

Long-Term Results of a Problem-Solving Approach to Response to Intervention: Discussion and Implications

Karen J. Carney¹ and Gilbert S. Stiefel

Eastern Michigan University

Two general models exist for implementing Response to Intervention (RtI) for struggling students, the standard protocol model and the problem-solving model. This study examined the long-term outcomes of one example of the problem-solving method, the Instructional Support Team (IST), in a field setting. Academic records of 32 students were reviewed to describe their educational outcomes 3.5 school years after their initial referral to IST. Use of this model resulted in an expansion of existing services for students, a permanent intermediate stratum for students at risk. Neither level of program support (Tier I, II, or III) at the end of the study, nor risk for school failure, was predicted based on student gender or reason for referral. Implications are discussed.

Keywords: Response to Intervention, Problem-Solving Model, Instructional Support Team.

Legislative changes contained in the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA 2004) reflect a transformation in perspective regarding identification of and services provided to children deemed “at risk” or with specific learning disabilities. At the core of these changes is the notion that outcome evaluation of evidence-based, multi-tiered interventions should comprise part of the overall assessment process.

While these changes, referred to as Response to Intervention (RtI), have come to schools through federal legislation, it has been left to educators and researchers to interpret and investigate the best means of operationalizing this intent to ensure that student difficulties do not stem from instructional deficiencies. The purpose of this study was to contribute to the evidence on the long-term effectiveness of such programs in altering the educational trajectories of at-risk students. Such information is essential to the development of meaningful policy and methods of intervention.

Response to Intervention and Multi-Tiered Models

Popular among advocates of RtI is the use of multi-tiered intervention approaches, frequently described as “three-tiered” or “four-tiered” models. In a manner analogous to practices in public health and medicine, the levels of intervention in these models typically vary in terms of intensity, duration, invasiveness, and gate-keeping procedures. In the medical fields, these are referred to as primary, sec-

1. Please send correspondence to: Karen J. Carney, Special Education Dept., Eastern Michigan University, 105 Porter, Ypsilanti, MI 48197; e-mail: karen.carney@emich.edu

ondary, and tertiary interventions. In the field of education, this terminology is now applied to behavior support interventions (Sugai & Horner, 1999), crisis intervention (James & Gilliland, 2001), and academic interventions (Good, Kame'enui, Simmons, & Chard, 2002; Kovaleski, 2003; Vaughn, 2003).

Variations on the three-tier approach have been offered by various writers (e.g., Reschly, 2003), most of them describing special education as a "fourth" tier. For the purposes of this study, however, we will refer to a three-tier model, with classroom interventions representing Tier I and special education as Tier III, since this matches the system of support used by the school district involved in the study and is supported by research (Sugai, 2007).

Secondary Interventions

One major aspect of this multi-tiered approach has been the enhancement and systematic investigation of services provided at the second tier. Research has demonstrated that timely provision of instructional interventions can alter "educational trajectories" and dramatically reduce the numbers of children requiring long-term (i.e., special education) remediation services (Askew et al., 2002). Second tier intervention programs have been described as following one of two types of methodologies, referred to as either a standard protocol or problem-solving model. An excellent description of these approaches and variations on them is provided by Fuchs, Mock, Morgan, and Young (2003), and is summarized as follows.

Standard protocol model. The standard protocol model requires the use of the same empirically validated treatment for all students with similar problems. The advantages this approach offers are:

- It is relatively easy to train practitioners to conduct one intervention correctly.
- There is no decision-making process concerning what interventions to implement.
- It is relatively easy to assess the accuracy of implementation.
- Large numbers of students are able to participate in the treatment protocol.
- It lends itself to group analysis where outcomes for students can be assessed against "aim-line" criteria.

Several scientific, research-based standard protocol interventions have been described in the research literature, including the Auditory Discrimination in Depth (ADD) program (Lindamood & Lindamood, 1998), the Embedded Phonics (EP) program (Torgesen et al., 2001), and Reading Recovery (Ruhe & Moore, 2005; Schmitt & Gregory, 2005).

Problem-solving model. The problem-solving model refers to interventions that using an inductive approach. This means that no student characteristic (e.g., disability label) dictates a priori what intervention will work. Solutions to instructional or behavioral problems are determined by evaluating student responsiveness to interventions. While following some common basic principles, the specific interventions are developed based upon preliminary data concerning a particular student's behavior and performance. Interventions are chosen via a group process and then implemented, feedback on the effectiveness of the interventions is collected, and the intervention program is modified accordingly. In comparison with tradi-

tional procedures for determining special education eligibility, which essentially document “a match between child characteristics and eligibility criteria” (McNamara & Hollinger, 2003, p. 182). problem-solving approaches should provide methods that would be more consistent with the goal of discovering and documenting effective intervention methods (McNamara & Hollinger, 2003).

