EFFECTS OF A PROBLEM SOLVING TEAM INTERVENTION ON THE PROBLEM-SOLVING PROCESS: IMPROVING CONCEPT KNOWLEDGE, IMPLEMENTATION INTEGRITY, AND STUDENT OUTCOMES

By

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Recent educational legislation and the professional literature have established high standards for providing quality, evidence-based instruction and intervention to all students. To meet these standards, many schools have adopted multi-tiered educational models (e.g., Response to Intervention; RtI) in which educators use data-based decision making and allocate resources based on student need. As part of RtI efforts, many schools incorporate problem-solving teams that (a) identify students in need of supplemental or intensive services, (b) develop intervention plans to meet academic and/or behavioral concerns, and (c) evaluate student outcomes in response to intervention. Research on effective problem-solving teams has found significantly positive impact on student and systemic outcomes with regard to special education referrals, teacher satisfaction, teaching practices, student outcomes, and disproportionality of minority students in special education. Research has also identified a significant lack of implementation of essential problem-solving procedures in applied school settings. To date, there is limited research on professional development and training in effective problem-solving procedures. A previous study has investigated the effects of performance feedback and coaching on enhancing the integrity of problem-solving teams and improving student outcomes. The proposed study aims to extend previous research by evaluating the effects of a problem solving intervention package consisting of problem-solving information, performance feedback, and coaching in a manualized

student intervention planning protocol. Outcomes of interest indicated that procedural integrity of problem solving teams and student outcomes were improved after participation in the problem solving intervention; however, self-reported concept knowledge and ability of problem solving components were not enhanced.

CHAPTER 1

Introduction

Despite professional recommendation and increased accountability for schools to provide effective prevention and intervention programs that meet the needs of all students, public schools continue to face challenges meeting the diverse needs of their students and achieving increased educational standards. The No Child Left Behind Act of 2001 set a national educational goal of 100% proficiency in reading, math and science by 2014. NCLB requires that public schools set the same challenging academic standards for all students, and furthermore, that all schools report annual progress toward achievement goals for specific groups including: (a) economically disadvantaged students, (b) students from major racial or ethnic groups, (c) students with disabilities, and (d) students with limited English proficiency. With less than 2 years until the NCLB deadline for 100% proficiency, nationwide data suggests an unfortunate reality in meeting these achievement goals.

In 2012, the National Center for Education Statistics (2012) reported significantly low nationwide percentages of 4th grade students scoring at or above proficient in reading (34%) and math (40%). The percentage of students scoring at or above proficiency in 8th grade suggests similar concerns, with 34% of students scoring at or above proficient in reading and 35% of students scoring at or above proficient in math. A recent report by the National Center for Fair and Open Testing provided a summary of independent educational research from 11 states, projecting the percentage of public schools that will meet adequate yearly progress (AYP) by 2014. The report projected that most if not all public schools in the 11 states will fail to make AYP by 2014 (NCFOT, 2010).

In the state of Wisconsin, a slightly higher percentage of students scored at or above proficient in reading and math on the Wisconsin statewide achievement exam (i.e., Wisconsin Knowledge and Concepts Examination [WKCE]) than national norms. For example, in 2011, 39% of 4th grade students and 43% of 8th grade students met or exceeded reading proficiency levels (national averages 34% and 40% respectively). In math, 49% of 4th grade students and 48% of 8th grade students met or exceeded proficiency levels (national averages 34% and 35% respectively. It is important to note that Wisconsin's benchmarks for meeting proficiency in reading and math are considered lower than most states' benchmarks (e.g., Finn, Petrilli, & Julian, 2006).

Additionally, Wisconsin's proficient and advanced percentages are considerably lower when the data are disaggregated for major racial/ethnic groups, socio-economic status, disability, and English proficiency. For example, in grades 3-10, only 59% of all African American students and 68% of all Latino students met proficient or advanced standards in reading, while 87% of Caucasian students met proficient and advanced standards. For minority students, the lowest percentage of students meeting reading proficiency was for 10th grade, suggesting declining achievement rates for these students as they progress through school. A similar trend is seen for proficiency in math for African American and Latino students. In grades 3-10, only 48% of all African American students and 64% of all Latino students met proficient or advanced standards, while 84% of Caucasian students met proficient and advanced standards. Again, math proficiency for 10th grade African American and Latino students was lowest, with only 31% of African American students and 49% of Latino students meeting proficient or advanced standards (WINSS, 2011). In 2011, 30% of economically disadvantaged Wisconsin students failed to meet reading proficiency standards and 35% of economically disadvantaged students failed to meet

math proficiency standards. When English language proficiency is considered, academic proficiency of these students highlight additional concerns. In the 2010- 2011 academic year, 45% of students with limited English proficiency failed to meet proficiency in reading; 43% of students in this category did not meet proficiency in math. During that year, 53% of Wisconsin students with disabilities did not reach proficiency in reading while 55% of students with disabilities failed to meet math proficiency standards (WINSS, 2012).

In addition to the academic performance of students nationwide, student behavior and dropout patterns continue to be an area of concern. Although average school dropout rates have decreased over the past 20 years, dropout rates for African American and Hispanic students (9% and 18% respectively) is substantially higher than dropout rates of White students (5%; NCES, 2012). In 2011, the dropout rate for Wisconsin students was less than 2% (national average 8%), yet disaggregated data reveals disproportionate dropout rates for minority students. Nearly 5% of African American students, 2.5% of Hispanic students, and 3.8% of American Indian students dropped out, as compared to less than 1% of White students. This data indicates a universal need for effective instruction and supports, but also highlights the critical need for evaluating the educational services provided to special populations such as students from minority or economically disadvantaged groups, and students with disabilities or limited English proficiency.

As the needs of students rises, effective resources within general education must be developed and implemented to meet the needs of a wide range of child and adolescent challenges. Over the past thirty years, there has been a significant increase in the percentage of public school students served by federally supported special education programs. Much of this increase can be attributed to a rise in the number of students identified as having specific learning disabilities (NCES, 2012). In 2010, 13% of students nationwide received special

education services. At that time, 38% of all students identified as having disabilities were categorized as having specific learning disabilities. This percentage is noticeably higher than that of the 1976-77 school year, during which specific learning disabilities accounted for approximately 21% of all identified disabilities. Many students served under special education spend a considerable amount of time in the general education setting. This has significant implications for general education teachers and other resources available in general education. In 2010, 59% of students receiving special education services spent more than 80% of their school day in general education (NCES, 2012).

Overrepresentation of minority students in special education has also been highlighted as a major problem in public education. The National Research Council (2002) reported that African American students are considerably overrepresented in the disability categories of emotional disturbance, mental retardation, and multiple disabilities. In nearly every state, African American students are over-identified for special education and significantly more likely than White students to be identified as having emotional disturbance (1.9 times more likely) or mental retardation (2.9 times more likely). Wisconsin's special education rate in 2012 was slightly higher than the national average with nearly 14% of students receiving special education services. Disproportionality of minority students in special education is evident in the state of Wisconsin. In the 2011-2012 academic year, 21% of African American students were categorized under special education services, whereas only 13% of White students were categorized under special education (WINSS, 2012).

Major federal legislation from both general and special education arenas [e.g., the Individuals with Disabilities Education Act (IDEA, 2004), and No Child Left Behind (NCLB,

2001)] have established high standards for the education of students. These mandates ensure high-quality instruction and intervention for all students, appropriate identification of students in need of supplemental services (including special education), and, evidence-based intervention for targeted students. With the passage of NCLB, the educational system has undergone a fundamental shift in expectations for academic achievement and decisions for curriculum and instruction (Tilly, 2008). In the traditional system, instruction in general education provided adequate support to most students and few instructional modifications were implemented in the classroom. In this old model, varied levels of student achievement and outcomes were expected. NCLB, on the other hand, outlines an educational system based on the assumption that all students can reach proficient academic levels (Tilly, 2008).

Foundational to achieving 100% proficiency is flexible, responsive teaching practices based on student need. In this new system, collaboration among professionals and data-based decisions identify students in need of modified and/or supplemental instruction and match students to appropriate interventions (Gravois & Rosenfield, 2002; Tilly, 2008). The National Research Council's (Donovan & Cross, 2002) report outlines recommendations for effective school-based programming for students. These include (a) definition of concerns in clear, observable terms, (b) collection of baseline data, (c) identification of measurable goals, (d) identification of intervention components, (e) graphing of progress monitoring data, and (f) evaluation of intervention through graphed data and comparison to baseline.

In alignment with the changing standards in educational service delivery, schools have adopted service delivery models that incorporate science into practice. One model that supports science in practice and incorporates problem-solving components is a multi-tiered system, known in practice as Response to Invention (RtI; e.g., Kratochwill, Albers, & Shernoff, 2004).

RtI is defined as a multi-tiered model by which (1) students receive effective instruction in the general education setting, (2) data is regularly collected, (3) students who do not respond to core instruction receive additional or alternate instruction, (4) data is regularly collected, and (5) students who continue to struggle either receive additional/alternate instruction or are referred for special education evaluation (Vaughn & Fuchs, 2003). RtI, like other tiered educational models (e.g., Simmons, Kame'enui, & Good, 2002), assumes that all students in a school will be proficient in basic academic, social-emotional, and behavioral skills, regardless of identified learning disabilities (Tilly, 2008).

RtI models have commonly been conceptualized as following a (a) standard protocol approach, or (b) problem-solving approach. A standard protocol approach to RtI applies the same empirically-supported intervention for all children with similar academic, behavioral or social-emotional concerns (Fuchs, Mock, Morgan, & Young, 2003). For example, a school might identify students scoring in the lowest 20% on specific literacy measures and provide those students with a pre-determined intervention. Conversely, a problem-solving approach utilizes a team of educators for identifying and analyzing student problems, and developing and delivering appropriate services.

A standard protocol approach to service delivery may have several important advantages over a problem-solving approach. For example, if educators can be trained in specific interventions, school resources may be efficiently allocated to a greater number of students. Additionally, if the standard protocol intervention has been rigorously evaluated, it is more likely that students will demonstrate progress as a result of intervention (Fuchs et al., 2003). A problem-solving process, on the other hand, is considered a more individualized approach. Problem solving is an appropriate service delivery model for problems that cannot be adequately

addressed by standard protocol interventions. Since both approaches provide benefits to student programming, RtI models described in the literature typically employ a combination of a standard protocol and problem-solving approach (Jimerson, Burns, & VanDerHeyden, 2007).

Implementing a problem-solving approach has been identified as "best practice" for school psychologists (Thomas & Grimes, 1995). Problem solving within a multi-tiered delivery system is an example of both effectiveness and efficiency (Batsche, Castillo, Dixon, & Forde, 2008). RtI has been described as "synonymous with problem solving" (Fuchs et al., 2003, pp. 159). Schools following an RtI model typically utilize problem-solving teams (PST) for determining allocation of resources in response to student need. Through this process, educators identify, deliver and evaluate school-based interventions. In order to evaluate the effectiveness of services developed and implemented by school problem-solving teams, research must first evaluate the process through which educators develop intervention plans. Integrity of the problem-solving process provides a critical foundation for evaluating student outcomes.

Research in this area has identified low integrity of problem-solving procedures in schools; more specifically, there is a significant lack of problem-solving components related to data-based decision-making. Preliminary research has also shown promising outcomes of professional development and coaching in improving problem-solving procedural integrity (e.g., Burns et al., 2008a; Lundahl, 2010). These studies, however, were limited in that they did not provide training that addressed all stages of problem solving. Consultation literature considers each stage of problem solving indispensable (Gresham, 1989), and a component analysis of problem solving consultation stages found improved student outcomes with increasingly inclusive models of consultation (Fuchs & Fuchs, 1989). This study extends prior research by

examining a comprehensive multi-component problem-solving intervention in several local schools.

Districts focused on adopting multi-tiered models that utilize problem-solving procedures should focus efforts on improving their identification of at-risk students and evaluating student outcomes in relation to service delivery integrity. Although school psychologists are typically trained in problem-solving consultation, it is essential that training be provided to all educators involved in the development, implementation, and evaluation of student programming. The proposed study utilized a problem-solving intervention focused on training school psychologists in a manualized problem-solving protocol. School psychologists were responsible for delivering training to their respective problem-solving team and implementing ongoing professional development strategies guided by the primary investigator. This research also evaluated educator knowledge, skill, and integrity of problem-solving components prior to and after intervention delivery. Additionally, student outcomes in relation to problem solving integrity during student programming were evaluated.

CHAPTER 2

Review of Literature

This chapter outlines (a) traditional approaches to educational service delivery and their limitations, (b) RtI and team-based problem solving as an alternative approach to service delivery, (c) theoretical basis and goals of the problem solving process, (d) outcomes of effective problem solving procedures in addition to barriers to procedural integrity, and (e) research in the topics of professional development and improving problem solving integrity. The chapter concludes with a rationale for the current study and research questions that were addressed through experimental analysis.

Traditional Approaches to Educational Service Delivery and Their Limitations

In 1977, the Office of Education defined the marker of learning disability (LD) as a "severe discrepancy" between performance on achievement versus intelligence tests. If a child received appropriate instruction and demonstrated age-appropriate ability, but did not demonstrate proportionate academic achievement, this child may qualify as having a learning disability. Most states adopted this discrepancy model, defining "severe discrepancy" in different terms (e.g., 1.0 SD vs. 2.0 SD between standard score on IQ and achievement) and using different measures (Fuchs et al, 2003). This approach to defining and identifying learning disabilities has significant limitations. Not only does this approach lead to inconsistent models, it has been argued that this approach fails to identify many struggling students (Fuchs et al., 2003). Criticized as a "wait-to-fail model," many at-risk students go years before meeting the IQ-achievement discrepancy requirement and receiving additional educational services. Within this traditional model, students with low IQ scores that are not discrepant enough from low achievement scores are denied special education services (Fuchs et al., 2003). In schools that do

not have resources or systems allocated to at-risk students, special education services may be the only supplemental supports available to struggling students.

Another downfall of the discrepancy model is its failure to consider the role instruction plays in academic achievement. The discrepancy model assumes a within-child problem rather than considering contextual factors related to low achievement, such as poor instruction. Although federal regulations identify appropriate instruction as exclusionary criteria to identifying a learning disability, questions about what constitutes age-appropriate instruction has led to confusion and inconsistencies across states, districts, and schools.

RtI as an Alternative Approach to Service Delivery

Overview of RtI

The reauthorization of IDEA (2004) supports the use of a multitiered model of service delivery and scientific, research-based instruction and intervention. IDEA specifically authorizes the use of alternative procedures for the identification of student with specific learning disabilities.

> "In determining whether a child has a specific learning disability, a local educational agency may use a process which determines if a child responds to scientific, research-based intervention" (69 FR 779768 Section 614)

Response to Intervention is considered a solution to many of the limitations of the IQ-achievement discrepancy model (Fuchs et al., 2003). Struggling students are identified more quickly and therefore receive intervention sooner. Additionally, students who are receiving inadequate instruction are more readily identified from students with disabilities. This results in more appropriate referrals to and placement in special education, reducing the number of "false positives," but also providing early intervention to students at risk for failure (Fuchs et al., 2003).

Within an RtI model, students may be identified as having a learning disability only if the student does not demonstrate adequate improvement despite being provided with research-supported intervention (Gresham, 2002). Multi-tiered models of service delivery (e.g., RtI) have been identified as a notable alternative to the traditional model of identifying students with disabilities (Tilly, 2008; Vaughn & Fuchs, 2003).

Although a multi-tiered model (e.g., RtI) is recognized as an effective approach to guiding appropriate identification of students with disabilities, the primary goals of mutlitiered services delivery models are to provide research-supported instruction and intervention to all students in general education (Fletcher & Vaughn, 2009). Following a multitiered service delivery model, a student does not need to be identified as having a disability in order to receive intervention. Instead, schools employ systematic assessment procedures across academic, behavioral, and social-emotional domains in order to identify students in need of additional services and measure outcomes in response to school resources (i.e., curricula, interventions, etc.; Fletcher & Vaughn, 2009). The traditional model relies predominantly on teacher referral to determine which students will receive supplemental intervention. As noted previously, this approach has significant limitations, including (a) inconsistent identification of at-risk students across teachers, (b) inconsistent approaches and available resources for struggling students, and (c) missed identification of at-risk students (Tilly, 2008).

Students within a tiered service delivery model receive resources in proportion to their need. This model supports the vision that the majority of students will demonstrate proficiency when provided the general education curriculum (i.e., Tier 1: Core instruction), a smaller group of students will require core instruction in addition to supplemental instruction (i.e., Tier 2: Supplemental Instruction), and few students will require intensive intervention in addition to

core and supplemental instruction (i.e., Tier 3: Intensive Intervention) (Tilly, 2008). The literature typically defines Tier 1 instruction as "effective" if 80% of all students meet proficiency standards with core curriculum alone. At Tier 1, universal screening and assessment procedures of basic academic skills or behavioral domains are used to identify students in need of additional services. With effective universal supports in place, approximately 5-10% of students will be identified for targeted intervention. Students identified for targeted, Tier 2 services receive core instruction and supplemental intervention (e.g., additional time in core curriculum, structured supplemental services). Supplemental instruction (a) must be explicit, (b) must be more intensive than core curriculum, (c) must be emotionally and cognitively supportive and (d) must include progress-monitoring methods (Torgesen, 2004). Although many children respond to supplemental intervention, a smaller set of children (approximately 1-5% of students) will fail to reach proficiency levels. It is important to note that intensive instruction does not imply special education. Although some students within Tier 3 may qualify for and benefit from special education services, students may need intensive instructional support for reasons that do not fall under special education eligibility (e.g., students learning English as a second language). For these students, core instruction in addition to intensive instruction is provided. Intensive instruction has the same core characteristics as supplemental instruction, but should be more intensive and individualized.

Batsche and colleagues (2005) described eight core principles of an RtI model. These include: (a) all children can effectively be taught, (b) intervene early, (c) use a multitier model of service delivery, (d) use a problem-solving methods to make decisions within a multitier model, (e) use research-based, scientifically validated interventions/instruction to the extent available, (f) monitor student progress in inform instruction, (g) use data to make decisions, and (h) use

assessment for screening, diagnostics, and progress monitoring. As a result of recommendations and mandates for change in our service delivery model, schools have become devoted collectors and users of data in decision-making for student programming (Tilly, 2008).

