., PPVT-4 ES=.31, EVT-2 ES=.38).

(Insert Table 1 here.)

Conclusions:

These results suggest that the R&R system offers evidence of promise for improving language and literacy outcomes for young children. Positive effects were found in the growth rates for target children compared to their peers on formative assessment and standardized measures. Although target children had substantially lower scores initially as well as following the intervention, their rates of growth were greater than or the same as comparison children. These results indicate that through the assessment and intervention components, teachers who used the R&R model were able to successfully determine target children for the interventions (i.e., those with significantly lower skill levels than their peers), and potentially to alter their developmental trajectory so that they began catching up to their peers in some areas and maintained pace in others. Moreover, positive effects were found across different populations of children; although Study 2 included a relatively more disadvantaged population, as evidenced by their background characteristics and fall scores, the model had positive effects for target children in both studies. Not surprisingly, stronger effects were found in critical areas of receptive and expressive language skills when R&R was implemented under the more ideal conditions present in Study 2 (i.e., a full year rather than one semester, more highly educated teachers). Although these studies did not provide the opportunity for a true control group (given the requirements for Goal 2 Development and Innovation studies), the results clearly provide empirical evidence of the promise of R&R as an educational intervention for pre-k, and suggest that further research of the efficacy of this model is warranted.

Appendices

Appendix A. References

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Appendix B. Tables and Figures

Figure 1. *R&R Conceptual Framework*

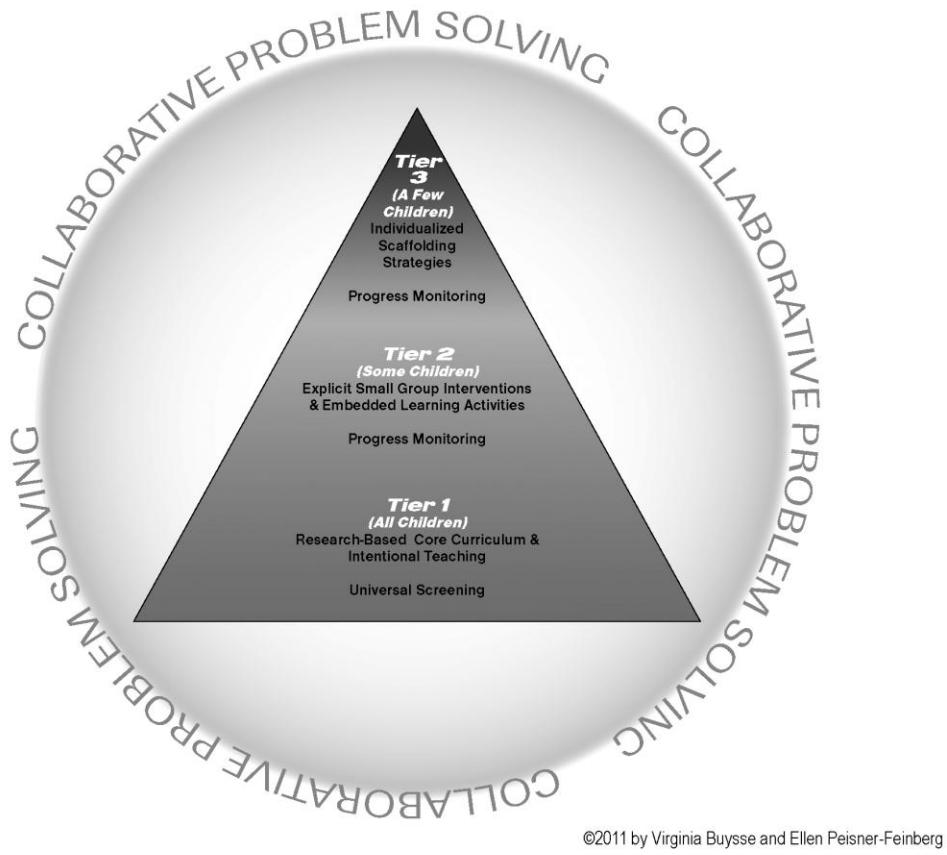

Table 1. Results for R&R Language and Literacy Studies 1 and 2

	STUDY 1						STUDY 2									
	Target n=83-92		Comparison[1] n=88-245				Target n=114-115		Comparison n=240-243				Restricted Comparison n=82-85			
OUTCOME	Pre M (SD)	Post M (SD)	Pre M (SD)	Post M (SD)	P [2]	ES[4]	Pre M (SD)	Post M (SD)	Pre M (SD)	Post M (SD)	P [3]	ES[4]	Pre M (SD)	Post M (SD)	P [3]	ES[4]
mCLASS: CIRCLE Letters	5.1 (6.3)	16.4 (12.1)	18.9 (11.2)	27.6 (11.8)	**	.34	2.1 (4.8)	22.4 (11.3)	8.5 (9.3)	27.9 (9.4)	NS	.10	4.32 (6.44)	25.09 (11.19)	NS	-.06
mCLASS: CIRCLE Vocabulary	13.5 (5.5)	18.5 (7.0)	18.5 (6.1)	21.2 (7.0)	***	.40	9.2 (7.0)	15.8 (6.5)	16.1 (6.0)	20.7 (5.6)	***	.41	12.04 (5.90)	17.75 (5.84)	NS	.15
mCLASS: CIRCLE Phonological Awareness	17.2 (5.6)	27.6 (7.4)	24.4 (7.1)	31.6 (7.3)	***	.50	11.4 (5.8)	27.4 (7.5)	16.9 (6.3)	31.5 (7.1)	NS	.21	13.86 (5.53)	28.97 (7.08)	NS	.16
PPVT-IV Receptive Language	88.0 (18.4)	91.9 (15.8)	95.3 (17.0)	98.9 (17.0)	NS	.03	72.8 (20.9)	84.0 (15.4)	89.4 (16.2)	95.6 (14.5)	***	.55	81.05 (17.83)	89.61 (15.15)	NS	.31
EVT-2 Expressive Language	___	___	___	___	___	___	70.3 (24.8)	84.1 (14.1)	91.0 (16.2)	96.5 (13.5)	***	.74	81.25 (17.37)	89.97 (13.65)	*	.38
TOPEL Phonological Awareness	86.3 (13.6)	90.9 (13.9)	90.0 (16.1)	97.1 (14.6)	NS	-.20	75.6 (11.0)	84.1 (13.1)	84.0 (11.6)	91.4 (14.2)	NS	.10	79.19 (10.70)	86.41 (13.16)	NS	.12
TOPEL Print Knowledge	92.6 (11.8)	101.5 (14.2)	103.9 (14.4)	107.4 (12.1)	***	.61	84.2 (7.4)	100.6 (12.4)	92.1 (12.3)	106.9 (9.8)	NS	.15	86.04 (8.15)	103.18 (11.27)	NS	-.10

[1] n=245 for mCLASS:CIRCLE; n=88 for PPVT-IV and TOPEL.

[2]These analyses adjusted for classroom and state, and child's age for non-age standardized scores (mCLASS:CIRCLE).

[3] These analyses adjusted for classroom, and child's age for non-age standardized scores (mCLASS:CIRCLE).

[4]Cohen's d statistic was used for effect size calculations.