Fuchs et al. (2003) provide detailed reviews of several large-scale programs utilizing variations of the problem-solving model. These include Ohio’s Intervention Based Assessment (IBA) (Telzrow, McNamara, & Hollinger, 2000), Pennsylvania’s Instructional Support Teams (IST) (Kovaleski, Tucker, & Stevens, 1996), the Minneapolis Public Schools Problem-Solving Model (PSM) (Minneapolis Public Schools, 2001), and Heartland (Iowa) School District’s Building Assistance Teams (BAT) (Ikeda, Tilly, Stumme, Volmer, & Allison, 1996).

The level of professional expertise required for implementation is typically high for these programs. Unfortunately, these authors report there is little evidence on the effectiveness of these programs. In a meta-analysis of the four programs, Burns, Appleton, and Stehouwer (2005) reported significant effect sizes for all programs although their conclusion of program effectiveness was based upon various and mixed short-term outcome data. A reason for the paucity of outcome findings may be the difficulty in aggregating data from individualized programs that vary in terms of goals and criteria of success.

Measuring Success in the Problem-Solving Model

Pennsylvania’s IST has been described as a pioneer model of secondary intervention using the problem-solving model (Kovaleski, 2003), with empirical evidence documenting its effectiveness (Kovaleski et al., 1996). Reports have touted high statewide success rates in terms of several “indirect” measures of effectiveness. Based on 47,000 referrals to ISTs throughout the state of Pennsylvania, Kovaleski and associates cite that (a) referral rates for special education evaluation were reduced to between one third and one half of that of other schools, (b) retention rates were reduced by 67% over a three-year reporting period, and (c) 85% of the students referred to the IST over a one-year period were *not* referred for special education evaluation. Such indirect findings, however, provide limited evidence of student success. As Fuchs et al. (2003) note “this information is difficult to interpret because referral and placement numbers can be influenced by many administrative and political factors that have little to do with student performance” (p. 164).

To evaluate the “direct” effects of IST interventions, Kovaleski, Gickling, Morrow, and Swank (1999) selected a sub-sample of approximately 2,000 students who had received these services. From their study, which assessed such student variables as time on task, task completion, and task comprehension, the authors found significant positive treatment effects for programs that maintained high treatment fidelity. However, since these latter findings were obtained from assessments that were conducted 80 days after the initiation of IST interventions (ostensibly, 30 days after their cessation), they do not address the issue of longer term impact or sustainability once interventions have been terminated.

The absence of findings concerning longer term outcomes of IST was addressed by Rock and Zigmond (2001) in their two-year follow-up of a sub-sample of 140 students who had participated in the Pennsylvania IST interventions.

Using a review-of-records procedure, they found that “approximately one third of the students who were referred to IST during Year One were on grade level, were in the mainstream two years later, and were not receiving special education services” (p. 160). Another third had been placed in special education by the end of the second year, and another fifth had been retained in grade. The researchers shared a concern that such “late referrals” to special education represented a delay in the provision of a free and appropriate public education to students with disabilities. They found that the IST interventions seemed to have different rates of effect depending on the reason for referral; 42% of the students referred as a result of academic concerns had been placed in special education programs versus only 18% of students referred due to problem behavior. In a similar vein, Fuchs and Fuchs (2006) have noted that the distinction between problem-solving and standard protocol models may also have implications in terms of eventual outcome decisions.

Evidence regarding academic achievement levels has been collected with regard to such standard protocol interventions as Reading Recovery (Ruhe & Moore, 2005; Schmitt & Gregory, 2005) using standardized individual reading tests. However, to date, relatively little data have been reported concerning the long-term outcomes of problem-solving approaches such as the IST, for which such standardized assessments might not be appropriate. Fortunately, such evidence is often available through a detailed scrutiny of the regularly collected data that are part of students’ academic records. For example, these records contain grade and placement information on which students succeeded in school in subsequent years, and at what level of success, with or without any secondary or tertiary support.