Problem-solving within RtI. A problem-solving model is an appropriate fit within a multi-tiered RtI framework (Burns, Vanderwood & Ruby, 2005; NASDSE, 2005). The problem-solving method is foundational to science-based practice in schools (Tilly, 2008). School-based problem solving is an indirect service delivery model used to develop academic and/or behavioral interventions for students experiencing difficulties in general education. These models follow the same general procedures including a request for consultation, observation, conference, and, if needed, formal special education referral (Burns & Symington, 2002). The problem-solving process is a prevention-focused approach that builds a teacher's capacity to provide effective services to struggling students in the general education setting (Fuchs et al., 2003). This differs from a traditional service delivery model in which teachers may (a) provide instructional modifications without consultation, (b) refer struggling students for formal special education evaluation, or (c) fail to provide instructional supports.

School-based problem solving is considered an indirect approach to service delivery because consultants (e.g., school psychologists, specialists, and/or others) provide support to teachers rather than directly to target students (Albers & Kratochwill, 2006; Gutkin & Curtis, 1999; Kratochwill, 2008). By consulting with teachers, indirect problem-solving models allow specialists to address the needs of more students than could be served through direct service delivery models (Kratochwill, 2008). Within this model, teachers seek consultation from a multidisciplinary team for developing and delivering intervention plans to struggling students in their classroom. In addition to the referring teacher, problem-solving teams (PSTs) may include

school psychologists, administrators, general education teachers, special education teachers, and specialists (e.g., social worker, speech pathologist, bilingual resource specialist; Burns, et al., 2008b). Members on the PST work collaboratively to identify and analyze the referring problem, develop appropriate intervention plans, and evaluate intervention effectiveness.

Data-based decision making, a primary function of problem-solving teams, is critical for both general and special education services; therefore problem solving teams can play an integral role at all tiers of service delivery in an RtI model (Burns, Vanderwood, & Ruby, 2005; Burns, Wiley, & Viglietta, 2008b). In practice, the problem-solving process is typically used to develop intensive, individualized interventions (i.e., Tier 3 interventions) for students with significant challenges in regular education who do not demonstrate progress in response to supplemental interventions (i.e., Tier 2 interventions). Although the primary focus of PSTs is prevention and early intervention for at-risk or struggling students in general education, PSTs can play a significant role in the special education eligibility process (Burns et al., 2008b). Previous intervention delivery by PSTs and student progress (or lack thereof) in response to these interventions are key sources of eligibility data (Tilly, 2002).

Problem solving stages. Many models of educational problem solving exist, each with its own specific procedures and protocols; however, the underlying problem solving components are consistent throughout these models (Fuchs et al., 2003). Most problem solving models can be considered extensions of behavioral or instructional consultation models, which follow structured, multiple-stage procedures for intervention development [e.g., Behavioral Consultation (Bergan & Kratochwill, 1990); Conjoint Behavioral Consultation (Sheridan, Kratochwill, & Bergan, 1996); and Instructional Consultation (Rosenfield, 1987)]. These models foster collaboration among stakeholders in the student's learning and development (e.g., parent,

teacher, school psychologist). CBC, for example, has been defined as "a strength-based, cross-system problem- solving and decision-making model wherein parents, teachers, and other caregivers or service providers work as partners and share responsibility for promoting positive and consistent outcomes related to a child's academic, behavioral and social-emotional development" (Sheridan & Kratochwill, 2008, p. 25).

Problem-solving consultation procedures are typically carried out through four stages. The four-stage problem-solving model includes: (1) problem identification (2) problem analysis, (3) plan implementation, and (4) plan evaluation (Sheridan et al., 1996; Sheridan & Kratochwill, 2008). A preliminary stage of relationship building has also been included in descriptions of problem solving consultation (e.g., Kratochwill, Elliott, & Rotto, 1995). Problem-solving stages answer the following questions: Is there a problem and what is the problem? Why is the problem happening? What can be done to improve the problem? and Did the treatment work? These stages are intended to be dynamic rather than linear, with objectives including strengthening the relationships among contexts of the student, developing consultee skills, and facilitating ongoing communication between consultants and consultees (Sheridan & Kratochwill, 2008)

Establishing a collaborative relationship. The first stage of the problem solving process is relationship building, during which consultant and consultee establish a collaborative working relationship by building trust, outlining common goals and expectations, and sharing unique expertise (Kratochwill, Elliott, & Stoiber, 2002; Sheridan & Kratochwill, 2008). The quality and effectiveness of team problem- solving procedures is enhanced when a collaborative relationship is established. Effective teams have diverse members and may include general education teachers, special education teachers, school psychologists, administrators, parents, specialists, and a times the student (Fuchs, Fuchs, & Bahr, 1990). Objectives of this stage of the problem-

solving process include: (a) improve communication, knowledge, and understanding of child, family, and school, (b) share ownership and responsibility for problem solution, (c) achieve greater conceptualization of needs and concerns, (d) maximize opportunities to address needs and concerns across settings, (e) increase shared commitments to educational goals, and (f) increase diversity of available expertise and resources (Sheridan & Kratochwill, 2008). Establishing a collaborative relationship sets the stage for how problem solving procedures are carried out among teachers, parents and educators, and is therefore considered an important prerequisite to what is done in the context of problem solving (Sheridan & Kratochwill, 2008).

Problem identification. The second stage of the problem solving process is problem identification, during which the target behavior(s) are clearly defined in operational terms. Problem identification has been considered the most important problem solving stage, as it guides the development of the intervention plan (Kratochwill, 2008). Consultants collaborate with parents and teachers in order to identify and prioritize the child's academic, behavioral, or social-emotional needs in relevant settings (Sheridan & Kratochwill, 2008). At this stage, a comparison between what the student is presently doing and what the student is expected to do should be identified (Burns et al., 2008a; Albers & Kratochwill, 2006). Understanding expected academic or behavioral competencies allows consultants to focus intervention efforts in these areas (Stoiber & Kratochwill, 2000). Problem identification that is supported by assessment data is a critical component of effective problem solving (Deno, 2002). In addition to preliminary baseline data, the team must determine what additional types of baseline data are needed to understand the problem (Kratochwill, Elliott, & Stoiber, 2002). A multi-informant (e.g., parents, teachers, students), multi-measure (e.g., interviews, observations, standardized assessments, and permanent products), multi-setting (e.g., home, school, community) approach to assessment is

considered "best practice" to understanding student concerns (Sheridan & McCurdy, 2005). Comprehensive measurement provides baseline data through which hypotheses can be developed and evaluated. Problem identification follows the assumption that problems can be explained by inconsistent or ineffective relationships between people and systems in student's ecology (e.g. parent-student, parent-school, student-teacher) (Kratochwill, 2008). A strength-based approach to problem identification and subsequent stages of problem solving requires identification of student, family, teacher, and system strengths to build upon (Sheridan & McCurdy, 2005).

Problem analysis. Problem analysis is defined as "the systematic process of assessment and evaluation for indentifying and understanding the causal and maintaining variables associated with a well- specified problem" (Christ, 2008, p. 159). The purpose of the problem analysis phase is to, if necessary, redefine the operational definition of the problem, and identify factors contributing to the referral problem (Kratochwill, 2008; Albers & Kratochwill, 2006). A major goal of the problem analysis phase is to identify whether the referral concern is a skill or performance deficit (i.e., "can't do" versus "won't do"). Through data collection and review, hypotheses related to student problems may be systematically tested, rejected or verified (Christ, 2008). Intervention recommendations should be made after evaluating hypotheses behind referral concerns because clear, data-supported hypotheses and treatment recommendations have a greater likelihood of success (Tilly, 2008). Hypotheses that are not data-supported are considered high inference conclusions—these conclusions are based on assumptions and typically rely on within-student constructs (e.g., personality or ability) (Christ, 2008). The most applicable hypotheses are those that are (a) low inference, (b) related to both causal and maintaining variables, and (c) guided by alterable variables related to intervention (Christ, 2008). Through

analysis of hypotheses, the team can determine whether intervention will include instruction of new skills or incorporation of new environmental contingencies.

Assessment in the problem analysis stage is aimed at identifying variables and conditions that either promote or inhibit student success. Hypotheses should consider the relationship student factors, teacher factors, peer factors, curriculum factors, classroom/school factors, and/or family factors have to present student challenges (Batsche et al., 2005). It is likely that biological and ecological factors contribute to student problems, but the goal of the problem analysis stage is to identify solutions for contributing factors that can be altered. For example, the instructional match (e.g., type, mode, pace, and duration) of curriculum delivery may be modified to meet the needs of target students (Ysseldyke & Elliott, 1999; Christ, 2008). Evidence-based instructional variables and classroom conditions related to (a) teaching behaviors, (b) structure of the classroom environment, and (c) student-mediated strategies are related to positive student outcomes (Gettinger & Stoiber, 1999; Gettinger & Seibert, 2002). Consultation between school psychologists and classroom teachers has been identified as a practical process for promoting the use of these effective strategies (Gettinger & Seibert, 2002).

Problem analysis may be approached from a standard protocol or individualized approach. If a common referral concern is presented to the PST, the team may employ a consistent procedure for problem analysis and intervention development. Common domains of assessment during problem analysis are instruction (i.e., how new skills or behaviors are taught), curriculum (i.e., what skills or behaviors are taught), environment (i.e., where skills or behaviors are taught) and the learner (i.e., to whom skills or behaviors are taught). Assessment typically includes direct observation and curriculum-based measures (CBM; Deno, 1985), as these provide contextually relevant information for intervention planning (Gickling & Rosenfield, 1995).

Recommended methods for data collection include review, interview, observation, testing, and self-report (RIOT, Knoff & Batsche, 1991).

For referral concerns that are more unique, assessment, evaluation, and intervention steps are more individualized to the particular type and context of referral concern (Christ, 2008). Recommended assessment procedures include functional behavioral assessment (FBA; e.g., O'Neill et al., 1997) and the Functional Assessment of Academic Behavior (FAAB; Ysseldyke & Christenson, 2002), as these methods provide comprehensive, individualized evaluation of academic and/or behavioral challenges and guide functionally-based interventions. Essential steps of the FBA process include: (1) a clear description of the problem behavior, (2) identification of antecedents (i.e., events, times, situations) that predict the expression or suppression of the problem behavior, (4) development of hypotheses that describe the problem behavior and factors related to its occurrence/nonoccurrence, and (5) direct observation data to support these hypotheses (O'Neill et al., 1997). This strategy guides the development of evidence-based interventions directed at factors that precede (i.e., setting events, antecedents) or follow (i.e., consequences) target behaviors. This process aligns with problem-solving procedures employed by school-based teams for supporting students with academic or behavioral challenges (Sheridan & McCurdy, 2005; Martens, 2002). School psychologists have the skills to facilitate appropriate assessment of variables within the learner's environment that are related to academic or behavioral progress (Ysseldyke, et al., 2006).

Successful problem analysis results in a plan that can be into effect during the plan implementation stage. Therefore, the goals of the intervention plan, broad intervention strategies, assessment objectives, and sources of the intervention plan should be outlined at this stage (Kratochwill, 2008). If professional development must be provided to educators prior to plan

implementation, the people responsible for providing professional development and a plan for completion should be indicated. General assessment procedures for evaluating performance outcomes should be identified. Typically, procedures for progress monitoring follow the same general format of baseline data in order to evaluate skill development and achievement of intervention objectives (Kratochwill, 2008).

Plan implementation. Once target problems have been identified and analyzed, a prevention and/or intervention plan can be implemented. During the plan implementation stage, intervention goals should be defined in measurable terms and procedures for plan implementation and progress monitoring should be put into place (Tilly, 2008). Procedures should include a clear plan of the resources, personnel, assessment measures, and training necessary to carry out the treatment plan. Plan implementation should outline a time frame for completing intervention steps, monitoring student response to intervention, and comparing student progress to treatment goals. Best practices recommends that all aspects of the plan be put in writing, for example, with the use of a written protocol. A written plan can increase accountability in plan implementation (Zins & Erchul, 2002). Selection of appropriate interventions should consider the evidence-base, acceptability, and effectiveness of the intervention. Consultants on the team (e.g., school psychologists) can provide direction to evidence-based strategies that address the function of referral concerns (e.g., escape, attention). Consultees (e.g., classroom teacher) can modify these strategies in order to fit within existing settings, routines, and other factors of the student (Sheridan & McCurdy, 2005).

The PST is encouraged to select evidence-based interventions (EBIs; i.e., interventions with substantial research support) that are appropriately matched to the target problem. Interventions with research support are more likely to result in positive outcomes for students;

therefore, PSTs are encouraged to select EBIs. Educators are encouraged to utilize standards provided by professional organizations when identifying and selecting EBIs during problem solving procedures. For example, the American Psychological Association's Division 16 developed the Task Force on Evidence-Based Intervention in School Psychology to identify, review, and evaluate psychological and educational interventions for school-aged children with academic, behavioral, or emotional challenges (Kratochwill & Stoiber, 2002). The rigor of studies evaluating intervention effectiveness and reported intervention outcomes are considered. Rigor of intervention study is determined by considering (a) general study characteristics (e.g., theoretical/empirical basis, design, statistical procedures), (b) internal validity (e.g., validity/reliability of outcome measures, comparison group, durability of effects), and (c) other study features (e.g., external validity indicators). Interventions are rated as "well established," "probably efficacious," or "experimental" (Kratochwill & Stoiber, 2002). Other federal and professional organizations have developed lists of evidence-based interventions and strategies to promote the incorporation of research into practice. The National Reading Panel provides a comprehensive review of the efficacy of reading programs and instructional practices. The What Works Clearinghouse, funded by the U.S. Department of Education, reviews intervention programs related to a variety of educational concerns including academic, social-emotional, behavioral, and other mental health issues.

In addition to its evidence-base, consultee skills, available resources, and consistency of the intervention with the student's learning environment should also be considered during intervention selection (Kratochwill, 2008; Sheridan & McCurdy, 2005). Interventions that are developed jointly by individuals responsible for carrying out the plan have greater chances for implementation success (Sheridan & McCurdy, 2005). Once the intervention plan is

implemented, there should be ongoing communication between the consultant and consultee (i.e., teacher) so that assistance and reinforcement can be provided to the consultee (Zins & Erchul, 2002). Ongoing communication is also critical for monitoring plan implementation. Two types of plan implementation are typically monitored. First, the team should measure whether the intervention plan was implemented as intended (i.e., treatment integrity; Gresham, 1989. Integrity of plan implementation can be monitored through teacher completion of integrity forms, direct observation of the teacher implementing the intervention, and providing training or feedback related to intervention implementation (Hagermoser-Sanetti & Kratochwill, 2008). Without measuring treatment integrity, the outcomes of the intervention plan cannot be appropriately evaluated. Secondly, the prevention or intervention plan should be assessed using ongoing progress-monitoring procedures outlined during the problem identification and analysis stages (Albers, Elliott, Kettler, & Roach, 2005). Examples of commonly used progress-monitoring methods include frequency counts, ABC charts, goal attainment scales (GASs), rating scales, test scores, and other permanent products. "During the intervention implementation stage, data collected should assist the problem-solving team in determining whether the intervention is having sufficient impact so that the student can reach defined goals" (Albers et al., 2005, p. 333). If the intervention plan does not result in adequate progress towards treatment goals (based on pre-determined decision rules) the plan should be revised or previous problem-solving stages should be re-examined (Albers et al., 2005; Kratochwill, 2008).

Plan evaluation. The final stage of the problem-solving process is to evaluate intervention effectiveness. This includes assessment of goal attainment and determination of plans for generalization and maintenance of target skills. The PST reviews progress-monitoring data that was collected on a daily or weekly basis and determines whether intervention goals

were attained or if the student is making adequate progress towards intervention goals. Student performance is measured against baseline data as well as the standard for acceptable behavior. The literature recommends multiple direct and indirect methods for evaluating intervention effectiveness including observations, curriculum-based measurement, permanent products, rating scales, and goal attainment scaling (Albers et al., 2005). Goal attainment scaling (GAS; Kratochwill, Elliott, & Rotto, 1995) is an individualized criterion-reference approach to describing and documenting change in academic and social behaviors. GAS can be used in conjunction with a variety of assessment tools including direct observations, CBMs, self-report measures, and work samples, making it a particularly useful tool for monitoring progress, evaluating outcomes, and determining the need for additional interventions (Roach & Elliott, 2005; Elliott, DiPerna, & Shapiro, 2001).

Theoretical Basis of Problem-Solving

All Students Can Learn.

The belief that all children can and do learn is a central assumption to a problem-solving model (Burns, Vanderwood & Ruby, 2005). This idea is supported by extensive research demonstrating the effectiveness of academic and behavioral intervention in improving student outcomes (see meta-analyses by Kavale & Forness, 1999; Swanson, Hoskyn, & Lee, 1999).

Collaboration

Collaboration is defined as a process in which two professionals work in an equitable relationship in the development of effective services (Rosenfield, 1987). "Through consultation, home and school systems are collaboratively involved in a joint problem-solving process to address common goals for children" (Sheridan & Kratochwill, 2008, p. 29). Participants in problem-solving consultation make varying contributions towards common goals (Zins &

Erchul, 2002). Consultees provide contextual information that is critical to defining student problems and identifying prevention/intervention plans. It is each member's responsibility to ensure that the intervention plan is an appropriate fit, based on the setting and skill repertoire of the consultee (Zins & Erchul, 2002).

Consultants and consultees both contribute in the problem-solving process; consultants generally provide structure and guidance in the overall process, while consultees contribute a substantial amount of information during discussions (Zins & Erchul, 2002). Because consultants are typically responsible for implementing treatment plans, their input on treatment acceptability is critical. When teachers have a role in developing intervention plans, they are more likely to carry it out (Nevin, Thousand, Paloucci-Whitcomb, & Villa, 1990). Ultimately it is each participant's responsibility for maintaining the collaborative partnership during intervention implementation and evaluation by conducting ongoing follow-up activities (Zins & Erchul, 2002). Whereas traditional referral procedures include a shift of intervention responsibility from the referring teacher, to a team, and subsequently back to the teacher, "the PST process should involve a collaborative sharing of responsibility rather than a shift" (Burns et al., 2008a, pp. 1637). It has been argued that a collaborative relationship is linked to benefits including increased fidelity of intervention implementation and increased skill and knowledge by both consultant and consultee (Schulte & Osborne, 2003).

Eco-Behavioral Framework

The problem-solving model supports an ecological approach to defining, analyzing, and treating student academic, social-emotional, and behavioral challenges. Following an ecological approach to problem solving (e.g., Brofenbrenner, 1979), student performance can be understood by evaluating multiple factors within the student's ecology (i.e. school, classroom, and home

environments). Instructional context and match are considered as opposed to a traditional model that considers isolated student-centered characteristics (Rosenfield, Silva, & Gravois, 2008). Central components to the problem solving process which reflect an ecological framework include (a) consideration of student's prior knowledge, present skill level, and learning rate, (b) use of instructional time, delivery of instruction, classroom management strategies, assessment procedures, and teacher expectations, and (c) task demands of student (Rosenfield, Silva, & Gravois, 2008).