PURPOSE OF THE STUDY

The purpose of this study was to add to the research base on the problem-solving approach by examining long-term outcomes of success for one cohort of elementary students from one elementary school who were involved in Tier II interventions of the IST problem-solving model. Results will be discussed in relation to the following research questions:

1. What proportions of students initially referred for IST interventions received services in Tier I, Tier II, and Tier III during the 3.5 years of the study?
2. How successful were students within these tiered levels of support?
3. Does the implementation of secondary-level support services inhibit or delay referral for special education services?
4. Was either placement or risk status of students at the end of 3.5 years predicted by gender or initial reason for IST teacher-referral?

METHOD

Participants

Participants were identified by selecting records of all students referred by classroom teachers for instructional support team (IST) intervention (needing academic or behavioral support) at a midwestern elementary school of 537 students during the 2001-2002 school year. Forty-three students (8% of the school population), grades K-5, were initially identified as receiving these services in that year; 27

males and 16 females. Twenty-eight of these students had been referred because of concerns about their academic performance, and 10 students because of behavior problems; reasons for referral of the remaining 5 students were unspecified. The ethnicity of this group of students (or cohort, for the purpose of this study) was as follows: 38 Caucasians (88%), 3 African Americans (7%), and 2 Asians (5%).

The IST Approach

Tier II support in the participating district originated with general education teachers referring students to the IST due to academic or behavior concerns (they did not use any universal screening method for identification). An IST staff member (a certified staff member, usually a special educator best suited to work with the suspected problem) met with the teacher and set up a contract for service. A problem-solving approach was utilized, individualized for each student. Each student received IST interventions until (a) the referral problem was resolved, (b) the school year ended, or (c) a referral for special education testing was made. It fell to the classroom teacher in the following year to determine if the student should be referred again to the IST. The philosophy of the school's IST program permitted students to be served on a year-by-year basis, allowing for multiple years of IST support if a subsequent year's teacher re-referred the student. Tiered services were utilized in a flexible manner. For example, a student receiving speech/language special education for a language disability also received IST support for reading. Tier II services eventually also came to be utilized as a "step-down" service in transitioning students from special education programs and services.

Procedure

Once identified, the participants' academic and behavior histories were followed via instructional support files, report cards, discipline reports, and special education files, from IST support received in 2001-2002 until January-June of the 2004-2005 school year, a period of at least 3.5 years for each student depending upon the date of the student's initial IST referral. Data were recorded for each of the four school years and entered into SPSS for descriptive and cross-tab analysis. In addition, data were entered into SYSTAT for predictive configural frequency analysis (predictive CFA).

As data were collected for Year Four (2004-2005), the researchers coded each student based upon his or her most recent report card grades and discipline referrals (midterm or third quarter). If the student was passing (a grade of C or better in the major subject areas, reading, writing/English, and math, science, social studies, and demonstrated no behavior concerns, he/she was coded low risk. If a student received a D grade in one of those areas, or had recent occasional documented behavior problems, he/she was coded moderate risk. If a student received more than one D and/or had documented chronic or severe behavior problems, the code was high risk.

RESULTS

Data were collected from the records review of the cohort of 43 students referred to the IST in Year One of the study (2001-2002) at the elementary school. Eleven students had moved out of district by the 2004-2005 data collection point, leaving 32 target students who were included in data analysis at the end of 3.5 years.

Results by Placement Level

Descriptive data in Table 1 show the service placement status (Tier I, II, and III, and move from district) as well as referrals for Tier III services over the course of the 3.5 years (four school years) of the study.

Table 1

Service Status and Referral to Special Education by Year of Study

Service	Year 1	Year 2	Year 3	Year 4
Tier I (General Education)				
Total	0	15	14	14
Tier II (IST Support)				
Total	28	11	12	12
Referral to Tier III				
Academic Total				
# Referred- # Qualified/year	3 - 0	5 - 2	3 - 1	1 - 0
Total Academic # Referred - # Qualified	12 - 3			
Behavior Total				
# Referred- # Qualified/year	1 - 1	1 - 1	1 - 0	0 - 0
Total Behavior # Referred - # Qualified	3 - 2			
Tier III (Special Education):				
SpEd academic	6	6	5	5*
SpEd behavior	0	1	1	
Moved	9	1	1	0
Total – 43 at start	34	33	32	32

Note. IST=Instructional Support Team; SpEd=Special Education placement reason

*One student receiving services from speech/language was concurrently referred but did not qualify for learning disabilities; student is, therefore, double-counted.

Tier I (general education). The purpose of a secondary-level intervention is to return a student to successful functioning in the general education classroom. This involves two interdependent components: cessation of the secondary intervention and successful functioning in the general education curriculum. Regarding cessation of secondary service, 46% of the 32 students were operating without additional support in their classrooms at the end of Year Two, and 44% by the end of Years Three and Four. The level of success will be discussed later.

Tier II (secondary intervention). In the participating district, students could receive multiple years of Tier II support if re-referred. At the end of Year One, 28 students (82%) completed the year receiving Tier II support. At the end of Year Two, 33% of the students were receiving Tier II support, and 38% at the end of Years Three and Four. Of note, while the numbers in Table 1 appear fairly stable, they mask the considerable shifting of students among both more and less intensive levels of support since they indicate only the totals of what service each student was receiving at the end of the year. For example, in Year Two, two students had qualified for special education, but then did not qualify again at their three-year re-evaluation (both returned to secondary interventions). In Year Four, one student who

was already receiving special education for language problems was also referred for learning disabilities, but did not qualify for services under that category.

Tier III (tertiary intervention). After the first year of IST interventions, during the ensuing 2.5 years, a total of 15 students receiving secondary level interventions (IST) were referred for special education evaluation. For purposes of analysis, categories of referral to special education, such as learning disability (LD) or speech/language (speech/language for language, not articulation) or emotional disturbance were collapsed into two categories, academic or behavioral. Of the 15 referrals, 12 were due to academic difficulties and 3 to behavioral difficulties. Five of the 15 referrals (33%) qualified for special education services; four due to persistent academic difficulties, and one for behavioral concerns.

Long-term results showed that 21% of the remaining cohort were receiving Tier III support (special education) at the end of Year Two, and 19% at the end of Years Three and Four.

Final-Year Analysis – Placement Level

Table 2 represents the results of a comparison between the reason for initial referral to IST and student placement level over the four school years. Categories were collapsed to form an academic referral category and a behavior referral category. Results show that two thirds of the initial referrals were due to academic concerns (28 students), and just under a quarter were due to behavioral concerns (10 students). For five students, the initial reason for referral was not recorded.

Of the 23 students initially referred to IST for academic concerns, 11 were back in the general education setting at the end of the study, 8 were still receiving Tier II interventions, 4 qualified for Tier III special education support, and 5 had moved out of the school.

Of the 10 students initially referred for behavior, 2 were back in general education at the end of Year Four, 4 were continuing to receive Tier II interventions, 1 was receiving special education services, and 3 had moved.

Table 2

Initial Reason for IST Referral by Year Four Placement

Initial Reason	Year Four Placement				Total
	Tier I	Tier II	Tier III	Moved	
ESL	0	0	0	1	1
LD	0	1	0	0	1
Math	2	3	0	0	5
Reading	6	3	4	4	17
Spelling	2	1	0	0	3
Writing	1	0	0	0	1
Total Academics	11	8	4	5	28
Total Behavior	2	4	1	3	10
Unknown	1	0	1	3	5
Total	14	12	6	11	43

A predictive CFA was performed to examine the relationship between variables at the time of initial IST referral and outcome variables at Year Four. This method of statistical analysis asks whether a particular pattern of categorical variables (described as the “predictor”) forecasts a greater or lesser frequency of occurrence rate of criterion variables than would be expected if variables were independent (vonEye, Mair, & Bogat, 2005). In a cross-tab analysis, this approach examines whether individual cell frequencies contain significantly more or fewer individuals than expected based on their proportions in the sample. Findings from this analysis indicated that service placement (tier level) was independent of gender or initial reason for referral. A Pearson $\chi^2 (7, N = 30) = 3.959, p = 0.784$ indicated that the variables are independent. Further, the Predictive CFA indicated that each cell conforms to this independence model (see Table 3).

Table 3

Placement: Prediction Configural Frequency Analysis (Standardized Deviates)*

Referral Reason	Gender	Tier I	Tier II	Tier III
Academic	Male	0.591	-0.488	-0.692
	Female	-0.685	0.272	1.193
Behavior	Male	0.135	0.478	0.095
	Female	-0.219	0.023	-0.789

Note. $\chi^2 (7, N = 30) = 3.959, p = 0.784$ n/s.

*Critical value ± 1.96 at $p \leq .05$.

Final-Year Analysis – Level of Risk

Finally, the outcomes of the 32 students were analyzed by their level of success based upon their academic grades and discipline referrals at the midterm or third quarter report cards in 2004-2005 (see Table 4).

Of the 32 students, 19 were successful or low risk after 3.5 years. This included 10 who were performing independently at Tier I, 5 students who were successful with Tier II support, and 4 students who were successful in Tier III receiving special education support. Results of a Pearson chi-square comparing the proportions of low-risk students in Tier I with those in Tiers II and III was not significant, $\chi^2 (2, N = 30) = 2.54, p = 0.28$.