Behavioral theory has a strong link to problem-solving procedures, as it supports systematic assessment and experimental methods for identifying variables related to challenging behavior and developing intervention for behavior change (Sugai &Horner, 2006). Behavioral strategies evaluate the interaction between an individual and the natural conditions in his/her environment related to behavior expression (Gresham, Watson, & Skinner, 2001). Approaching problem identification and analysis from a behavioral perspective encourages data-supported intervention development and evaluation (Bergan & Kratochwill, 1990). There is extensive literature documenting the success of behavioral interventions that can be provided through a consultation process (Elliott & Busse, 1993). When student academic or behavioral problems are identified and analyzed with behaviorally-oriented data (e.g., curriculum-based measurement and functional behavioral assessment), interventions with consistently successful student outcomes are developed (Gresham et al., 2001).

Goals of Problem Solving

Problem-solving consultation is considered both a proactive and reactive model of service delivery because it focuses on enhancing the competencies of individuals in the partnership in addition to improving student outcomes (Sheridan & Kratochwill, 2008). Major

goals of problem-solving consultation include (a) providing prevention and/or intervention services to improve the academic, behavioral, and/or social problem(s) of a system, classroom, or individual student, and (b) improving the system or skills of consultees so that they may more effectively prevent or respond to the problems of future students (Kratochwill, 2008; Sheridan & Kratochwill, 2008). Similarly, Gravois & Rosenfield (2002) identified three goals that effective school-based consultation teams should have in order to provide support to students in general education settings, thereby reducing referrals for special education. These include: (1) providing professional development to teachers in order to build their capacity to implement evidence based instruction and management for students at risk, (2) promoting system-wide collaboration towards improving student achievement, and (3) improving academic achievement of minority students.

Outcomes of RtI Models and Problem Solving Teams

There is a growing body of research supporting various components of RtI models, including problem-solving approaches to assessment and intervention. Outcome research on the effectiveness of RtI models has several challenges particularly because RtI does not refer to a particular set of procedures (Christ, Burns, & Ysseldyke, 2005). Instead, RtI is a process of integrated procedures and decision rules, typically following a problem-solving approach (Barnett, Daly, Jones, & Lentz, 2004; VanDerHeyden, Witt, & Barnett, 2005). Theoretically, if the components within an RtI model effective, the overall process should result in positive outcomes, but research on the overall process of RtI approaches should be evaluated (VanDerHeyden, Witt, & Gilbertson, 2007). Another limitation to outcome research in RtI models is that much of the research has been facilitated by research centers, which provides schools with trained researchers to carry out intervention components with high integrity

(VanDerHeyden, et. al., 2007). Whether educational professionals can effectively implement intervention components and whether these procedures improve student and systemic outcomes is a critical area of research.

The use of prereferral intervention teams (e.g., PSTs) as part of RtI initiatives has increased significantly over the past 20 years (Burns et al., 2005). RtI and team-based problem solving has become a critical decision-making approach for serving children at risk for academic failure and identifying students in need of special education services. Therefore, it is imperative to focus research efforts on evaluating the implementation of these procedures. Illback, Zins, Maher, & Greenberg (1999) cautioned that many schools quickly implement alternative service delivery models without incorporating an evaluative component.

There is a relatively small body of research addressing effectiveness of problem-solving teams; many of the studies have been limited by small samples of schools, teachers, and students, insufficient information on the type of interventions implemented, the integrity of their implementation, and impact on student outcomes (Burns & Symington, 2002; Fuchs et al., 2003). The literature has, however, identified positive student and systemic outcomes of pre-referral teams. Effective pre-referral teams (e.g., Teacher Assistance Teams, Bay, Bryan, & O'Connor, 1994; Instructional Support Teams, Kovaleski, Tucker, & Duffy, 1995; School Based Intervention Teams, McDougal, Moody, Clonan, & Martens, 2000) have been associated with the following outcomes for students: (a) decreased referrals to, and placements in special education, (b) increased appropriateness of special education referrals, (c) positive satisfaction by teachers and principals, and (d) positive academic and behavioral progress for students, and (e) improved attitudes and teaching practices of teachers (McNamara, 1998; Schrag & Henderson, 1996; Nelson et al., 1991). Recent research has investigated this trend with regard to

minority students and outcomes suggest that team-based problem solving may be effective in reducing the overrepresentation of minority students in special education (Gravois & Rosenfield, 2002, 2006).

Ikeda and Gustafson (2002) evaluated systemic and student outcomes of a multi-level problem-solving model in 29 Heartland Area Educational Agency schools. The problem-solving model implemented at Heartland AEA facilitated collaboration among general education teachers and educators serving on a multidisciplinary team (i.e., Building Assistance Team; BAT). Team members were trained to identify academic or behavioral problems, analyze reasons for the problem, develop goal-oriented interventions, implement the intervention as planned, and monitor student progress. After the second year of problem solving implementation, reports indicated that 75% of student problems were successfully resolved without the need of special education services (Ikeda & Gustafson, 2002). Important limitations were noted about these findings. For example, student outcome data was not provided in order to indicate what resolution of student problems meant. Similarly, intervention fidelity was not documented, which would provide a link between problem solving procedures and student progress.

In 1994, Minneapolis Public Schools (MPS) adopted the problem-solving model as an alternative, nonbiased approach to identifying students in need of targeted intervention and strengthening teachers' capacity to address diverse student needs (Marston, Muyskens, Lau, & Canter, 2003; Fuchs et al., 2003). MPS implemented a four-stage problem-solving approach whereby (1) teachers identify at-risk students based on systematic data, (2) teachers consult with colleagues regarding instructional and environmental modifications for the student, (3) the PST directs intervention implementation and evaluation procedures, and, (4) if appropriate, the PST considers special education evaluation. Implementation of a problem-solving model did not

significantly affect the number of students identified for special education services (Marston et al., 2003). Of note is that a previous evaluation of the MPS problem-solving model found that teachers participating in the problem-solving model provided higher quality interventions and that students were provided with special education services earlier when addressed in the problem- solving process (Reschly & Starkweather, 1997).

A meta-analysis of prereferral intervention teams (PITs) and their relation to student and systematic outcomes found PITs to be effective in positive student and systemic outcomes (Burns & Symington, 2002). Student outcomes of interest included observations of time on task, work completion, scores on behavior rating scales, and observations of target behaviors. Systemic variables of interest included referrals to special education, placement in special education, percentage of referrals resulting in disability diagnosis, number of students facing grade retention, and an increase in consulting activities by school psychologists. Seven of the nine outcome variables had large effect sizes (Cohen, 1988), suggesting that a pre-referral intervention team approach is associated with desired outcomes (Burns & Symington, 2002).

An important finding in that study was the significant difference in effect sizes between university-based studies (1.32) and field-based studies (0.54) of prereferral intervention teams and their relation to desired school and systemic outcomes. University-based studies involved training and prereferral intervention team implementation by university personnel, whereas field-based studies evaluated existing prereferral intervention teams. Only 10 studies of 72 that directly evaluated PIT models met inclusion criteria. The analysis highlighted the need for research on the integrity of existing pre-referral intervention teams and factors related to effective implementation. Future study might investigate whether a school-based PIT training delivered by individuals within the school can effectively increase the integrity of problem

solving procedures and improve student and systemic outcomes. The current study evaluates this area of research.

Barriers to Problem Solving Integrity in Schools

Research has identified a lack of implementation of research-supported prereferral team practices in schools. Teams that are under direct supervision by university research projects implement quality consultation procedures with greater fidelity than school teams without university support (Doll et al., 2005). It is critical to evaluate barriers related to limited staff commitment and support for effective problem solving procedures. Research into this area has identified various barriers including (a) lack of familiarity with recommended consultation procedures, (b) inconsistency with current staff roles, (c) perceived complexity of procedures, and (d) perceived inefficiency of procedures.

Previous study has evaluated teacher beliefs related to the prereferral team process, and identified key teachers perceptions that might account for poor implementation this model. For example, a problem-solving model approaches learning and behavioral problems from an ecological framework rather than attributing student difficulties to within-child characteristics. This approach may be incompatible with teachers who do not consider context or instruction as targets for intervention (Rubison, 2002). Additionally, some teachers consider prereferral consultation teams as burdensome and an inefficient use of time that delays service delivery to students in need of intervention.

Another component related to poor problem solving implementation in schools is a lack of administrative support and adequate intervention resources. These obstacles hinder the ability of prereferral teams to conduct effective problem solving procedures to the degree that impacts student outcomes (Rubinson, 2002). Substantial training in stages of systematic problem-solving

consultation is recommended for team members. Notably, effective pre-referral teams receive training and support in these practices by administrators (Rosenfield & Gravois, 1996). In a recent study of prereferral team integrity and barriers to quality implementation, 16 pre-referral teams received several district-level trainings in problem solving procedures and were evaluated with regard to quality of implementation and related factors (Doll et al., 2005). Teams were asked to identify barriers and facilitators to systematic problem solving team procedures. The most common barriers mentioned by team members were (a) extensive time demands of procedures and (b) unfamiliarity with procedures due to limited training. Recommendations from team members included having "on-the-job training" with individual teams by "local experts" such as school psychologists or special educators as opposed to large district-wide in-services (Doll et al., 2005). Future research should investigate teacher acceptability and adherence to high quality problem solving procedures with the involvement of school staff as trainers.

A survey of PST leadership identified that general education teachers and school counselors as most frequently appointed as case managers to PSTs (59%), in comparison to special education teachers (47%) and school psychologists (31%) (Buck et al., 2003). This trend has significant implications given that general education teachers have limited training in problem solving consultation and data analysis (Burns et al., 2008a). Therefore in order for problem solving procedures to be conducted effectively, teachers require adequate training and support in these skills.

Doll and colleagues (2005) evaluated barriers that prevent team problem-solving consultation in schools in addition to what supports enable effective problem solving procedures. Prior to receiving training in effective problem-solving procedures, teams completed a self-assessment of their adherence to essential components of problem solving. Teams rated higher

competence in (a) identifying the problem, (b) identifying treatment goals, (c) planning the intervention and (d) maintaining treatment integrity. Teams rated lower competence in components related to data collection, including (a) collecting baseline data, (b) collecting intervention integrity data, and (c) comparing pre- and post-intervention data. After training, teams submitted case examples that demonstrated their best adherence to effective problem solving procedures. Evaluation of case examples identified lower fidelity in baseline data collection, treatment integrity, and pre-/post-intervention comparisons. This finding was consistent with pre-training conclusions, suggesting ongoing barriers to problem solving implementation despite training efforts.

Treatment Integrity

Treatment integrity can be defined as the degree to which treatment agents implement treatment with accuracy and consistency (Gresham, 1989). Treatment integrity is a critical component of the problem-solving process. Without data indicating whether the treatment plan was implemented as intended, outcomes cannot be accurately interpreted. Treatment effects can only be considered relative to the degree to which it was delivered (Cordray & Pion, 2006). A "lack of response" to intervention may only be concluded if there is evidence on the degree to which the plan was implemented. Particularly in the area of consultation, it is critical to assess (a) treatment integrity of interventions developed through consultation, and (b) the degree to which such interventions resulted in behavior change of the student (Watson, Sterling, & McDade, 1997).

Integrity assessments in consultation procedures are fundamentally difficult. For example, interventions are provided in naturalistic field settings and typically are not standardized. Instead, intervention implementation may vary considerably depending on

contextual factors. Additionally, consultees (e.g., parents, teachers) are responsible for delivering the intervention, often without training or support for implementing intervention procedures as intended. Given that interventions are delivered in naturalistic settings (e.g., schools), a host of contextual factors and relationships may impact how intervention are delivered and received. Finally, consultation procedures typically develop and implement highly individualized intervention plans, weakening the evaluation of the reliability and validity of interventions (Sheridan et al., 2009).

Gresham, Gansle, Noell, and colleagues (1993) reviewed treatment integrity factors of school-based studies published between 1980 and 1990 that experimentally addressed behavioral concerns. Of the 181 studies reviewed only 14.9% (N=27) formally assessed and reported treatment integrity levels. Only 10% (N=18) claimed to have monitored treatment integrity, but did not report quantitative data. Of the studies that did include treatment integrity data, the mean level of treatment integrity was ~97% (range 75%-100%).

There is conflicting evidence regarding treatment integrity and its relation to treatment outcomes. Much of this conflict can be attributed to the various methods that are used to demonstrate treatment integrity (Sterling-Turner, Watson, Wildmon, Watkins, & Little 2001). Different measures (e.g., direct versus indirect) have varying levels of rigor, including self-report measures (low rigor), permanent products (intermediate rigor), and direct observation (high rigor). Comparison of these methods has produced significantly different results, highlighting the limitations of treatment fidelity and the importance of rigorous fidelity measures in evaluating treatment effectiveness. Wickstrom, Jones, LaFleur, and Witt (1998) compared three measures of treatment integrity of plans developed in consultation with teachers. According to teacher self-report, teachers followed the treatment plan with high integrity (average of 54%). Using

permanent products (i.e., stimulus materials) as a measure of treatment integrity, teachers demonstrated an average of 62% treatment integrity. Finally, when teachers were directly observed implementing treatment plans, treatment integrity was significantly lower—average of 4%. Without direct measures to evaluate and/or corroborate treatment integrity, consultation outcome research is difficult (Sterling-Turner et al., 2001).

Measures of Treatment Integrity

Power and colleagues (2005) describe a comprehensive framework for measuring treatment integrity. Following this framework, two dimensions of treatment integrity should be assessed: (1) an average rating for implementation of specific intervention components, and (2) a daily rating for implementation of the intervention package. There are multiple assessment methods that can be used to collect treatment integrity data. Depending on the type, location, and frequency of the intervention, consultants can use the method(s) that are most feasible and appropriate (Hagermoser-Sanetti & Kratochwill, 2008). Methods include: (a) permanent products, (b) direct observation, (c) self-monitoring, self-reporting, and behavioral interviews, and (d) manualized treatments and intervention scripts (Gresham, 1997; Lane, Bocian, MacMillan, & Gresham, 2004). Permanent products are created specifically for the intervention plan (e.g., sticker chart, checklist). In addition to providing a regular assessment of the degree to which intervention components were carried out, permanent products require minimal work on the part of the consultee and can provide an easy sampling of the target behaviors. One limitation of this method is that permanent products often do not assess all components of an intervention plan. Direct observation of treatment integrity follows the same procedures as systematically observing target behaviors (Hagermoser-Sanetti & Kratochwill, 2008). Using this method, intervention components are defined and the observer records the percentage and frequency of

intervention components observed (and/or not observed). Self-reporting methods require the consultee to record his or her degree of intervention implementation at the end of the session or day. Typical self-report measures or behavioral interviews allow the consultee to describe each intervention component using a likert-scale rating or free response. Self-report methods may not provide an accurate measurement due to either over- or under-estimation of treatment integrity (Lane et al., 2004; Hagermoser-Sanetti & Kratochwill, 2008). Finally, manualized treatments outline specific expectations and instructions for the consultee (e.g., scripted lessons) and may increase treatment integrity. The use of multiple measures of treatment integrity and evaluating convergent outcomes is recommended for outcome research (Hagermoser-Sanetti & Kratochwill, 2008).

Treatment Integrity Research

Research has evaluated various consultation strategies and their effects on treatment integrity of student intervention plans. Scripts, for example, have been shown to aid consultees (i.e., teachers) in their delivery of intervention plans (Erhardt, Barnett, Lentz, Stollar, & Reifin, 1996). Feedback has also been researched as an effective strategy for improving treatment integrity. A study Martens, Hiralall, & Bradley (1997) found feedback to be effective in increasing treatment integrity of intervention plans developed through consultation. In their study, consultants provided teachers with intervention goals and feedback, resulting in improved treatment integrity and student outcomes. Witt, Noell, LaFleur & Mortenson (1997) evaluated performance feedback and treatment integrity using a multiple baseline design with four classroom teachers. Teachers received initial in-vivo training on the intervention, and integrity data was collected using permanent products that were developed as a result of intervention implementation. Although integrity was high immediately following the initial training, integrity

levels dropped significantly within a few days of implementation; all teachers dropped below 80% integrity. Consultants then provided performance feedback to teachers on their treatment integrity, missed intervention component, and daily student performance scores. During the daily performance feedback phase, treatment integrity and student outcomes improved. With the removal of the performance feedback, treatment integrity again declined.

In a similar study, Noell and colleagues (1997) investigated treatment integrity in relation to general consultation versus performance feedback. Using a multiphase design, teachers were first instructed to use a packaged intervention (i.e., consultation only). In the second phase, teachers were provided with daily performance feedback that indicated which intervention components were implemented correctly. The final phase evaluated maintenance of treatment integrity with the removal of performance feedback. Teachers demonstrated high treatment integrity during the consultation-only phase, but integrity dropped off soon after. With the addition of performance feedback, treatment integrity increased and was maintained. When performance feedback was removed, only one teacher maintained high treatment integrity. These studies suggest that performance feedback might be an effective alternative to training with regard to increasing treatment integrity (Noell et al., 1997).

Problem Solving Consultation: Two Tiers of Treatment Integrity

"Consultation may be considered a 'two-tiered' intervention (i.e., independent variable), with fidelity issues obvious at each of the tiers" (Sheridan et al., 2009, p.478). The first tier to consider is the fidelity with which the consultation model (i.e., problem solving) is implemented. The goals of this tier are to (a) develop a plan that is guided by data and meets the needs of the client (e.g., student), (b) facilitate direct change in the consultee (e.g., teacher), and (c) indirectly improve student outcomes through consultee-delivered intervention. The second tier to consider

is the fidelity with which the plan was implemented. It is necessary to consider fidelity of both tiers when evaluating the efficacy of the consultation process. "In addition to implementing PST-developed interventions with integrity, PSTs should also examine the process with which interventions were developed by conducting a self-assessment of its process" (Burns et al., 2008a, p. 1640).