The remaining 13 students (41%) were identified as moderate risk (6 students) or high risk (7 students) in Year Four. Four of these at-risk students were at Tier I, and 7 were still receiving Tier II support in Year Four. Finally, two students receiving special education at the end of the study were coded moderate (1 student) or high (1 student) risk.

A predictive CFA was performed regarding the 3.5-year risk status of the students, again using the reason for initial referral and gender as predictor variables for Year Four risk status. Findings of this analysis indicate that risk status was independent of gender or reason for referral, Pearson $\chi^2 (7, N = 32) = 3.808, p = 0.802$. Each cell conforms to the independence model (see Table 5).

Table 4
Year Four Status by Level of Risk

Year Four Status	Level of Risk				Total
	Low	Moderate	High	Moved	
Tier I	10	3	1	0	14
Tier II	5	2	5	0	12
Tier III	4	1	1	0	6
Moved	0	0	0	11	11
Total	19	6	7	11	43

Table 5
Risk Status: Prediction Configural Frequency Analysis (Standardized Deviates*)

Referral Reason	Gender	Low	Medium	High
Academic	Male	-0.274	0.130	-0.137
	Female	0.395	0.069	-0.149
Behavior	Male	0.339	-0.883	1.144
	Female	-0.530	0.639	-0.789

Note. $\chi^2 (7, N = 32) = 3.808, p = 0.802$ n/s.

*Critical value ± 1.96 at $p \leq .05$.

DISCUSSION AND IMPLICATIONS

This study presents the findings of a 3.5-year follow-up of students who received secondary support through an IST problem-solving model in 2001-2002. It demonstrates some of the implementation issues associated with RtI, such as does such assistance provide a less intensive alternative to special education programming?

Sugai (2007) has stressed the importance of instructional accountability and argued that RtI should be considered an approach, not a program. The results of this study demonstrate just why those concepts are so vital. Teachers across the nation are grappling with meeting student needs using Tier II interventions while keeping up with research and training in best practice as well as reflecting on their practices.

The specific results of this study can be discussed in terms of the four questions set out previously. The sample size was too small to yield significant inferential findings, but answers to the four questions are found in the data, with discussion points and implications.

Q1: What proportions of students referred for IST interventions received services in Tier I, Tier II, and Tier III during the four-year period of this study?

Over one third (33-38%) of the students were re-referred for Tier II interventions throughout the four school years in this study. The proportion of target students receiving special education services remained fairly stable (19-21%), although a few of the students rotated between tertiary and secondary levels. Thus, more than half of the students (52-59%) continued to receive either Tier II or Tier III level services during each of the subsequent years after their initial referral.

Eight percent of the participating school's student population in 2001-2002 were referred for Tier II interventions. This figure is lower than predicted expectations of Tier II interventions based upon a three-tier model, which includes approximately 80% at Tier I, 15% at Tier II, and 5% at Tier III (<http://www.pbis.org/schoolwide.htm>). However, by looking at the long-term service placements of these students, the longevity of students receiving Tier II level of support is of interest. The IST model proposes that students will demonstrate a positive response to the secondary intervention within no more than 50 days (Kovaleski et al., 1999). However, teachers in this district did not limit interventions to 50 days. Students were re-referred for secondary intervention in subsequent years, and if they were referred for special education identification but did not qualify, they were also maintained at the Tier II level. In fact, by looking at what occurred over the 3.5 school years, a new stratum of support had been added between general education and special education.

This observation highlights one of the dilemmas faced by schools as they attempt to implement RtI methods. Specifically, how should they deal with students who respond, or partially respond, to Tier II services while they are provided, yet do not otherwise qualify for special education services nor are able to successfully participate in the mainstream classroom without some more intensive supports?

According to the current RtI literature, key components of a good intervention strategy involve a cycle of universal screening, implementation with fidelity, use of evidence-based interventions, monitoring of student performance with continuous progress monitoring, and follow-up decision making (Sugai, 2007). In real time, teachers are caught playing catch-up as they transition from their current practices to newer research-validated approaches. Students with academic and behavioral problems require support daily, and teachers try to meet that need in the best way they can and using whatever resources are available. The results of this study show how one school addressed these issues. This example is informative because it describes a perhaps not unreasonable outcome for students who do not appear appropriate for Tier I or Tier III programming. Comments from numerous colleagues in the field suggest this is a widespread concern.

Q2: How successful were students within the tiered levels of support?

Fifty-nine percent of the target students were found to be successful (low risk) by Year Four, though not totally independent of additional levels of support. Looked at from the perspective of initial reason for referral to IST and success in terms of functioning well independent of any secondary or tertiary support in Year Four, only 20% (2/10) of students referred for behavioral concerns were functioning independently in Year Four, and just under 40% (11/28) of students referred for academic concerns were functioning independently in Year Four.

Of the 12 students still receiving Tier II services at four years, over half (7/12) were coded at risk even with this help. This tier included the highest percent of at-risk students in terms of grade reports and disciplinary referrals. Approximately one third of the students in the special education group (2/6) were considered at moderate or high risk at Year Four in terms of grades and discipline reports. This proportion may be understated, however, since these students might

have had grading and behavioral management accommodations related to their individualized education programs (IEPs).

The high proportion of Tier II students still at risk at the end of 3.5 years begs the question as to the efficacy of using this problem-solving model as the sole intervention for these students. Did teachers in this study need more high-efficiency, rapid-response interventions? Does implementation of the IST model lend itself to the use of evidence-based interventions that can continuously monitor student performance while individualizing student help?

At the end of Year Four, the teachers in this study recognized the need for more accountability and data keeping for their decisions. They felt they were going to have to consider standard protocol models if students were not progressing. At the same time, teachers felt the ethical responsibility to provide the long-term support that the Tier II students needed to be successful. The implication of this may be that schools need to consider using a combination of approaches, a mixed model.

The introduction of potentially more intensive and measurable interventions in a standard protocol model does not resolve this issue. Fuchs and Fuchs (2006) have noted that in comparison with problem-solving methodology, the standard protocol for secondary-level interventions, by virtue of its intensive and systematic instructional approach, is more likely to under-identify truly disabled students. These are students who at higher instructional tiers (e.g., Tier II) seem more responsive and, therefore, would be considered nondisabled, but are unable to survive in the mainstream classroom without these more intensive supports. Fuchs and Fuchs characterize this misidentification as “false negative.” In comparison, they state that problem-solving approaches may be more likely to over-identify “false positives,” in referring students who are initially unresponsive to Tier II interventions but do respond when interventions become more intensive and systematic. The findings of the current study would support that assertion since two thirds of the students referred for special education evaluation from Tier II interventions were not found eligible for services.

Q3: Did the implementation of secondary-level support services inhibit or delay referral for special education services?

It does not appear that special education referrals were inhibited or delayed because students were referred for Tier II interventions, but it is difficult to tell. By Year Four, 15 of the 32 target students (47%) had been referred to special education, 12 due to academic concerns, and 3 due to behavioral concerns. Even with this number of referrals, however, only 5 of these 15 students qualified for Tier III special education support.

At the time when the target students were first referred for secondary-level services (IST) in 2001, no policies or procedures were in place to provide guidance regarding students who were unresponsive to secondary interventions yet did not meet eligibility criteria for special education. Following the IST protocol, students were terminated at the end of each school year, but many of them were re-referred the following year.

Questions can be raised as to whether prior enrollment in Tier II interventions should have precluded similar referrals in subsequent years, or whether these students should have been directly referred for special education evaluation. The

answers to these questions are not expected to come from state or federal rule, but perhaps local initiatives will help to resolve the issues regarding whether and/or to what extent RtI may supplant other eligibility criteria for special education. Did the operation of an IST program result in a delay of implementation of special education services for students with a possible disability? Perhaps. While four students qualified for special education services more than a year after their initial IST referral, the authors of this study disagree with Rock and Zigmond's (2001) characterization of IST as "delaying" access to a free and appropriate public education since individualized interventions in the interim were directed toward discovering effective instructional or management methods. Although sometimes extended, such efforts could provide assistance similar to that offered through special education as well as providing more comprehensive information regarding effective and ineffective treatment in developing IEPs. Meanwhile, it would seem that claims regarding the effectiveness of IST in reducing special education enrollment may be distorted. The existence and procedures associated with Tier II, rather than the efficacy of these interventions, may alter judgments and timing regarding the need for special education services.

Q4: Were placement or risk status of students at four years predicted by gender or initial reason for referral?