Problem solving integrity and student outcomes. Fidelity of school-based problem solving procedures and its relation to student outcomes has been evaluated in the literature. Study of the implementation of problem solving components by multidisciplinary teams has identified low and inconsistent levels of fidelity (e.g., Telzrow, McNamara, and Hollinger, 2000; Burns et al., 2008a). Telzrow et al., (2000) examined procedural integrity of eight essential problem-solving components and their relation to student outcomes. 227 problem solving teams were evaluated along these problem-solving components: (a) observable definition of target behavior, (b) baseline data, (c) measurable goals, (d) hypothesis for the problem, (e) specified intervention plan, (f) post intervention data collection, (g) intervention integrity, and (h) comparison of post intervention performance with baseline. The study evaluated integrity of problem solving procedures using two products provided by the multidisciplinary team. The first product, a Problem Solving Worksheet, listed and defined eight essential components of student-centered problem solving (see Telzrow et al., 2000). Team members recorded information pertaining to the case under each component. The second product, an Evaluation Team Report, requested information regarding intervention planning, implementation, and student progress. These products were evaluated using a 5-point likert scale, allowing the researchers to assess the degree to which problem solving components and student outcomes were executed and measured.

Results of the study indicated that PSTs typically did not carry out problem solving components with all essential elements present. For example, multidisciplinary teams typically identified and defined problem behaviors in observable terms, but failed to provide direct baseline information. PSTs generally outlined goals for intervention, but did not include target dates. Problem solving components that received the lowest integrity scores were "Hypothesized Reason for the Problem" and "Treatment Integrity." Hypotheses describing factors related to the problem were often child-centered and did not consider environmental or instructional variables. Documentation of treatment integrity and evaluation were notably low. Although some teams provided quantifiable data to indicate student progress, data was infrequently graphed to compare outcomes to baseline data (Telzrow et al., 2000). These conclusions were consistent with previous study that found infrequent collection and use of data by PSTs during intervention development, implementation, and evaluation (e.g., Flugum & Reschly, 1994). Six of the eight essential problem-solving tenets were positively correlated to student outcomes. Two problem-solving components ("Clearly Identified Goal" and "Data Indicating Student Response to Intervention") were significant predictors of student outcome (Telzrow et al., 2000).

The Problem Solving Worksheet and Evaluation Team Report were self-report measures and provided an outline and prompt for problem solving procedures. Because of this, outcomes might not reflect the teams' typical or actual problem solving implementation. Future study might more directly assess the typical implementation of problem solving components on school problem solving teams (e.g., through direct observation of problem solving meetings). An additional area of future study might evaluate the effect introduction and training on a problem-solving guide (e.g., Problem Solving Worksheet) has on increasing the procedural integrity of problem solving.

Kovaleski et al., (1999) also evaluated the integrity of a school-based problem solving model, Instructional Support Team (IST), and its relation to student outcomes. IST is a team-based model of early intervention support for students struggling academically. The IST process is a collaborative problem solving approach that follows phases of data collection, hypothesis formation, intervention establishment, and outcome evaluation (Kovaleski et al., 1999). IST trainers and field practitioners measured level of IST implementation using two instruments: (a) a 103-item checklist of essential IST elements (e.g., a team was in place) and (b) a 4-point scale rating of seven broad areas of IST implementation (e.g., design and implementation of classroom interventions). Schools who demonstrated "high implementation" (i.e., top 30% of the sample) of the IST process experienced significant gains in student outcomes including academic learning times, time on task, task completion, and task comprehension. Schools with "low implementation" (i.e., bottom 30% of the sample) of IST procedures did not experience these gains, and instead, showed similar patterns to schools without IST procedures in place (Kovaleski et al., 1999). This finding highlights the importance of the evaluation of problem solving team implementation integrity. Although the study did not provide a description of specific procedures for data collection of IST implementation integrity (i.e., direct observation, interview, self-report), future study in this area is recommended.

There has also been research investigating the impact of increasingly inclusive behavioral consultation procedures on student outcomes. In a study by Fuchs and Fuchs (1989) 48 teacher-consultant dyads were randomly assigned to one of three variants of behavioral consultation intervention or a control group. Teachers received intervention in the form of consultation for their "most difficult to teach student." In the least intensive variant of the intervention (BC 1:

Problem Identification and Problem Analysis), the consultant and teacher collaboratively identified and analyzed the problem, but the consultant did not provide assistance in intervention delivery, monitoring, or evaluation. The next variant of the behavioral consultation intervention (BC 2: Problem Identification, Problem Analysis, and Plan Implementation) required that the consultant also visit the classroom at least twice in order to observe the teacher implementing the intervention and provide corrective feedback. Consultants did not formally evaluate the student intervention plan. The most intensive variant of behavioral consultation (BC 3) incorporated the first three stages, and also required the consultant and teacher to evaluate intervention effects.

Student outcomes in response to the classroom intervention were measured using teacher ratings and a minimum of four classroom observations (e.g., time-interval recording, A-B-C charts). The differences between the pre-intervention and post-intervention teacher ratings for the behavioral consultation groups were significantly different from the control group. Results indicated that 88% of students in BC 1, 100% of student in BC 2, and 88% of students in BC 3 received more positive teacher ratings following intervention. Half of the students in the control group received improved teacher ratings. These results were slightly inconsistent with observational data collected by consultants. Target behaviors were reduced for 75%, 88%, and 63% of students in BC 1, BC 2, and BC 3 respectively; however, only 29% of control group students demonstrated improved target behaviors. The study reported notable observations with regard to student intervention development and implementation. For example, only four of the eight teachers assigned to the most intensive behavioral consultation intervention completed all stages of the process, citing competing job responsibilities as barriers to implementation. Additionally, 61% of the teachers did not keep a written record of student behavior, which limits the degree to which intervention integrity and student outcomes can be evaluated.

Improving Problem Solving Integrity and Unique Contribution to the Literature

Burns and colleagues (2008a) evaluated the integrity of consultation procedures (i.e., problem solving) in response to a performance feedback intervention. In their study, problem-solving teams (PST) from three elementary schools were evaluated using a 20-item problem solving fidelity checklist created from the literature. Burns and colleagues (2008a) investigated the effect performance feedback had on increasing problem solving fidelity in school teams. Extensive study has demonstrated the efficacy of performance feedback on improving and sustaining school-based service delivery (e.g., Mortenson & Witt, 1998; Witt, Noell, LaFleur, & Mortenson, 1997). When graphs are used to demonstrate child outcomes and intervention implementation, performance feedback effectiveness is more consistent (Noell, Gresham, & Gansle ,2002). Burns' (2008a) study extended research on the effectiveness of performance feedback in improving intervention integrity by evaluating the effect performance feedback has on procedural integrity of problem solving teams.

Using a multiple-baseline design, PST integrity data was collected using the problem solving observation checklist. Performance feedback was provided to each team member during the intervention phase by distributing copies of the observation checklist along with graphed data of problem solving team observations. Graphs depicted components that the team previously demonstrated or failed to demonstrate during problem solving meetings. Reinforcement of correct implementation and discussion about missing components were included in the performance feedback sessions. Observation data was collected at each meeting following the delivery of performance feedback. All three schools demonstrated significant and rapid increases in problem solving procedural integrity after performance feedback implementation. Three essential components from the problem solving observation from were consistently missing from

PSTs, despite being provided with performance feedback. These included: (a) a progress monitoring data are objective and directly linked to the problem, (b) a progress monitoring plan is developed to monitor effectiveness and progress, and (c) an implementation integrity plan is developed.

Burns et al. (2008a) identified several limitations and areas of future study in the topic problem-solving integrity. These ideas are addressed in the current study. For example, although a causal relationship between performance feedback and integrity of problem solving procedures was not demonstrated, Burns and colleagues hypothesized that the informational aspect of performance feedback resulted in increased problem solving implementation. Previous research suggests that a limited understanding of essential problem solving components and the apparent complexity of these procedures are related to poor problem solving implementation (Doll et al., 2005). Burns et al. (2008a) was limited in that it did not provide a preliminary problem solving information component to PSTs prior to providing performance feedback. The current study incorporates a structured training component that includes problem solving information and training in a manualized problem solving protocol.

Secondly, Burns et al. (2008a) suggested providing direct training to PSTs, including focused performance feedback, modeling, or coaching on specific problem solving components teams demonstrated particular weakness in. The current study utilized ongoing evaluation of problem solving integrity to identify specific problem solving steps and procedures for feedback and targeted training. Finally, Burns and colleagues focused strictly on the integrity of first two stages of problem solving: problem identification and problem analysis. Integrity for plan implementation and evaluation were not evaluated. The current study addresses this limitation by

providing a problem solving intervention that addresses all four stages of the problem solving process. The procedural integrity of the entire problem solving process was measured.

A study by Lundahl (2010) extended the focus of the Burns et al., (2008) study and addressed some of its limitations. Using a multiple-baseline design across three elementary schools, procedural integrity of problem solving teams was evaluated using an observation checklist adapted from Burns et al. (2008a). Teams participated in two phases of treatment aimed at increasing problem-solving procedural integrity: performance feedback and targeted coaching. During the performance feedback phase, teams were provided graphs listing the scores they received from previous problem solving meeting. Scores indicated the degree to which each of the essential 25 components of problem identification and problem analysis were met. In the second phase of treatment, PSTs received targeted coaching in addition to performance feedback. Coaching included modeling, rehearsal, and prompting of specific problem solving components. Two of the three participating school teams received both treatment phases. Both schools demonstrated an increase in procedural integrity of problem solving during the performance feedback and coaching phases. The remaining school received only the coaching treatment phase, but also evidenced improved integrity during this phase.

Lundahl's (2010) study also extended previous study by evaluating the relationship between (a) procedural integrity of problem identification and analysis and (b) intervention implementation and evaluation. The study reported a non-significant correlation between the first two stages of problem solving and the final two stages of problem solving. It is important to note that although there was an anticipated relationship between these stages of problem solving, treatment for PSTs targeted only the first two stages of problem solving. A limitation of Lundahl's (2010) study, like Burns et al., (2008a), is that problem solving intervention did not

provide direct training procedures in plan implementation and plan evaluation. The current study addresses this limitation by incorporating intervention components that target all four stages of the problem solving process.

Finally, Lundahl (2010) extended previous study by evaluating the degree to which overall problem solving integrity predicted student outcomes. Although the sample size of the study was small (N=3), integrity of overall problem solving procedures was predictive of student outcomes, accounting for 33% of the variance of student outcomes. The current study evaluates the correlation between problem solving integrity and positive student outcomes.

Treatment Acceptability

Treatment acceptability is considered a prerequisite to treatment integrity, and therefore critical to treatment success (Elliott, 1988). Treatment acceptability, treatment integrity and treatment effectiveness may be understood as reciprocal components (Bergan & Kratochwill, 1990). The literature discusses multiple factors related to treatment integrity, many of which correspond to qualities of treatment acceptability. These include (a) difficulty of treatment, (b) time intensiveness of treatment, (c) number of individuals required for treatment implementation, (d) degree of resources required for treatment, and (e) acceptability of treatment by treatment agent (Gresham 1989). Treatment acceptability is defined as the degree to which an individual considers a procedure to be fair, reasonable, appropriate, and unobtrusive (Kazdin, 1980). Research has found that intervention integrity increases when intervention agents have evidence that the treatment if effective (VonBrock & Elliott, 1987). This has important implications for problem solving procedures since ongoing assessment and data-based decision making are key components of the process. Teams that conduct data-based problem solving continuously review student response to treatment and evaluate treatment effectiveness. Teachers and other PST

members may therefore find problem solving procedures both effective and acceptable, increasing the likelihood of procedural integrity. "Although treatment acceptability holds a great deal of intuitive appeal, there is little evidence to support that it is a necessary condition for high treatment integrity" (Sterling-Turner & Watson, 2002, p. 42). Therefore an emphasis on effective training in intervention implementation is recommended.

Professional Development

School districts must provide effective professional development to staff in components related to RtI and problem-solving in order to improve the integrity of their service-delivery models. The sustainability and success of school initiatives such as RtI depend on quality of professional development provided to school staff (Coordination, Consultation, and Evaluation [CCE], 2004). Professional development is a continuous process of mentoring, coaching, and feedback aimed at improving professionals' abilities to meet the needs of students (Little & Houston, 2003). School-based professional development should focus on supporting educators as they acquire knowledge and skills and reflect on adapting new strategies into their teaching contexts.

The Office of Special Education Programs (OSEP) funded six research centers to facilitate research on prevention and early intervention models nationwide. Collectively, these research centers evaluated their professional development efforts and reported their findings in a Professional Development Guidebook. Researchers identified common types of professional development activities provided to schools, but did not systematically evaluate the effectiveness of these strategies. Common activities provided by the research centers included group discussions, review and modeling of interventions, role-plays, coaching, collaborative problem solving, and case study review.

Research has identified core features of effective professional development. Garet, Porter, Desimone, Birman, & Yoon (2001) surveyed over 1,000 educators regarding professional development characteristics and their effects on teacher learning. The researchers considered the form, duration and collective participation of teachers' professional development experiences. Core features of professional development opportunities were also measured, including (a) the degree to which activities had a content focus (i.e., strengthens teachers' content knowledge), (b) the extent to which the activity offers opportunities for active learning (i.e., allows teachers to engage in meaningful analysis of teaching and learning), and (c) the degree to which the activity promotes coherence (i.e., consistency with state standards and communication among teachers). All three core features of professional development activities were associated with increased educator knowledge and skill. Additionally, enhanced knowledge and skills were found to positively influence change in instructional practices. Important to note, results indicated that time span and number of contact hours has a significant positive influence on opportunities for active learning, coherence, and content knowledge. Therefore higher quality professional development typically involves a substantial amount of time and contact hours (Garet et al., 2001).

Equally important is research in the area of consultant training. Similar to conclusions regarding training of consultees, direct training strategies have been found to be the most effective for consultants training to conduct consultation (Kratochwill, Sheridan, Rotto, & Salmon, 1992; Kratochwill et al., 1995). Consultee training can be categorized as indirect or direct training procedures. Indirect training procedures may include didactic instruction or written intervention description. Direct training procedures include strategies such as modeling, role-playing, rehearsal and feedback (Sterling-Turner et al., 2002). "The level of training that

prereferral intervention team members (e.g., school psychologists, school counselors, and classroom teachers) in the field receive is largely unknown or suspected to be insufficient" (Burns, et al., 2005). Training is recommended in the areas of curriculum-based assessment, behavioral assessment, differentiated instruction, collaboration, and consultation in order to successfully implement problem solving teams in school (Kovaleski, 2002).

The literature has stressed the importance of using direct training methods in consultation (e.g., modeling, role-playing, rehearsal, and feedback), as these methods increase the likelihood of skill generalization. The effectiveness of competency-based training in consultation skills has been evaluated and supported by a series of studies that evaluated the effectiveness of a competency-based training package for teaching consultation interview skills (e.g., McDougall, Reschly, and Corkery, 1988; Kratochwill, VanSomeren & Sheridan, 1989, Kratochwill, et al., 1992). Competency-based training includes the trainer identifying specific learning objectives and providing training in those domains (Kratochwill et al., 1992). In these types of direct training procedures, trainers may provide the trainee with instructions, modeling, opportunities for rehearsal, and performance feedback. For example, the training package in a study by Kratochwill et al. (1995) provided training in consultation interview skills using rehearsal and feedback components. Readings, skill rehearsal and feedback were focused on skills in problem identification and problem analysis. Generalization and integrity of consultation interview skills were evaluated by measuring analog interviews. All consultants met or surpassed the mastery level of 80% implementation integrity (i.e., percentage of interview objectives met). Although the referenced studies focused on training and implementation of problem solving stages, they were directed at one-on-one behavioral consultation (i.e., consultant-teacher). This area of study can be extended to problem solving teams in which the team (along with the referring teacher)

collaboratively carries out problem solving stages. Training would be directed at the team as a whole, and evaluation of problem solving procedural integrity might be evaluated. The current study aims to extend this area of research by delivering a problem solving intervention package to school-based problem solving teams.

Problem Solving Consultation Training Tool: Outcomes: PME

Outcomes: Planning, Monitoring, and Evaluating (Outcomes: PME; Stoiber & Kratochwill, 2002) is a tool that can assist in the development, implementation, and evaluation of student academic and behavioral interventions. Outcomes: PME can be used by various educational professionals, including teachers, principals, consultants, and psychologists. Outcomes: PME is modeled after a problem-solving framework, whereby problems are identified, goals and benchmarks are established, intervention and progress-monitoring procedures are designed, and outcomes are evaluated. The tool follows a data-based decision making format, and may be used for individual student or system programming and evaluation. "The primary intent of Outcomes: PME id to enhance professionals/ understanding of student or client progress and to encourage them to be active in gathering evidence to support their decisions" (Kratochwill & Stoiber, 2002, p. 1). School teams can use Outcomes: PME to organize their intervention development and decision-making information. The tool follows five systematic steps of intervention planning, monitoring, and evaluation. These include: (1) identify concern, describe context, and establish baseline, (2) set meaningful goal(s) and benchmarks, (3) plan the intervention and specify progress-monitoring procedures, (4) monitor progress and analyze data, and (5) evaluate intervention outcomes and plan next steps. Several components within this tool are consistent with best practices for student programming. For example, Outcomes: PME encourages professionals to consider the context of the concern (e.g., classroom

environment, expectations, and instructional match) rather than focusing strictly on within-child characteristics. Outcomes: PME has been recommended as a protocol for training and practice in intervention planning and monitoring (Kratochwill & Shernoff, 2004). The current study utilized Outcomes: PME as a protocol for problem-solving training, implementation, and evaluation for school-based problem-solving teams.

Summary

To date, there has not been extensive research evaluating problem solving team integrity and it's impact on student outcomes. Studies that have evaluated problem solving team integrity have identified low and inconsistent implementation of core problem solving components, regardless of the use of direct training procedures (e.g., performance feedback, targeted coaching). Much of the research directed at improving problem solving integrity has used university-based personnel as trainers, limiting the degree to which school personnel can feasibly sustain and generalize problem solving consultation practices. Additionally, research that has facilitated the use of school staff as trainers (e.g., Burns et al., 2008; Lundahl, 2010) has been limited in its focus on preliminary problem solving stages (i.e., problem identification and analysis). Such research has failed to promote and evaluate ongoing student plan implementation and evaluation. The current study aims to provide a comprehensive problem solving intervention to teams and referring teachers that addresses all stages of problem solving and facilitates continuous collaboration among referring teachers and problem solving team members in providing effective interventions to meet student needs.

Research Questions and Hypotheses

Question 1: What is the impact of providing problem-solving teams with a problem solving intervention, consisting of (a) problem-solving information and training in the use of a manualized problem-solving protocol, (b) performance feedback, and (c) targeted coaching relative to the teams' procedural integrity of conducting problem solving stages?

Hypothesis 1: It is hypothesized that the problem solving intervention will increase teams' procedural integrity of conducting problem solving stages (Burns et al., 2008a, Lundahl, 2010).