Neither tier-level placement nor risk status four years post IST referral was predicted by the initial reason for referral or the gender of the student referred. Moreover, each cell of a predictive CFA conformed to the independence model. The small sample size may have affected the chance of finding statistical significance for this question. A frequent problem with long-term studies is attrition rate, which occurred in this study at a rate of approximately 25% due to students moving out of the district. Whereas this may or may not demonstrate the transitory nature of students who are at risk in schools, it makes drawing conclusions with such a limited sample highly speculative. It also illustrates some of the issues that confront researchers and practitioners as they attempt to evaluate the long-term outcome of multi-tiered interventions.

Limitations

The small sample size makes findings speculative and limits inferences that might have been derived from statistical analysis. Another limitation of this study was the availability of Tier II progress monitoring data. By Year Four, the IST staff at the elementary school recognized the need to pre- posttest students and to document their growth trajectories. During the years of this study, however, these outcome data were not collected nor maintained in any systematic manner.

SUMMARY

Concern regarding long-term outcomes of secondary interventions has grown as public policy and special education regulations have increasingly embraced these processes. The current study adds to the body of research regarding multi-tiered intervention services in several ways. Previous studies have used "indirect" measures of effectiveness to measure success, such as reduced referral rates to special education district-wide, as well as from the group receiving secondary intervention, and retention rate reduction (Hartman & Fay, 1996), or "direct" measures such as time on task, task completion, or task comprehension (Kovaleski et al., 1999).

The scope of the present study, using the records review of one group of students, can be more closely compared to the results of Rock and Zigmond (2001). Rock and Zigmond found that approximately one third of the students referred to IST were on grade level and mainstreamed two years later. In the current study, 30% of the target students were coded low risk (receiving passing grades in all core subjects and demonstrating acceptable behavior) and functioning independently by Year Four. Rock and Zigmond found that approximately one third of the students referred to IST had been placed in special education by the end of the second year. Only 19% of students in this study had been placed in special education by Year Four. Finally, Rock and Zigmond found that approximately a fifth of students referred to IST had been retained in a grade, whereas in this study, only one student had been retained (in kindergarten) during the four years of our record review student (2%).

The results of this study also illustrate the ambiguity that exists for teachers attempting to implement RtI interventions without policy dictating appropriate measures for students who are experiencing failure in general education classrooms, but who are not responsive at Tier II and who do not qualify for Tier III special education services. Federal policy states that “a LEA may use a process that determines if a child responds to scientific, research-based interventions as part of evaluation procedures (Pub. L. No. 108-446, §614(b)(6)). In the absence of clear federal policy, school districts are responding with practices to responsibly support students who do not respond to Tier II interventions. This may include local decisions for using Tier II interventions prior to Tier III referrals for special education identification and how long to try those Tier II interventions and what to do with non-responders. At the same time, school district personnel need time to identify, learn, and then implement a variety of interventions that might meet the unique needs of each individual student who is at risk for academic or behavior success.

Additional research is needed to address the effects of secondary intervention programs, especially problem-solving models such as the IST model, over time. As this level of intervention services matures, with consistent progress monitoring, research can help to determine the success of problem solving approaches as well as standard protocol models. The struggle to address the learning difficulties of students who are slow to respond to secondary-level interventions, yet do not qualify for special education, needs attention as well. The national perspective on using RtI in this regard is pivotal. As more students come to our schools at risk for learning problems, understanding how best to help each one succeed, and in the least restrictive environment, is essential.

REFERENCES

- Askew, B. J., Kaye, E., Frasier, D. E., Mobasher, M., Anderson, N., & Rodríguez, Y. G. (2002). Making a case for prevention in education. *Literacy Teaching and Learning: An International Journal of Early Reading and Writing*, 6(2), 43-73. Reprinted (2003) in S. Forbes & C. Briggs (Eds.), *Research in reading recovery* (vol. 2, pp.133-158). Portsmouth, NH: Heinemann.
- Burns, M. K., Appleton, J. J., & Stehouwer, J. D. (2005). Meta-analytic review of responsiveness-to-intervention research: Examining field-based and research implemented models. *Journal of Psychoeducational Assessment*, 23, 381-394.

- Fuchs, D., & Fuchs, L.S. (2006). Introduction to response to intervention: What, why, and how valid is it? *Reading Research Quarterly*, 41(1), 93-99.
- Fuchs, D., Mock, D., Morgan, P., & Young, C. (2003). Responsiveness-to-intervention: Definitions, evidence, and implications for the learning disabilities construct. *Learning Disabilities Research and Practice*, 18(3), 157-171.
- Good, R. H., Kame'enui, E. J., Simmons, D. S., & Chard, D. J. (2002). *Focus and nature of primary, secondary, and tertiary prevention: The CIRCUITS model* (Tech. Rep. No. 1). Eugene: University of Oregon, College of Education, Institute for the Development of Educational Achievement.
- Hartman, W. T., & Fay, T. A. (1996). Cost-effectiveness of instructional support teams in Pennsylvania. *Journal of Education Finance*, 21, 555-580.
- Ikeda, M. J., Tilly, D. W., Stumme, J., Volmer, L., & Allison, R. (1996). Agency-wide implementation of problem-solving consultation: Foundations, current implementation, and future directions. *School Psychology Quarterly*, 11, 228-243.
- Individuals with Disabilities Education Improvement Act of 2004, Pub. L. No. 108-446, §614(b)(6).
- James, R., & Gilliland, B. (2001). *Crisis intervention strategies* (4th ed.). Belmont, CA: Brooks/Cole.
- Kovaleski, J. F. (2003, December). *Secondary interventions in a three tier model: Program features and system issues*. Paper presented at the National Research Center on Learning Disabilities Responsiveness-to-Intervention Symposium, Kansas City, MO. Retrieved October 10, 2005, from <http://www.nrcld.org/symposium2003/kovaleski/kovaleski2.html>
- Kovaleski, J. F., Gickling, E. E., Morrow, H., & Swank, P. (1999). High versus low implementation of instructional support teams: A case for maintaining program fidelity. *Remedial and Special Education*, 20, 170-183.
- Kovaleski, J. F., Tucker, J. A., & Stevens, L. (1996). Bridging special and regular education: The Pennsylvania initiative. *Educational Leadership*, 53, 44-47.
- Lindamood, P., & Lindamood, P. (1998). *The Lindamood phoneme sequencing program for reading, spelling, and speech*. Austin, TX: PRO-ED.
- McNamara, K., & Hollinger, C. (2003). Intervention-based assessment: Evaluation rates and eligibility findings. *Exceptional Children*, 69(2), 181-193.
- Minneapolis Public Schools. (2001). *Problem solving model: Introduction for all staff*. Minneapolis, MN: Author.
- Reschly, M. (2003, December). *What if LD identification changed to reflect research findings?* Paper presented at the National Research Center on Learning Disabilities Symposium, Kansas City. Retrieved October 30, 2007, from www.nrcld.org/symposium2003/reschly/reschly.pdf
- Rock, M. L., & Zigmond, N. (2001). Intervention assistance: Is it substance or symbolism? *Preventing School Failure*, 45(4), 153-161.
- Ruhe, V., & Moore, P. (2005). The impact of Reading Recovery on later achievement in reading and writing. *ERS Spectrum*, 23(1), 20-30.
- Schmitt, M. C., & Gregory, A. E. (2005). The impact of an early literacy intervention: Where are the children now? *Literacy Teaching and Learning: An International Journal of Early Reading and Writing*, 7(1-2), 57-76.
- Sugai, G. (2007). RTI: Reasons, practices, systems, & considerations. PowerPoint slides from a keynote address at Response to Intervention Summit – December 6, 2007, Washington, DC. Retrieved March 15, 2008, from: www.pbis.org/main.htm.
- Sugai, G., & Horner, R. (1999). Discipline and behavioral support: Practices, pitfalls, promises. *Effective School Practices*, 17(4), 10-22.
- Telzrow, C. F., McNamara, K., & Hollinger, C. L. (2000). Fidelity of problem-solving implementation and relationship to school performance. *School Psychology Review*, 29, 443-461

- Torgesen, J. K., Alexander, A. W., Wagner, R. K., Rashotte, C. A., Voeller, K.K.S., & Conway, T. (2001). Intensive remedial instruction for children with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities, 34*(1), 33-58, 78.
- Vaughn, S. (2003, December). *How many tiers are needed for response to intervention to achieve acceptable prevention outcomes?* Paper presented at the National Research Center on Learning Disabilities Responsiveness-to-Intervention Symposium, Responsiveness to Intervention, Kansas City, MO. Retrieved October 12, 2005, from <http://www.nrcld.org>
- von Eye, A., Mair, P., & Bogat, A. (2005). Prediction models for configural frequency analysis. *Psychology Science, 47*(3/4), 342-355.

Authors' Note

The authors wish to thank Dr. Alexander von Eye, Michigan State University, for his statistical consultation on configural frequency analysis.

Received September 12, 2007

Revised January 15, 2008

Accepted January 17, 2008

Copyright of *Learning Disabilities -- A Contemporary Journal* is the property of Learning Disabilities Worldwide and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.