Question 2: Does higher problem solving procedural integrity correlate to improved student outcomes?

Hypothesis 2: It is hypothesized that engaging in problem solving with integrity will correlate to improved student outcomes, as measured by baseline and progress monitoring data of problem solving cases (Kovaleski et al., 1999; Fuchs and Fuchs, 1989).

Question 3: What impact does the problem solving intervention have on problem-solving team members' perceptions of their (a) knowledge/familiarity and (b) ability to implement problem-solving components?

Hypothesis 3: It is hypothesized that the problem solving intervention will increase problem solving team members' perceptions of their knowledge/familiarity and ability to implement problem-solving components (Doll et al., 2005).

Question 4: What is the problem solving team acceptability of each problem solving intervention component?

Hypothesis 4: It is hypothesized that educators/team members will find the problem solving intervention acceptable (i.e., average score of at least 5 on the Problem Solving Acceptability Questionnaire) with regard to usefulness, feasibility, and appropriateness of intervention.

Exploratory Question 1: What types of barriers do educators/team members identify as limitations to conducting "best practice" problem solving procedures?

Exploratory Question 2: Which problem solving components do educators/team members identify as areas of strength and weakness, with regard to their team implementation of problem-solving components?

CHAPTER 3

Methods

Participants and Settings

School and Problem-Solving Team Characteristics

Participants included problem-solving team (PST) members, referring classroom teachers, and referred students from three elementary schools in the same Midwestern state. Participating schools were a part of the same school district, and were located in suburban areas. All components of the study occurred within the school building setting. See Table 1 for school characteristics. The first school (hereafter referred to as School A) was located in a suburban area of the state and enrolled 429 students during the 2011-2012 academic year. This school, comprised of students in 4K through 5th grade, was predominantly Caucasian (80%) but also reported the highest percentage of Hispanic students (7%) compared to other participating schools. School A also reported small percentages of African American (3%), Asian (2%), American Indian (1%), and Biracial (6%) students. During the 2011-2012 academic year, School A provided special education services to 8.4% of its students. Approximately 4% of its student population comprised of English Language Learners, and 25% of the student population were eligible for free and reduced lunch. The problem solving team in this school met 2-4 times per month and consisted of the principal, school psychologist, special education teacher, and two regular education teachers. The second school (hereafter referred to as School B) served students in 2nd though 4th grade and reported 430 students in the 2011-2012 academic year. School B was comprised of 85% Caucasian, 5% Hispanic, 3% African American, 3% Asian, 0.2% American Indian, and 5% Biracial students. During the 2011-2012 academic year, School B provided special education services to 3.5% of its students. Approximately 4% of its students were English

Language Learners and 22% were eligible for free and reduced lunch. The PST at School B was comprised of two school psychologists, an administrator, and a regular education teacher. The PST met 1-4 times per month. The third school (hereafter referred to as School C) served students 4K through 2nd grade and reported 409 students in the 2011-2012 academic year. The student population was comprised of 82% Caucasian, 6% Asian, 4% African American, 3% Hispanic, and 5% Biracial students. School C served the highest percentage of students in special education (10%), when compared to the other participating schools. Approximately 18% of its student population was eligible for free and reduced lunch, and 6% were English Language Learners. School C's PST was comprised of two school psychologists, an administrator, a regular education teacher, and a special education teacher. The PST met 1-2 times per month.

The PST meetings at each school were facilitated by the principal, school psychologist, and at least one other professional (e.g., special education teacher, reading specialist). These professionals were present at every PST meeting, and consequently, were considered the core team members of the PSTs at each school.

Table 1
Characteristics of Participating Schools

	School A	School B	School C
*Student Enrollment	429 Students	430 Students	409 Students
* Student Ethnicity	Caucasian: 80.2% Asian: 1.9% African American: 3.3% Hispanic: 7.2% American Indian: 1.2% Biracial: 6.3%	Caucasian: 84.7% Asian: 3.0% African American: 2.6% Hispanic: 4.7% American Indian: 0.2% Biracial: 4.9%	Caucasian: 82.2% Asian: 5.9% African American: 3.7% Hispanic: 3.4% American Indian: 0.2% Biracial: 4.6%
*Percentage of Students Enrolled in Special Education	8.4%	3.5%	10.8%
*Gender	Female: 49% Male: 51%	Female: 50.9% Male: 49.1%	Female: 45.5% Male: 55.5%
*Percentage of Students Eligible for Free/Reduced Lunch	25.2%	21.6%	18.3%

*Percentage of English Language Learners (ELLs)	4%	4.4%	5.6%
*Percentage of Students at Each Grade Level	Pre-K: 8.4% K: 18.9% 1st: 14.2% 2nd: 21.4% 3rd: 13.5% 4th: 10% 5th: 13.5%	2nd: 21.9% 3rd: 41.2% 4th: 37%	Pre-K: 20% K: 31.5% 1st: 31.5% 2nd: 16.9%

*These data were retrieved from the Wisconsin Information Network for Successful Students (WINSS; 2012).

Participant Recruitment

Schools. School administrators and/or school psychologists from each of the three schools voiced interest in the project because of their commitment to providing professional development around effective student programming and improving student outcomes as part of RtI and PBIS initiatives in their districts. Each of the three participating schools had representative members at a regional problem-solving consortium. The primary investigator presented an overview of the study at a problem-solving consortium meeting. School representatives expressed interest in the study and voiced concern about the integrity with which the problem-solving process at their respective schools was implemented. Participating schools were part of the same district of two schools in Lundahl's (2010) study, and were interested in participating due to the benefits that the previous project had on initiative-related procedures. Participating PST members in this study did not participate in the study by Lundahl (2010). In July 2011, written consent was obtained by an administrator (i.e., principal) at each participating school. Written consent from a school administrator was required as part of the IRB process, and was obtained from school administrators of each participating school in July 2011.

Problem Solving Team Coaches. In July 2011, consent forms (see Appendix A) were distributed to the school psychologists at the three participating schools, asking for their

participation as a problem-solving team coach. One problem solving coach (i.e., school psychologist) was identified for each school so that each problem solving coach was responsible for one school. This aspect of the study was important for internal validity—problem-solving coaches responsible for more than one participating school might confound intervention outcomes.

To serve as the problem solving coach, school psychologists provided written consent, agreeing to (a) attend a single-session problem-solving training with the primary investigator and all school problem solving coaches, (b) communicate problem solving team meeting schedules to the primary investigator and graduate student observers scheduled to attend the meetings, (c) provide single-session problem-solving training to their PST, (d) collect documents relevant to project aims (e.g., completed Outcomes: PME protocols, problem solving procedural integrity rubrics, and surveys, (e) communicate regularly with primary investigator regarding intervention steps, (f) provide ongoing intervention components to problem solving team, and (g) be available for the researchers to contact via email or telephone, at their convenience, if questions or concerns arose. For schools that had more than one school psychologist, they elected to either share the role as problem solving team coach or elect one primary coach. Each school elected to have one school psychologist serve as the PST Coach. Although School B and School C had two school psychologists on their team, one was elected to serve as the primary contact and carry out the roles of the PST Coach. To compensate the school psychologists for their time and commitment to the project, each received $300 at the end of the data collection phase. Table 2 provides demographic information about the school psychologist participants, who served as their school's respective problem solving team coach.

Table 2
Characteristics of Participating School Psychologists/Problem Solving Team Coaches

	Problem Solving Team Coach A	**Problem Solving Team Coach B**	**Problem Solving Team Coach C**
Job Title	School Psychologist	School Psychologist	School Psychologist
Ethnicity	Ed.S.	Ed.S.	M.S.
Highest Degree	Female	Female	Female
School(s) Coached	A	B	C

PST Members. At the beginning of the 2011-2012 academic year, PST members were provided consent forms (see Appendix B) asking them to participate in the study. The consent form asked whether the team member was willing to: (a) participate in a single-session problem-solving intervention with their school's respective problem solving coach, (b) be observed during problem solving meetings, (c) complete a questionnaire about how acceptable and useful he/she found the problem-solving intervention, and (d) complete a questionnaire evaluating team member knowledge of problem solving components and ability in problem solving implementation. Completion of these tasks required minimal time for participating educators (i.e., approximately two hours). To compensate the school psychologists for their time and commitment to the project, each problem solving team member received $50 at the end of the data collection phase. Table 3 presents demographic data for participating core problem solving team members (including team coaches) across each school.

Table 3
Characteristics of Participating Core Problem Solving Team Members

	School A (n=5)	**School B (n=4)**	**School C (n=5)**
Job Titles	School psychologist (1) Administrator (1) Regular educator (2) Special educator (1)	School psychologist (2) Administrator (1) Regular educator (1)	School psychologist (2) Administrator (1) Regular educator (1) Special educator (1)
Ethnicity	Caucasian 100% African American 0% Hispanic 0% Asian 0% American Indian 0%	Caucasian 100% African American 0% Hispanic 0% Asian 0% American Indian 0%	Caucasian 100% African American 0% Hispanic 0% Asian 0% American Indian 0%
Gender	Female 100% Male 0%	Female 100% Male 0%	Female 100% Male 0%

Referring Teachers. Referring teachers do not having standing positions on school problem-solving teams. Instead, they seek consultation from the PST on a case-by-case basis, and are typically present for one initial problem solving meeting as well as a follow-up meeting(s) to discuss intervention progress. Consent was obtained by referring teachers prior to the initial problem-solving meeting (Appendix C). Teachers consented to (a) be observed during problem-solving meetings, and (b) share de-identified intervention data (e.g., progress monitoring data) and feedback regarding student's progress/outcomes. Six referred students were not included in the study due to declined teacher consent (3 teachers in total). Each of these teachers were from the same school, School B.

Students. Although students referred to PSTs were indirect participants according to the procedures of this study (i.e., students had no direct contact with researchers and did not receive direct intervention as part of this study), university IRB considered students participants. Therefore, parental consent was obtained prior to each student's inclusion in the study. Data collected by PST members and referring teachers (e.g., meeting notes, progress monitoring data, treatment integrity data, outcome measures) did not contain individually identifying data (i.e., student name, ethnicity, student ID). These data were collected with the intention of evaluating problem solving procedure effectiveness at a system and individual student level. Parents of students referred to the problem solving team were provided with consent forms (Appendix D), allowing the researchers to have access to de-identified progress-monitoring and intervention outcome data. Procedures in this project supported the PST process already in place in participating schools. Assessment and intervention services provided to students through the problem-solving process were a part of typical school procedures and were delivered by school personnel as part of their typical job responsibilities. Six students were not included in the study

due to declined parental consent (6 parents in total). One parent from School A, one parent from School C, and four parents from School B declined participation. See Figure 1 for flowchart regarding final student participant sample. See Table for 4 for consenting responsibilities/allowances of all participants.

Figure 1
Obtaining Student Participant Sample

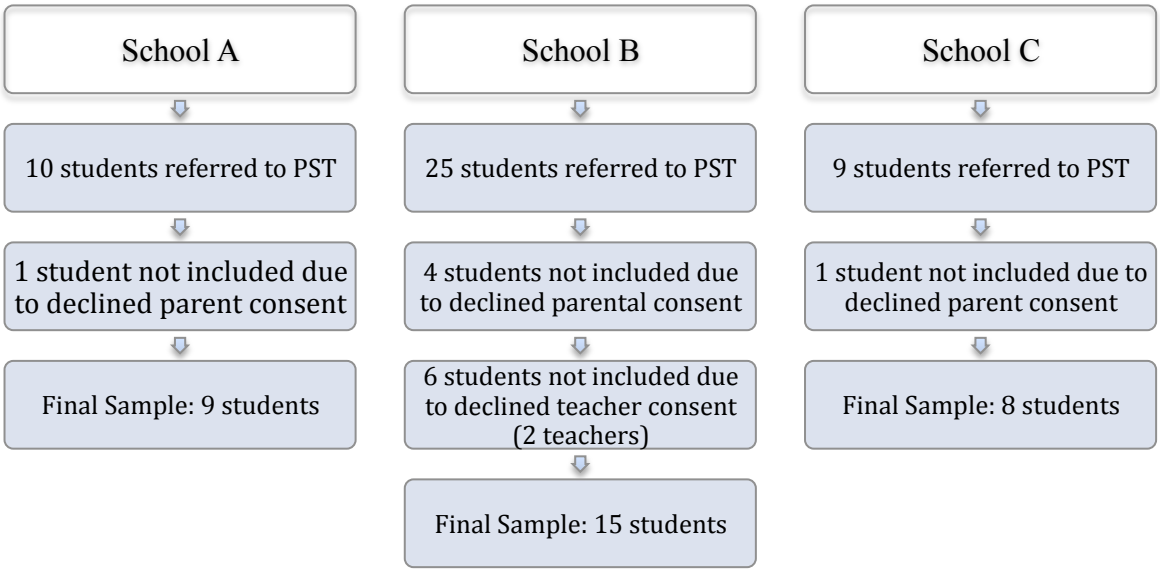


Table 4
Consenting Responsibilities/Allowance of Participants.

Participant	Consenting Responsibilities/Allowances
PST Coaches	1. Attend a single session of problem-solving training with the primary investigator (approximately 2 hours). 2. Communicate problem solving team meeting schedule to the primary investigator. 3. Provide single-session problem-solving training to their PST. 4. Collect documents relevant to project aims (e.g., completed Outcomes: PME protocols, student plan and outcomes reports, and surveys). 5. Communicate regularly with primary investigator regarding intervention steps. 6. Provide ongoing intervention components to problem solving team. 7. Be available for the researchers to contact via email or telephone.

Problem Solving Team Members	1. Participate in a single-session problem-solving intervention with their school's respective problem solving coach. 2. Be observed during problem solving meetings. 3. Complete problem solving intervention acceptability questionnaire. 4. Complete a questionnaire evaluating team member knowledge of problem solving components and ability in problem solving implementation.
Referring Teachers	1. Be observed during problem solving meetings. 2. Complete problem solving intervention acceptability questionnaire. 3. Share de-identified intervention data (e.g., progress monitoring data) and feedback regarding student's progress/outcomes.
Students	1. Share de-identified progress-monitoring and outcome data with researchers (with parent consent).

Measurement

This study followed a train-the-trainer model, whereby problem solving team coaches received preliminary training from the primary investigator and subsequently delivered the problem solving intervention to their respective teams. Problem solving teams from each of the three participating schools received a problem-solving intervention package consisting of (a) problem-solving information and training in a manualized problem solving protocol (i.e., Outcomes: PME), (b) performance feedback, and (c) targeted coaching. As will be discussed, due to time-constraints and the multiple baseline design, each school did not receive all of the intended intervention components. The following dependent variables were of interest in the study: (a) procedural integrity of the problem-solving process (as evidenced by completion of Outcomes: PME protocol), (b) knowledge and skill of problem-solving components (as evidenced by self- report questionnaire), (c) student outcomes (as evidenced by Outcomes: PME protocol), and (d) PST member and teacher acceptability of the problem-solving process (as evidenced by acceptability questionnaire).

Problem Solving Team Coaches Training

PST Coaches (i.e., school psychologists) from each of the three participating schools received preliminary problem solving training so that they would be able to deliver intervention components to their PST during the treatment phase and provide ongoing support to their team during the problem solving process. Directly prior to each school's implementation of the problem solving intervention (i.e., January 2012, February 2012, and March 2012), the school's respective problem solving coach received preliminary problem solving training materials. The purpose of this schedule was to prevent risks to validity if all problem-solving coaches were to have received training at the outset of the study. Preliminary training materials included a narrated PowerPoint presentation focused on the topic of problem solving integrity and the use of *Outcomes: Planning, Monitoring, Evaluating* (Outcomes: PME; Stoiber & Kratochwill, 2002), a manualized tool for the development, implementation, and evaluation of interventions. Each problem solving coach was given instructions to review the training materials prior to presenting the first intervention component to their remaining team members. PST coaches notified the primary investigator when they had independently reviewed the intervention materials. This strategy also provided an opportunity for coaches to relay any questions or concerns with regard to technical assistance or components of the intervention. Coaches did not report any difficulties with viewing or using the intervention materials. PST Coaches received individual training on the problem solving intervention approximately one week prior to intervention implementation for their team. School A's PST Coach received training in January 2012, School B's PST Coach received training in February 2012, and School C's PST Coach received training in March 2012. Implementation of the first problem solving team intervention (see below) occurred at the first problem solving session following each PST Coach's training.

Problem-Solving Team Intervention

Component 1: Problem Solving Information. The first component of the problem solving intervention included problem solving professional development and introduction to a problem-solving protocol (i.e., Outcomes: PME). After reviewing the preliminary problem-solving training materials, the PST coach presented their PST with the narrated PowerPoint presentation and Outcomes: PME protocol. The presentation focused on the problem-solving process, including (a) an overview of best practices of problem solving, (b) problem solving integrity information and research findings, (c) an overview of Outcomes: PME as a problem solving protocol, and (d) practice in the use of Outcomes: PME protocol using sample vignettes. The first training component took approximately 45 minutes to complete, including viewing the presentation and completing embedded activities. Problem-solving team coaches were instructed to assist their team during the embedded activities by providing scaffolding and feedback as needed. Integrity of implementation of the first training component was measured through phone call confirmation with the primary investigator. PST Coaches confirmed that their PST had viewed the PowerPoint presentation, reviewed the Outcomes: PME protocol and completed each of the four team activities during the training. See Appendix E for training materials used in this component.

Component 2: Problem Solving Performance Feedback. After the PST began incorporation of Outcomes: PME in their problem solving meetings, the primary investigator reviewed completed Outcomes: PME protocols. Researchers obtained copies of completed protocols of each case after the intervention plan had been implemented for a sufficient amount of time (i.e., at least 4 weeks). Completed Outcomes: PME protocols were scored using the *Problem Solving Integrity Checklist* (Appendix F). Two sessions of performance feedback were

provided to the PST, regardless of overall integrity score. The PST coach provided the feedback following a script developed by the first author. An example script and feedback handout are provided in Appendix G. During the performance feedback sessions, problem solving procedural integrity data from previous problem solving meetings were graphed and reviewed with the PST. The feedback included graphed problem solving integrity scores from previous problem solving sessions. Three graphs depicted the team's overall problem solving percentages from previous problem solving sessions in addition to procedural integrity percentages for the first two stages of problem solving (i.e., problem identification and problem analysis) and final two stages of problem solving (i.e., plan implementation and plan evaluation). The feedback also included tables of each of the 25 problem solving components and their operational definitions. The tables indicated which problem-solving components the team successfully addressed during the previous problem-solving meeting and which components were partially-implemented or absent during the previous problem solving meeting. Problem solving feedback sessions took approximately 15 minutes to review with the PST. Integrity of implementation of this training component was obtained through a PST coach-completed checklist that accompanied the performance feedback script. After completing each section of the script, the PST coach placed a check mark under the item to indicate that she had indeed discussed that item with the team following the script. Immediately following the performance feedback session, the PST conducted their next problem-solving meeting.

Component 3: Problem Solving Targeted Coaching. The coaching phase was introduced after the PST had received two performance feedback sessions and subsequent Outcomes: PME protocols were scored. Using the *Problem Solving Integrity Checklist*, areas of improvement were identified for targeted coaching. Integrity scores for each step of

Outcomes: PME were compared across previous sessions (i.e., percentage of components fulfilled for each step) and the PST received coaching on the step with the lowest integrity score. For example School A demonstrated the lowest integrity on Step 3: "Setting meaningful goals and benchmarks;" (Appendix H) therefore, the PST coach delivered a brief coaching session focused on that problem-solving step. During the coaching session, the following occurred: (a) reviewed the problem-solving step and its essential components, (b) modeled examples of successful completion of the problem-solving step, and (c) provided an opportunity for guided practice and feedback using a case example. The PST coach was given a script for the coaching session, developed by the trainer. Integrity of this training component was evaluated using a PST coach-completed checklist that accompanied the targeted training script. The coaching session lasted approximately 15 minutes, and was immediately followed by subsequent problem solving sessions. During these meetings, the PST coach was advised to prompt teams in the specific problem-solving stage for which they received coaching.

Dependent Variables

Problem-Solving Integrity: Baseline

Measures Used. During baseline, problem-solving integrity was evaluated using the following procedures/measures: (1) in vivo observations of problem solving meetings, and (2) the *Student Plan and Outcomes Report* (Appendix I). Together, these measures provided information that would be used to complete the *Problem Solving Integrity Checklist*, which gave an overall problem solving integrity score for each case. The *Problem Solving Integrity Checklist* is a 25-item checklist adapted from the Outcomes: PME Procedural Checklist (Appendix J, the Problem-Solving Team Process Fidelity Checklist (Burns et al., 2008a; Appendix K), and The Problem Solving Observational Checklist (Lundahl, 2010; Appendix L). The *Problem Solving*

Integrity Checklist is comprised of two sections: (1) Plan Identification and Analysis Integrity, and (2) Plan Implementation and Evaluation Integrity. During the baseline phase, trained graduate student observers completed section one of the checklist (i.e., Problem Identification and Analysis Integrity) while observing problem solving meetings. Each problem solving meeting was attended by at least one observer: either the primary investigator or a trained graduate student observer. The primary investigator collected completed observational checklists directly from the observers. This measure provided an integrity score for the first two stages of the problem solving process (i.e., Problem Identification and Problem Analysis). The *Student Plan and Outcomes Report* is adapted from the Student Outcomes Report (Lundahl, 2010), and is designed to aid teachers as they reflected on the plan implementation and evaluation steps of problem solving. Using completed Student Plan and Outcomes Reports, the primary investigator scored section two of the checklist (i.e., Plan Implementation and Evaluation Integrity). Together, problem solving session observation and the Student Plan and Outcomes Report provided an overall integrity score for each case, using the *Problem Solving Integrity Checklist*. Specifically, 25 items (i.e., problem solving components) were scored, each of which could obtain a score of 0 (lack of implementation), 1 (partial implementation), or 2 (implementation with integrity). For each problem solving case, teams achieved a total integrity score of 50 if all components of the problem solving process were successfully implemented. Table 5 provides a general scoring description for each item on the *Problem Solving Integrity Checklist*. The 25 items found on the problem Solving Integrity Checklist are listed in Table 6, along with their operational definitions and scoring examples.

Table 5
Problem Solving Integrity Checklist: General Scoring Criteria

0= The team did not implement the component
1= The team attempted to implement the component, but require additional support to implement with better integrity
2=The team implemented the component with strong integrity and understanding and do not require additional support in this area

Table 6
Operational Definitions/Example of the Items on the Problem-Solving Integrity Checklist

*Items 1-16 = *Problem Identification and Analysis*	
Problem Solving Components	**Degree of Implementation**
1. Problem solving team members identified and purpose of meeting is articulated.	**0**: Component not implemented **1:** One of the components below is missing. **2:** Team members are listed on form *and* purpose of meeting is identified on form.
2. Behavioral and/or academic concern defined in observable, measurable terms.	**0**: Component not implemented **1:** Problem is vaguely defined. Only part of the problem is objectively defined. (e.g., Problem: Carrie is out of her seat during individual seatwork time (*objective*) and messing around at her desk (*not objectively defined*). **2:** Entire problem is objectively defined (Problem: Carrie is out of her seat during individual seatwork time *or* engaging in a behavior other than writing, reading, or asking teacher a question relevant to the seatwork).
3. Baseline established on behavioral and/or academic concern.	**0:** Component not implemented **1:** Baseline data includes 1-2 types of data (e.g., **R**ecords, **I**nterviews, **O**bservations, **T**est results= **RIOT**) **2:** Baseline data included 3-4 types of data (e.g., **RIOT**)
4. Context of concern identified/evaluated (i.e., setting, frequency, intensity, and duration of concern).	**0**: Component not implemented **1:** Context where concern occurs is identified (e.g., during math class) **2:** Context where concern occurs *and* frequency, intensity, or duration of occurrence is identified (e.g., during math class 3-5 days/week).
5. Student and situational assets to build on identified.	**0**: Component not implemented. **1:** Student assets to build on are identified (e.g., good relationships with peers) *or* resources to build on are identified (e.g., teachers involved in classroom management training; standard protocol intervention available). **2:** Student assets *and* resources to build on are identified.
6. Parental input about behavioral or academic concern obtained.	**0**: Component not implemented **1:** (no partial implementation score) **2:** Parental input is obtained.
7. Goal statement focusing on controllable, measurable behaviors written.	**0**: Component not implemented **1:** Goal statement is vaguely defined. Only part of the goal was objectively defined (e.g., Goal: Jimmy will read 75 words correctly per minute (*objective*) and comprehend what he is reading (*less objective)*. **2:** Entire goal was objectively defined (e.g., Goal: Jimmy will read 75 words correctly per minute and score in the average range on a

	standardized measure of reading comprehension.
8. Target date for goal attainment established.	**0**: Component not implemented **1:** Date is indicated for goal attainment (e.g., by May 15th); goal statement received score of 1. **2:** Date is indicated for goal attainment (e.g., by May 15th); goal statement received score of 2.
9. Benchmarks (i.e., performance indicators) that reflect the student's progress toward the general outcome goal are established.	**0**: Component not implemented **1:** No partial implementation **2:** Team identified objective, quantifiable, age-appropriate benchmarks to measure student performance (e.g., goal-attainment scale, graphed aim line).
10. Standard or social-comparison criteria against which to measure progress selected.	**0**: Component not implemented **1:** Social comparison criteria are identified, but are vaguely defined and not in measurable terms. **2:** Social comparison criteria are identified and are defined in measurable terms that correspond to target student's benchmark skills.
11. Specific academic skill or replacement behavior identified and evidence-based intervention strategies are identified.	**0**: Component not implemented **1:** Team identified a specific academic skill or replacement behavior and intervention strategies, but the intervention is not evidence-based or not linked to the function of the behavior based on baseline data. **2:** Team identified a specific academic skill or replacement behavior and intervention strategies, and the intervention is evidence-based and/or linked to the function of the behavior based on baseline data.
12. Intervention plan is clearly outlined in objective terms.	**0**: Component not implemented **1:** Some, but not all, of the intervention components were clearly outlined. Some intervention components vaguely defined (e.g., One on one reading group, behavior chart, reinforcement plan) **2:** All of the intervention components were clearly outlined, verbally or in writing.
13. Resources needed to implement intervention determined.	**0**: Component not implemented **1:** Individuals responsible for implementing intervention are identified (e.g., teacher, one peer) *or* specific strategies and resources needed are identified (e.g., reduced reading group size for target student, peer tutor) **2:** Individuals responsible for implementing intervention *and* specific strategies and resources needed are identified.
14. Progress-monitoring procedures specified, including individuals responsible for collecting progress-monitoring data.	**0**: Component not implemented **1:** A progress-monitoring plan identified but was missing 1-2 critical details (i.e., who, what, or when). **2:** A progress-monitoring plan was stated and clearly defined who, what, and when.
15. Individuals responsible for summarizing and charting progress monitoring data are identified.	**0**: Component not implemented **1:** (no partial implementation) **2:** Individuals responsible for summarizing and charting progress-monitoring data were identified.
16. Progress monitoring	**0**: Component not implemented

data are objective, empirical, and directly linked to the problem.	**1:** Progress-monitoring plan/data are not quantitative/empirical. **2:** The progress-monitoring plan/data are directly linked to the problem and are quantitative/empirical.
Problem Identification and Analysis Integrity Total =	
*Items 17-25 = *Plan Implementation and Evaluation*	
17. Progress-monitoring data and/or goal-attainment data are plotted.	**0**: Component not implemented **1:** progress-monitoring data plotted, but at least one of these components is missing: start date, end date, outcomes measure, labeled axes. **2:** Progress-monitoring data are plotted, and all essential components are included.
18. Direct comparison of the student's post-intervention performance with baseline data.	**0**: Component not implemented **1:** One type of progress-monitoring data plotted. Chart indicates baseline and intervention phases. **2:** Two types of progress-monitoring data plotted. Charts indicate baseline and intervention phases.
19. Reasons for positive and/or negative progress reviewed.	**0**: Component not implemented **1:** Reason(s) for positive and/or negative progress are listed, but do not have relevance to the intervention or target student. **2:** Reason(s) for positive and/or negative progress are listed, and have relevance to the intervention or target student.
20. Social-comparison evidence used to evaluate intervention outcomes.	**0**: Component not implemented **1:** Social comparison evidence provided but is not quantifiable and/or not consistent with intervention goals. **2:** Quantifiable social comparison evidence provided and is consistent with the intervention goals.
21. Based on convergent-evidence procedures, consensus on progress toward goal occurred.	**0**: Component not implemented **1:** Summary of outcome data is provided for each measure/rater *or* intervention outcome decision is indicated. **2:** Summary of outcome data is provided for each measure/rater *and* intervention outcome decision is indicated.
22. Treatment integrity of the intervention was assessed.	**0**: Component not implemented **1:** Vague, general statement about the integrity of the intervention is provided (e.g., assertion that the intervention occurred) **2**: At least one type of treatment integrity data is provided (e.g., attendance records, home notes, checklists, observation notes, rating scale, permanent products from student).
23. Intervention goals revised, if applicable (e.g., due to lack of progress). Otherwise, maintenance/generalization goal identified.	**0**: Component not implemented **1:** If applicable, revised goal statement is provided, but is not objectively defined (e.g., Erik will participate in large group activities). **2:** If applicable, revised goal statement is provided and is objectively defined. Otherwise maintenance/generalization goal is identified.
24. Feasible next-step strategies for meeting student's needs are developed.	**0**: Component not implemented **1:** Team identifies next-step strategies to meet student's needs, but strategies/steps are not objectively defined. **2:** Team identifies next-step strategies to meet student's needs, and strategies/steps are objectively defined.

25. Individuals responsible for implementing next-step strategies are identified.	**0**: Component not implemented **1:** (no partial implementation score) **2:**Team identifies person(s) responsible for implementing next-step strategies.
Plan Implementation and Evaluation Integrity Total =	
Total Problem Solving Integrity Score =	

Problem-Solving Integrity: Treatment Phase

Measures Used. During the treatment phase, problem-solving integrity was measured using completed Outcomes: PME protocols. Protocols for students who received at least four weeks of intervention (i.e., at least four weeks past the initial problem solving meeting for the student) were considered "complete." Each Outcomes: PME protocol was scored using the *Problem Solving Integrity Checklist*. Consistent with baseline procedures, each item on the checklist received a score of 0, 1, or 2 indicating the degree to which each component was implemented with integrity. For each problem solving case, teams achieved a total integrity score of 50 if all 25 components of the problem solving process were successfully implemented.

Student Outcomes: Baseline

Measures Used. The final item on the *Student Plan and Outcomes Report* asked PST member(s) and/or the referring teachers to indicate the student's progress toward the intervention goals. Five response options allowed the respondent to indicate whether the student demonstrated regression, no change, or improvement towards intervention goals. Only students who received intervention for at least 4 weeks were included in the analysis of student outcomes. Higher ratings represent better student outcomes. The five response options on the report correspond to the *Student Outcomes Rubric* (Appendix M), a 5-point likert scale used to provide a score for student outcomes. The *Student Outcomes Rubric* was adapted from the Likert Scale and Scoring Rubric for Problem Solving Components and Student Outcomes developed by Telzrow et al. (2000).

Student Outcomes: Treatment Phase

Measures Used. To evaluate student outcomes, qualitative and quantitative data provided in completed Outcomes: PME protocols were assessed. The primary investigator used data provided in Step 5: "Evaluate intervention outcomes and plan next steps" to assign a single student outcome score (i.e., 1 to 5) using the *Student Outcomes Rubric*. Step 5 of the Outcomes: PME protocol prompts the PST and referring teacher to graph and summarize progress monitoring and outcome data.

Problem Solving Knowledge and Skill

Measures Used. The *Problem Solving Team Self-Assessment Survey* (Appendix N) is a form adapted from Doll et al. (2005) and evaluates (a) the degree to which core problem-solving procedures are practiced, (b) PST member knowledge/familiarity of essential problem-solving components, and (c) PST member ability to implement essential problem-solving components. This self-report measure was used as a pre and post evaluation of knowledge and skill in problem solving procedures. Nine items on the survey ask PST members to rate their knowledge and familiarity of specific problem solving procedures using a 4-point likert scale (a score of 0= Not at all familiar, a score of 3= Very familiar). The same nine items ask PST members to rate their ability to implement specific problem solving procedures using a 4-point likert scale (a score of 0= Not at all able, a score of 3= Very able). Core team members completed the PST Self-Assessment Survey at the start of baseline (i.e., August 2011) and immediately following collection of problem solving integrity data (i.e., May 2012).

PST Member and Referring Teacher Acceptability

Measures Used. Following the delivery of the final problem solving intervention

component, PST members completed the *Problem-Solving Intervention Acceptability Questionnaire* (Appendix O), a 25-item questionnaire adapted from the Intervention Rating Profile (IRP; Witt & Elliott, 1985). The acceptability survey asks respondents to indicate the degree to which they agree with statements describing the problem solving intervention. For example, one item states, "The problem solving intervention was acceptable for our school." Respondents rated the degree to which they agreed with that statement (e.g., Agree). Each item is answered along a 7-point likert scale, ranging from Strongly Disagree to Strongly Agree.

Design and Procedures

Multiple Baseline Design

Procedural integrity of the problem solving process was examined using a randomized multiple-baseline technique across schools (Kratochwill & Levin, 2010). To assess procedural integrity of problem identification and problem analysis stages, trained graduate student observers collected baseline data by attending problem solving sessions and completing section one of the Problem Solving Integrity Checklist starting in October 2011. Baseline data collection began in all schools at the same time, and four overlapping baseline problem-solving sessions were measured for each school. Following a multiple baseline design, the preliminary problem-solving protocol training (T), performance feedback (PF), and targeted coaching (C) components were initiated at varying times across the schools to demonstrate experimental control. Schools were randomly assigned to the order in which they received the intervention phase (Kratochwill & Levin, 2010) using a digital randomization tool. School A received the T intervention phase followed by PF and C components first, followed by Schools B and C. Due to scheduling conflicts at the end of the school year, and fewer teachers referring students to the problem-solving teams at this time, School B did not receive the third intervention component (i.e., C),

and School C did not receive the second and third intervention components (i.e., PF and C). One to two observers collected data at every problem solving session during each school's baseline phase. During each school's intervention phase, at least 20% of each school's problem solving sessions were attended by an observer to provide supplemental data to completed Outcomes: PME protocols. Schools did not advance from the baseline phase to the first intervention component (i.e., T) until a stable or downward trend was established. Using a pre-determined criterion, problem solving integrity data were collected for at least two problem-solving sessions post T intervention component. The PF intervention component was introduced to School A after it had at least two problem solving sessions post T intervention and the team did not demonstrate 100% procedural integrity. At that time (January 2012), the second intervention component (i.e., PF) was introduced to School A, and the first intervention component (i.e., T) was introduced to School B. Using a predetermined criterion, Schools A and B received two sessions of the second intervention component (i.e., PF). The final intervention component [i.e. targeted coaching (C)] was implemented after School A had received two sessions of PF and did not demonstrate 100% procedural integrity.

Problem Solving Information and Outcomes: PME Training

As described previously, PSTs first received training focused on the topic of problem solving integrity and the use of Outcomes: PME (Stoiber & Kratochwill, 2002). Approximately one week prior to delivering the first intervention component to their team, each PST coach received intervention materials including written instructions, a narrated PowerPoint presentation, and a package of blank Outcomes: PME protocols. Each problem solving coach reviewed the training materials prior to presenting the first intervention component to their remaining team members. Training materials were then delivered to remaining PST members in

January 2012 (School A), February 2012 (School B), and March 2012 (School C) following a multiple-baseline design.

Performance Feedback

During the performance feedback phase, problem solving procedural integrity data from previous problem solving meetings were graphed and reviewed with the PST. The PST coach provided the feedback following a script developed by the first author. The feedback included graphed problem solving integrity scores from previous problem solving sessions. Three graphs depicted the team's overall problem solving percentages from previous problem solving sessions in addition to procedural integrity percentages for the first two stages of problem solving (i.e., problem identification and problem analysis) and final two stages of problem solving (i.e., plan implementation and plan evaluation). Team members also reviewed each of the 25 problem solving components and their operational definitions. Several tables indicated which problem-solving components the team successfully addressed during the previous problem-solving meeting and which components were partially implemented or absent during the previous problem-solving meeting.

Targeted Coaching

During the targeted coaching phase (i.e., intervention component C), the PST coach provided a brief, focused coaching session to the PST using a script and handout written by the first author. The focus of the coaching session was determined by evaluating completed Outcomes: PME protocols from previous problem solving cases. An integrity score for each step of the Outcomes: PME (five in total) was calculated in order to identify the step with the lowest integrity. School A demonstrated lowest problem solving integrity on Step 3: "Setting meaningful goals and benchmarks," therefore, that step was the focus of the coaching session.

During the coaching session the PST coach provided a handout to the PST with a description of the target problem-solving step in addition to the importance of carrying out the step with integrity. Next, the PST coach provided operational definitions and examples of specific core components within the problem-solving step. The PST then reviewed a case vignette of a problem solving case and completed examples of the target problem-solving step for the vignette. The PST coach was encouraged to provide assistance to their team as they conducted their subsequent problem solving session.

Treatment Integrity

As previously described, the PST coach checked off each component included in the performance feedback and coaching scripts after she had presented it. Thus, the script was used as a treatment integrity checklist. All of the scripts were reviewed following the meetings. The administrators reported 100% integrity across the PF and C intervention sessions.

Training of Observers/Raters

Six graduate students in school psychology received training in observational data collection procedures and scoring procedures for completed Outcome: PME protocols. Graduate student assistants participated in a 3-hour training session in July 2011, that included (1) introduction to the *Problem Solving Integrity Checklist* and scoring procedures, and (2) modeling, practice, and feedback in scoring sample problem-solving scripts and completed Outcomes PME protocols. At the observer training, each of the problem-solving components was described in detail using the operational definitions and scoring examples previously described. The graduate students then assisted in refining the operational definitions and scoring examples. Using three problem solving case examples derived from the Outcomes: PME manual, each assistant completed the *Problem Solving Integrity Checklist*. Each assistant's scores were

compared to the primary investigator's scores as preliminary IOA data. Preliminary IOA scores after the preliminary training ranged from 72-82%. Any discrepant scores were discussed with the first author. Through these discussions, the discrepancies were resolved and, when necessary, the problem-solving component definitions and scoring examples were further refined to prevent future discrepant ratings between observers.

Inter-Observer Agreement

Following the preliminary training, each observer independently completed problem solving integrity checklists for a sample script of a problem solving meeting and two video examples of school-based problem solving meetings. IOA across each component (i.e., score of 0, 1, or 2) was calculated using a point-by-point agreement ratio (Kazdin, 1982), which divides the number of agreements between the primary and secondary raters by the number of disagreements plus agreements, and multiplies the total by 100%. IOA ranged from 80%-88% with an average agreement of 82%; thereby meeting the conventional 80% minimum for interobserver agreement (Kennedy, 2005; Hartmann, Barrios, & Wood, 2004). After completion of the script and each video example, graduate assistants received detailed feedback for their scores on each component.

Inter-Observer Agreement Checks: Baseline

All problem-solving meetings were attended by at least one observer, including either the primary investigator or a trained graduate student observer. During the baseline phase, at least 20% of each school's total problem-solving meetings were attended by two observers, meeting the conventional percentage of sessions recommended for agreement checks (Kennedy, 2005) and WWC Standards (Kratochwill et al., 2010). The percentage of reliability data collected at each school varied, based on observer availability. Therefore, two observers were present during

1 problem-solving meeting at School A, 3 problem-solving meetings at School B, and 3 problem-solving meetings at School C. As depicted in Table 7, IOA checks ranged from 80% to 92%, with an average agreement of 85%. Following the initial meetings at each school, observers were encouraged to continue to discuss their observation scores following PST meetings but were requested not to change their scores.

Table 7
Inter-Observer Agreement Checks Across Each Problem-Solving Component

	School A	School B	School C
Percentage of Meetings with Reliability Data	25% (1/4)	50% (3/6)	50% (3/6)
Agreement Across Each Component	92% (23/25)	84% (63/75)	80% (60/75)

Inter-Rater Agreement: Intervention Phase

Raters. During the intervention phase, the first author assessed problem solving procedural integrity using completed Outcomes: PME protocols and scores derived from the *Problem Solving Integrity Checklist*. At least 62% of each school's problem solving cases during the intervention phase were analyzed by the first author and a graduate assistant (i.e.,10 problem solving cases total). The raters scored the cases independently using the *Problem Solving Integrity Checklist.* The inter-rater agreement was calculated by dividing the number of agreements by agreements plus disagreements and multiplying by 100%. An average inter-rater reliability of 87% was calculated for problem solving integrity scores during the intervention phase. It should be noted that the discrepant scores were always within one score of each other (i.e., Rater one assigned a score of 1 while Rater 2 assigned a score of 2).

Inter-rater Agreement: Rating of Student Outcomes

During the baseline and intervention phases, the first author evaluated student outcomes using completed *Student Plan and Outcomes Reports* and Outcomes: PME protocols. Student

outcome scores were derived using the *Student Outcomes Rubric.* At least 25% of each school's problem solving cases were analyzed by the first author and two graduate assistants (i.e., 10 problem solving cases total). The raters scored the cases independently using the *Student Outcomes Rubric.* The inter-rater agreement was calculated by dividing the number of agreements by agreements plus disagreements and multiplying by 100%. An average inter-rater reliability of 80% was calculated for student outcome scores during the baseline and intervention phase. It should be noted that the discrepant scores were always within one score of each other (i.e., Rater one assigned a score of 1 while Rater 2 assigned a score of 2).

Intervention Acceptability

Each core PST member who consented to participate in the study completed the *Problem Solving Intervention Acceptability Questionnaire* at the termination of the study. Core PST members were selected to compete the survey because they were the only individuals who participated in all problem solving intervention components.

Data Analysis

The following procedures were used to analyze each of the research questions.

Question 1: What is the impact of providing problem-solving teams with a problem solving intervention, consisting of (a) problem-solving information and training in the use of a manualized problem-solving protocol, (b) performance feedback, and (c) targeted coaching relative to the teams' procedural integrity of conducting problem solving stages?

Visual Data Analysis: Data from the multiple probe design across schools in each district were visually inspected. Data analysis followed the WWC Single-Case Design Standards, and specifically, the visual analysis criteria in order to demonstrate Strong Evidence of a causal relation between the independent variable (i.e., problem-solving intervention) and the outcome

variable (i.e., problem solving integrity). Three demonstrations of the intervention effect (along with no non-effects) will be assessed by: (1) documenting the consistency of level, trend, and variability within each phase, (2) documenting the immediacy of the effect, percentage of overlapping data, consistency of data across phases, and comparing observed and projected patterns of the outcome variable, and (3) examining external factors and anomalies. Using the quarter-intersect method, trend lines were produced and inserted into the graphs to assist with the visual analysis of graphed data.

Statistical Data Analysis: Effect sizes for each school's response (i.e., problem solving procedural integrity) to the problem-solving intervention were calculated using the Busk and Serlin (1992) method with no assumptions.

Question 2: Does higher problem solving procedural integrity correlate to improved student outcomes?

Data Analysis: Pearson r correlations were calculated to analyze the relationship between problem solving integrity scores (i.e., score out of 50) and student outcome scores (i.e., score out of 50) using the Student Outcomes Rubric. Strength of correlations were interpreted using guidelines by Cohen (1988). Therefore, correlations of 0.1 to 0.29, 0.3 to 0.49, and 0.5-1.0 will be considered small, moderate, and strong relationships, respectively (Cohen, 1988).

***Question 3*:** What impact does the problem solving intervention have on problem-solving team members' perceptions of their (a) knowledge/familiarity and (b) ability to implement problem- solving components?

Data Analysis: Descriptive results (i.e., means, standard deviations, ranges) from the PST

Self-Assessment Survey were assessed for the baseline and treatment phase. Components of problem solving that educators report (a) continued low knowledge/familiarity and ability in, and/or (b) improved knowledge/familiarity and ability are highlighted.

***Question 4*:** What is the problem solving team acceptability of each problem solving intervention component?

Data Analysis: Descriptive results (i.e., means, standard deviations, ranges) from the Problem-Solving Intervention Acceptability Questionnaire were calculated.

Exploratory Question 1: What types of barriers do educators/team members identify as limitations to conducting "best practice" problem solving procedures?

Data Analysis: Descriptive results from one item (i.e., item #11) on the PST Self-Assessment Survey were calculated.

Exploratory Question 2: Which problem solving components do educators/team members identify as areas of strength and weakness, with regard to their team implementation of problem-solving components?

Data Analysis: Descriptive results (i.e., means, ranges) from the PST Self-Assessment Survey were calculated.

CHAPTER 4

Results

To assess the effectiveness of the problem solving intervention on the integrity with which three school teams conducted the problem-solving process, graphed procedural integrity data were analyzed using a randomized multiple baseline design and visual analysis. As part of the analyses, descriptive statistics (i.e., mean scores, standard deviations, ranges) were reported for overall problem solving integrity, in addition to initial and final stages of the problem solving process. Effect sizes were also calculated to determine outcomes from the treatment phase. A Pearson's *r* correlation was calculated to examine the relationship between problem solving integrity and student outcomes. To evaluate the effect the problem solving intervention on PST member's (a) knowledge of and (b) ability to implement essential problem solving components, a pre and post self-assessment survey was completed by all core PST members across schools. Descriptive statistics (i.e. mean scores) were reported across schools. Finally, acceptability of the intervention package was assessed through completion of a PST member acceptability questionnaire. Descriptive statistics (i.e., mean scores, standard deviations, ranges) were reported across schools. Exploratory questions were considered, including self-reported barriers to the problem solving process and self-reported strengths/weaknesses in problem solving process. These questions were evaluated through analysis of the *PST Self-Assessment Survey*. The results from these analyses are presented in the following sections.

Question 1: What is the impact of providing problem-solving teams with a problem solving intervention, consisting of (a) problem-solving information and training in the use of a manualized problem-solving protocol, (b) performance feedback, and (c) targeted coaching relative to the teams' procedural integrity of conducting problem solving stages?

Baseline

Data from the multiple baseline design across schools were analyzed using visual inspection to address the first research question. Figure 2 depicts the results. In Figure 3, trend lines were added using the quarter-intersect method to create the trend lines. Fewer than three data points were collected in School C during the intervention phase; therefore it was not possible to add trend lines. On average, the schools earned less than half of the possible points (i.e., < 50% procedural integrity) during these initial observations. Four baseline data points were collected at School A and the trend was stable. The average percentage of problem-solving components observed was 38% (SD= 3.41) and scores ranged from 34%-42% integrity. At School B, procedural integrity data were considerably variable, ranging from 24%-50% integrity. School B demonstrated a steep downward slope of the data from sessions two through five, followed by a slight increase in data percentage during its final baseline session. Six problem-solving sessions were observed in total, resulting in an average percentage of 39% (SD= 9.76). Although moderately variable, School B demonstrated an overall stable trend during the baseline phase. Six baseline sessions were conducted in School C and the trend was fairly stable. School C demonstrated an average of 44% of components implemented (SD= 4.0; range 38%-50%).

Figure 2.

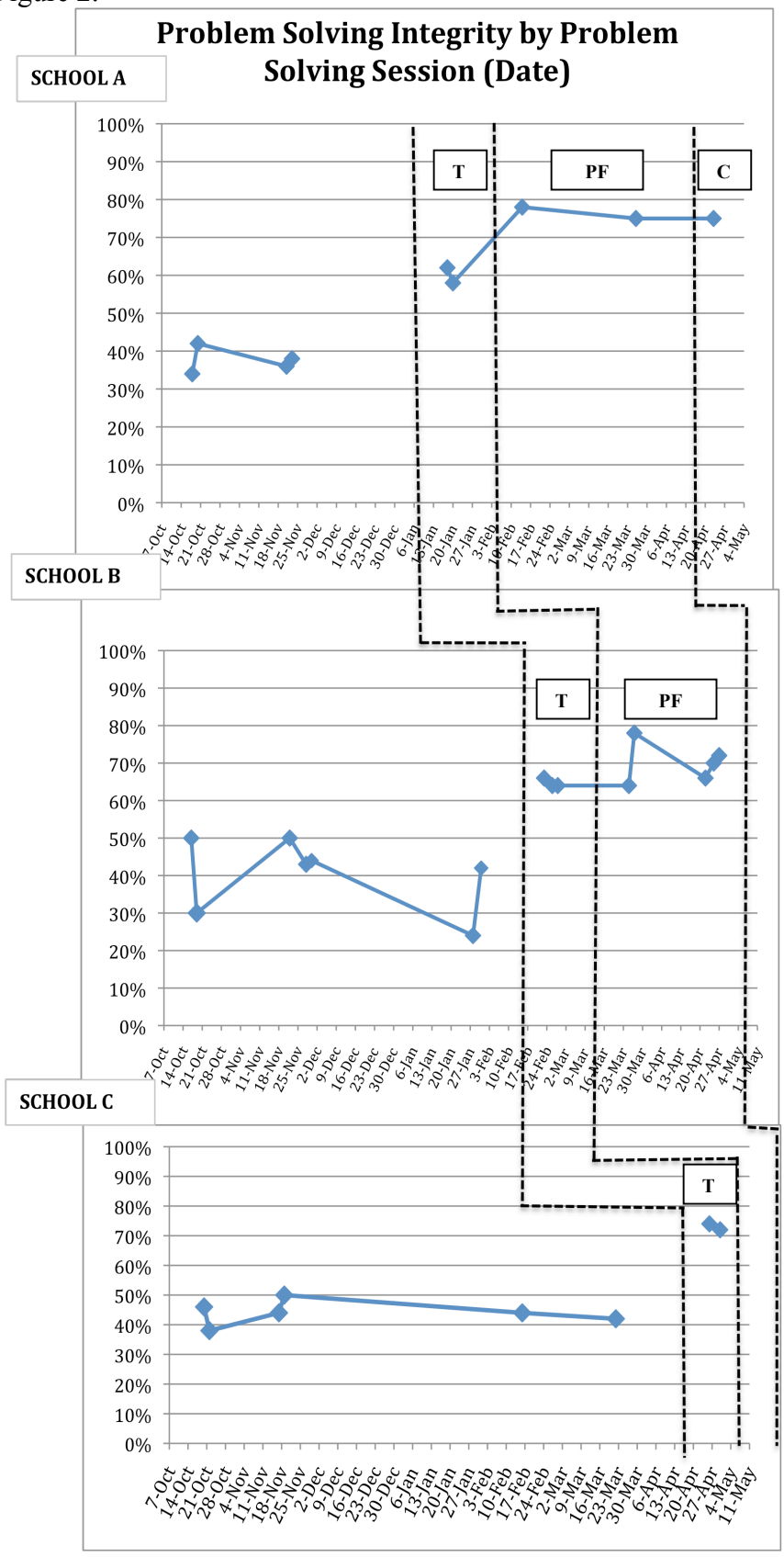
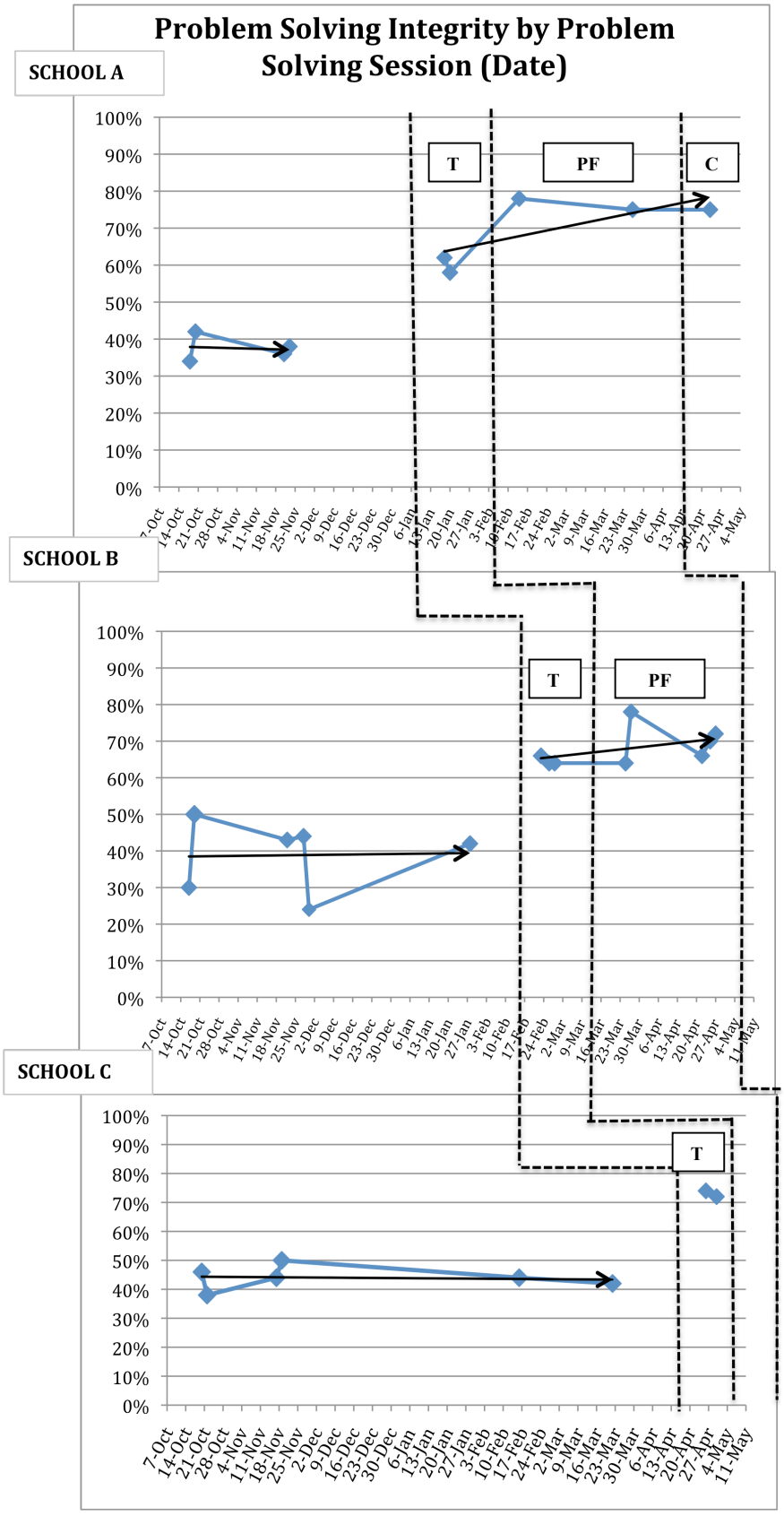

Problem Solving Integrity by Problem Solving Session (Date)
SCHOOL A
T
PF
C
SCHOOL B
T
PF
SCHOOL C
T
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

Figure 3.


Problem Solving Integrity by Problem Solving Session (Date)
SCHOOL A
SCHOOL B
SCHOOL C
T
PF
C
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
7-Oct
14-Oct
21-Oct
28-Oct
4-Nov
11-Nov
18-Nov
25-Nov
2-Dec
9-Dec
16-Dec
23-Dec
30-Dec
6-Jan
13-Jan
20-Jan
27-Jan
3-Feb
10-Feb
17-Feb
24-Feb
2-Mar
9-Mar
16-Mar
23-Mar
30-Mar
6-Apr
13-Apr
20-Apr
27-Apr
4-May
11-May

Problem-Solving Intervention

Component 1: Problem-solving information and Outcome: PME training. As displayed in Figures 1 and 2, implementation of the first intervention component reveals an immediate increase in procedural integrity compared to baseline levels. School A's procedural integrity increased from an average score of 38% to 60% (SD= 2.83; Range 58%-62%). School B demonstrated an increase in average integrity from 39% to 65% (SD: 1.15; Range=64%-66%). School C went from an average baseline integrity score of 44% to an average score of 73% (SD= 1.41; Range= 72%-74%). Across Schools A, B, and C the percentage of non-overlapping data was 100%.

Component 2: Performance Feedback. After implementation of the second intervention component, School A demonstrated a slight increase in procedural integrity to 77% (SD= 2.12; Range= 75%-78%). School B demonstrated some variability in integrity scores after receiving the second intervention component (Range= 64%-78%); however, all integrity scores were either equal to or higher than integrity scores in the first intervention phase. School B experienced an overall increase in integrity, with an average integrity score of 70% (SD= 5.48). Across Schools A and B, one data point overlapped from the previous intervention component. School C did not receive this component.

Component 3: Targeted Coaching. School A received the final intervention component (i.e., Coaching). School A did not demonstrate a change in level of procedural integrity, receiving a score of 75%. The percentage of non-overlapping data was 0% with scores obtained during the performance feedback component. Tables 8 and 9 provide the descriptive results (i.e., means, standard deviations, and ranges) across the phases of this study. Table 8 presents descriptive statistics considering individual intervention components, while Table 9 presents

descriptive statistics considering the problem solving intervention package as a whole. School B and C did not receive this component.

Table 8
Descriptive Statistics from Multiple Baseline Graph: Intervention Components Considered

	Baseline	PS Info/ Outcomes: PME Training	Performance Feedback	Coaching
School A	*n*= 4 *M*= 38.0% SD= 3.41% Range= 34-42%	*n*= 2 *M*= 60.0% SD= 2.83% Range= 58-62%	*n*= 2 *M*= 77.5% SD= 2.12% Range= 75-78%	*n*= 1 *M*= 75% SD= N/A Range= N/A
School B	*n*= 7 *M*= 40.0% SD= 9.76% Range= 24-50%	*n*= 3 *M*= 65.0% SD= 1.15% Range= 64-66%	*n*= 5 *M*= 70.0% SD= 5.48% Range= 64-78%	N/A
School C	*n*= 6 *M*= 44.0% SD= 4.0% Range= 38-50%	*n*= 2 *M*= 73.0% SD= 1.41% Range= 72-74%	N/A	N/A

Table 9
Descriptive Statistics from Multiple Baseline Graph: Intervention Package Considered

	Baseline	Problem Solving Intervention (all implemented components)
School A	*n*= 4 *M*= 38.0% SD= 3.41% Range= 34-42%	*n*= 5 *M*= 70.0% SD= 8.96% Range= 58-75%
School B	*n*= 7 *M*= 40.0% SD= 9.76% Range= 24-50%	*n*= 8 *M*= 68.0%% SD= 5.01% Range= 64-78%
School C	*n*= 6 *M*= 44.0% SD= 4.0% Range= 38-50%	*n*= 2 *M*= 73.0% SD= 1.41% Range= 72-74%

Each of the participating schools demonstrated similar trends with respect to problem solving components that were typically implemented with greater integrity prior to and after intervention implementation. During baseline, Schools A, B, and C demonstrated comparable integrity for components related to the first two problem solving stages, *Problem Identification and Problem Analysis*, with averages of 47%, 46%, and 50% respectively. During baseline, each

school demonstrated considerably lover integrity for components related to the final two stages of problem solving, *Plan Implementation and Plan Evaluation*, with averages of 19%, 29%, and 34% respectively. After participation in the first intervention component, each school demonstrated a moderate to significant increase in components related to problem identification and analysis, with averages ranging from 74 to 91%. After the first intervention component, average problem solving integrity for components related to plan implementation and evaluation was variable across schools. School A and C demonstrated a mild to moderate increase in integrity scores; however School B evidenced a mild decline in integrity scores. After two performance feedback sessions, Schools A and B maintained high problem identification and analysis integrity and demonstrated a moderate increase in plan implementation and evaluation integrity. After one coaching session, School A demonstrated an increase in problem identification and analysis integrity and slight decline in plan implementation and evaluation integrity. Overall, schools consistently practiced problem identification and problem analysis with higher integrity than plan implementation and plan evaluation. Each intervention component resulted in greater problem identification and analysis integrity; however, variable effects were found for plan implementation and evaluation integrity scores. Table 10 presents each school's average problem solving integrity by problem solving stage and across baseline and intervention phases.

Table 10
Average Problem Solving Integrity by Problem Solving Stage

	Baseline	PS Training	Performance Feedback	Coaching
School A	Stages 1 & 2: **47%** Stages 3 & 4: **19%**	Stages 1 & 2: **74%** Stages 3 & 4: **36%**	Stages 1 & 2: **78%** Stages 3 & 4: **61%**	Stages 1 & 2: **88%** Stages 3 & 4: **56%**
School B	Stages 1 & 2: **46%** Stages 3 & 4: **29%**	Stages 1 & 2: **91%** Stages 3 & 4: **19%**	Stages 1 & 2: **90%** Stages 3 & 4: **31%**	NA
School C	Stages 1 & 2: **50%** Stages 3 & 4: **34%**	Stages 1 & 2: **75%** Stages 3 & 4: **67%**	NA	NA

Stages 1 & 2: Problem Identification and Problem Analysis
Sages 3 & 4: Plan Implementation and Plan Evaluation

Statistical Analysis. Effect sizes for each school's response (i.e., problem solving procedural integrity) to the problem-solving intervention were calculated using the Busk and Serlin (1992) method without assumptions. The greatest effect size was found for School A (9.38), while School C evidenced an effect size of 7.25 and School B demonstrated an effect size of 2.84.

Question 2: Does higher problem solving procedural integrity correlate to improved student outcomes?

A correlation analysis was conducted to examine the second research question. Specifically, a Pearson *r* correlation was calculated to analyze the relationship between the procedural integrity scores using the *Problem Solving Integrity Checklist* and scores derived from analyzing permanent products and Outcomes: PME protocols using the *Student Outcomes Rubric.* Results revealed a strong positive correlation between these variables (r=0.63). The greatest correlation between problem solving integrity and student outcomes was demonstrated in School C with a positive correlation of r=0.93. School A and School B demonstrated correlation coefficients of r=0.64 r=0.54, respectively; however, these scores are still considered a strong positive relationship between variables. Table 11 depicts the descriptive statistics from this comparison for each school and all schools combined. Table 12 provided a list of the primary referral concerns for each of the 32 student problem solving cases included in this study.

Table 11
Descriptive Statistics: Correlation between Problem Solving Integrity and Student Outcomes

	School A (n=9)	School B (n=15)	School C (n=8)	All Schools (N=32)
Pearson's r correlation	r = 0.64	r = 0.54	r = 0.93	r = 0.63

Table 12
Referral Concerns for Student Problem Solving Cases

School A (7 referring teachers total)	School B (11 referring teachers total)
1. Problem: Academic, Social-Emotional, and Behavioral, Grade: 5	1. Problem: Behavioral (disruptive, off-task), Grade: 2
2. Problem: Academic (letter identification, early literacy skills) Grade: K	2. Problem: Academic (oral reading fluency) and Behavioral (off-task, impulsivity), Grade: 2
3. Problem: Academic (reading and math) and Social-Emotional (anxiety), Grade: K	3. Problem: Behavioral (inattention and off-task), Grade: 4
4. Problem: Behavioral (noncompliance), Grade: 4	4. Problem: Behavioral (relational aggression), Grade: 3
5. Problem: Behavioral (off-task, work completion) Grade: 5	5. Problem: Academic (reading and math), Grade: 2
6. Problem: Academic (math) and Behavioral (noncompliance) Grade: 4	6. Problem: Behavioral (impulsivity and off-task), Grade: 2
7. Problem: Behavioral (non-compliance, off-task) Grade: 4	7. Problem: Academic (spelling, oral reading fluency, and early numeracy concepts) Grade: 2
8. Problem: Academic (math and reading) Grade: 1	8. Problem: Academic (decoding and oral reading fluency), Grade: 3
9. Problem: Academic (oral reading fluency) Grade: 3	9. Problem: Academic (alphabetic principle, decoding), Grade 2
School C (6 referring teachers total)	10. Problem: Behavioral (disorganization, inattention, impulsivity), Grade: 2
1. Problem: Academic (letter identification, phonemic awareness) Grade: 1	11. Problem: Academic (spelling, vocabulary), Grade: 4
2. Problem: Behavioral (hyperactivity, inattention) Grade: K	12. Problem: Academic (oral reading fluency), Grade: 2
3. Problem: Behavioral (off-task), Grade: 1	13. Problem: Academic (oral reading fluency), Grade: 3
4. Problem: Multiple Academic and Behavioral concerns (non specific) Grade: 1	14. Problem: Behavioral (work completion, time-on-task), Grade: 3
5. Problem: Behavioral concerns (disruption, tantrums) Grade: K	15. Problem: Social-emotional (mood and peer relationships), Grade: 3
6. Problem: Behavioral (impulsivity, disruptive), Grade: 2	
7. Problem: Behavioral (work completion), Grade: 2	
8. Problem: Behavioral (work completion, off-task), Grade: 2	

Question 3: *What impact does the problem solving intervention have on problem-solving team members' perceptions of their (a) knowledge/familiarity and (b) ability to implement problem- solving components?*

To assess this research question, core PST members (including PST coaches) completed the *Problem Solving Team Self-Assessment Survey* at the start of the baseline phase (September 2011) and at the termination of the intervention phase (May 2012). The survey included 9 items adapted from the SAT Self Assessment Survey developed by Doll et al. (2005), and described nine essential problem solving components. Team members rated their (a) general knowledge/familiarity and (b) ability to implement each of the nine components on a 0 to 3 scale, where 0=Not at all familiar/Not able and 3= Very familiar/Very Able. For each school, averages were calculated at baseline and intervention across items. Pre and post averages are presented across schools A, B, and C in Table 13.

Table 13
Descriptive Results of Problem Solving Team Self Assessment Survey: Schools A, B, C

Survey Question		School A Baseline *M*	School A Intervention *M*	School B Baseline *M*	School B Intervention *M*	School C Baseline *M*	School C Intervention *M*
1. Developing a clear, observable definition of the referral concern	Knowledge	2.25	2.40*	2.50	2.75*	2.60	3.0*
	Ability	2.25	2.40*	2.75	2.50	2.60	3.0*
2. Collecting multiple types of baseline data	Knowledge	2.50	2.80*	2.50	2.75*	2.80	3.0*
	Ability	2.50	2.60*	2.25	2.75*	2.80	3.0*
3. Developing hypotheses regarding the referral concern	Knowledge	2.00	2.40*	2.25	2.50*	2.80	2.8
	Ability	2.25	2.40*	2.25	2.25	2.20	3.0*
4. Developing a behavioral or academic goal using quantifiable terms	Knowledge	3.00	2.60	2.50	2.50	2.80	3.0*
	Ability	2.50	2.40	2.50	2.50	2.80	3.0*
5. Developing a systematic intervention plan that outlines who, what, where, and when	Knowledge	3.00	3.00	2.75	2.50	2.80	3.0*
	Ability	2.50	2.80*	2.75	2.25	2.60	3.0*
6. Collecting integrity data with regard to intervention plan implementation	Knowledge	2.67	2.20	1.75	2.25*	2.80	2.8
	Ability	2.33	2.00	1.75	2.00*	2.40	2.8*

7. Collecting and graphing progress monitoring data	Knowledge	2.67	2.20	2.50	2.50	2.60	3.0*
	Ability	2.33	2.40*	2.50	2.75*	2.60	3.0*
8. Comparing baseline performance to post-intervention performance	Knowledge	2.67	2.40	2.25	2.25	2.80	2.80
	Ability	2.33	2.40*	2.0	2.0	3.00	2.80
9. Developing/using clear decision rules for continuing and/or changing intervention	Knowledge	2.00	2.20*	2.5	2.0	2.60	2.80*
	Ability	1.67	2.20*	2.25	1.75	2.60	2.80*

*Indicates a problem-solving component that PST members reported improved knowledge and/or skill in after intervention implementation

Baseline. Overall, each of the three participating schools' PSTs rated their problem solving knowledge and skill within the "moderately familiar/moderately able" to "very familiar/very able" level (i.e., items were typically rated as 2 or 3). At baseline, Schools A, B, and C reported relative strengths (i.e., average ratings of 2.50 or greater) for knowledge and skill in the areas of (1) collecting multiple types of baseline data, (2) developing a systematic intervention plan, (3) developing a behavioral or academic goal using quantifiable terms, and (4) collecting and graphing progress monitoring data. All schools identified relative weakness (i.e., average ratings less than 2.50) for collecting intervention integrity data. School A's lowest self-rating at baseline was for knowledge and skill in developing and using clear decision rules for continuing or changing intervention. School B's lowest self-rating at baseline was for knowledge and skill in collecting intervention integrity data. School C's lowest self-rating at baseline was for skill in developing hypotheses for the referral concern.

Intervention. Schools A, B, and C demonstrated variable outcomes for self-perceived knowledge and skill in core problem-solving components. School A demonstrated improvement in self-perceived knowledge of 4 out of 9 problem-solving components, and improvement in self-perceived skill in 7 out of 9 problem-solving components. School B demonstrated improvement in self-perceived knowledge of 6 out of 9 problem-solving components, and

improvement in self-perceived skill in 3 out of 9 problem-solving components. School C demonstrated improvement in self-perceived knowledge of 6 out of 9 problem-solving components, and improvement in self-perceived skill in 8 out of 9 problem-solving components. Self-ratings that did not increase post intervention declined or remained the same from baseline ratings.

School B demonstrated a slight decline in self-perceived knowledge and skill in numerous problem-solving components after receiving the performance feedback intervention component. Interestingly, Schools A and C demonstrated an increase in self-perceived knowledge and skill in the majority of the problem-solving components after receiving the targeted coaching and problem solving information/training components respectively.

Question 4: *What is the problem solving team acceptability of each problem solving intervention component?*

Acceptability of the problem solving intervention was evaluated using the *Problem Solving Intervention Acceptability Questionnaire*. At the end of the intervention phase, PST members and coaches completed the questionnaire by selecting a score of 1 if they strongly disagreed with the statement and a score of 7 if they strongly agreed (i.e., 2= disagree, 3= slightly disagree, 4= neutral, 5= slightly agree, 6=agree). Table 14 depicts the average score selected per item for the entire sample. Table 15 depicts the average score across all items by school and entire sample.

Table 14
Descriptive Statistics of Problem Solving Intervention Acceptability Questionnaire

Survey Question	*M*	SD	Range
1. The problem solving intervention was acceptable for our school.	5.64	1.00	3-7
2. Most educators would find the problem solving intervention appropriate.	5.86	0.53	5-7
3. The problem solving intervention should prove effective.	5.93	0.73	4-7

4. I would suggest the use of the problem solving intervention to other educators.	5.93	1.14	4-7
5. The problem solving intervention is appropriate to meet the school's needs and mission.	5.71	1.20	3-7
6. Most educators would find the intervention suitable for the described purposes and mission.	5.93	0.73	5-7
7. I would be willing to use this intervention in the school setting.	6.07	0.83	4-7
8. This intervention would not result in negative side effects for students.	6.43	0.51	6-7
9. The intervention would be appropriate for a variety of students.	6.43	0.51	6-7
10. The intervention is consistent with those I have used in school settings.	5.79	1.19	3-7
11. I like the procedures used in the intervention.	6.07	0.92	4-7
12. The intervention is a good way to meet the specified purpose.	6.21	0.80	5-7
13. The initial problem solving training was beneficial for me.	5.07	0.92	4-6
14. The initial problem solving training was beneficial for the team.	5.57	0.85	4-7
15. The initial problem solving training session was clear.	5.21	1.25	3-7
16. The initial problem solving training was convenient.	5.26	1.44	3-7
17. The performance feedback sessions were beneficial for me.	4.88	0.99	3-6
18. The performance feedback sessions were beneficial for the team.	5.12	0.64	4-6
19. The performance feedback sessions were clear.	5.12	0.83	4-6
20. The performance feedback sessions were convenient.	4.75	1.28	3-6
21. The targeted coaching sessions were beneficial for me.	4.00	0.71	3-5
22. The targeted coaching sessions were beneficial for the team.	4.80	1.10	3-6
23. The targeted coaching sessions were clear.	4.60	0.55	4-5
24. The targeted coaching sessions were convenient.	4.60	1.34	3-6
25. Overall, the problem solving intervention would be beneficial for my school.	5.86	0.77	4-7

Table 15

Descriptive Results of the Problem Solving Intervention Acceptability Questionnaire by School

Survey Question	*M*	Range
Entire Sample (N=14)	5.67	
School A (*n*=5)	5.21	4.64-6.04
School B (*n*=4)	5.74	4.54-6.48

School C (*n*=5)	6.12	5.56-6.75

Exploratory Question 1: What types of barriers do educators/team members identify as limitations to conducting "best practice" problem solving procedures?

Responses from one item (i.e., item #11) on the *PST Self- Assessment Survey* were tallied in order to collect information regarding team-identified barriers to problem solving. Table 16 presents factors that each school's PST members identified as barriers to their problem solving process.

Table 16
PST-Identified Barriers to Problem-Solving Procedural Integrity

	PST-Identified Barriers to Problem-Solving Procedural Integrity (# of team endorsements)
School A (*n*=5)	Time intensiveness of problem solving process (4) Complexity of problem solving process (2) Unfamiliarity/lack of training in problem solving procedures (1)
School B (*n*=4)	Time intensiveness of problem solving process (3) Complexity of problem solving process (1) Unfamiliarity/lack of training in problem solving procedures (1) Limited intervention resources (1) Number of students referred to PST (1) Staff follow-through (1)
School C (*n*=5)	Time intensiveness of problem solving process (4) Limited staff resources (1) Complexity of problem solving process (1) Limited intervention resources (1)

Exploratory Question 2: Which problem solving components do educators/team members identify as areas of strength and weakness, with regard to their team implementation of problem-solving components?

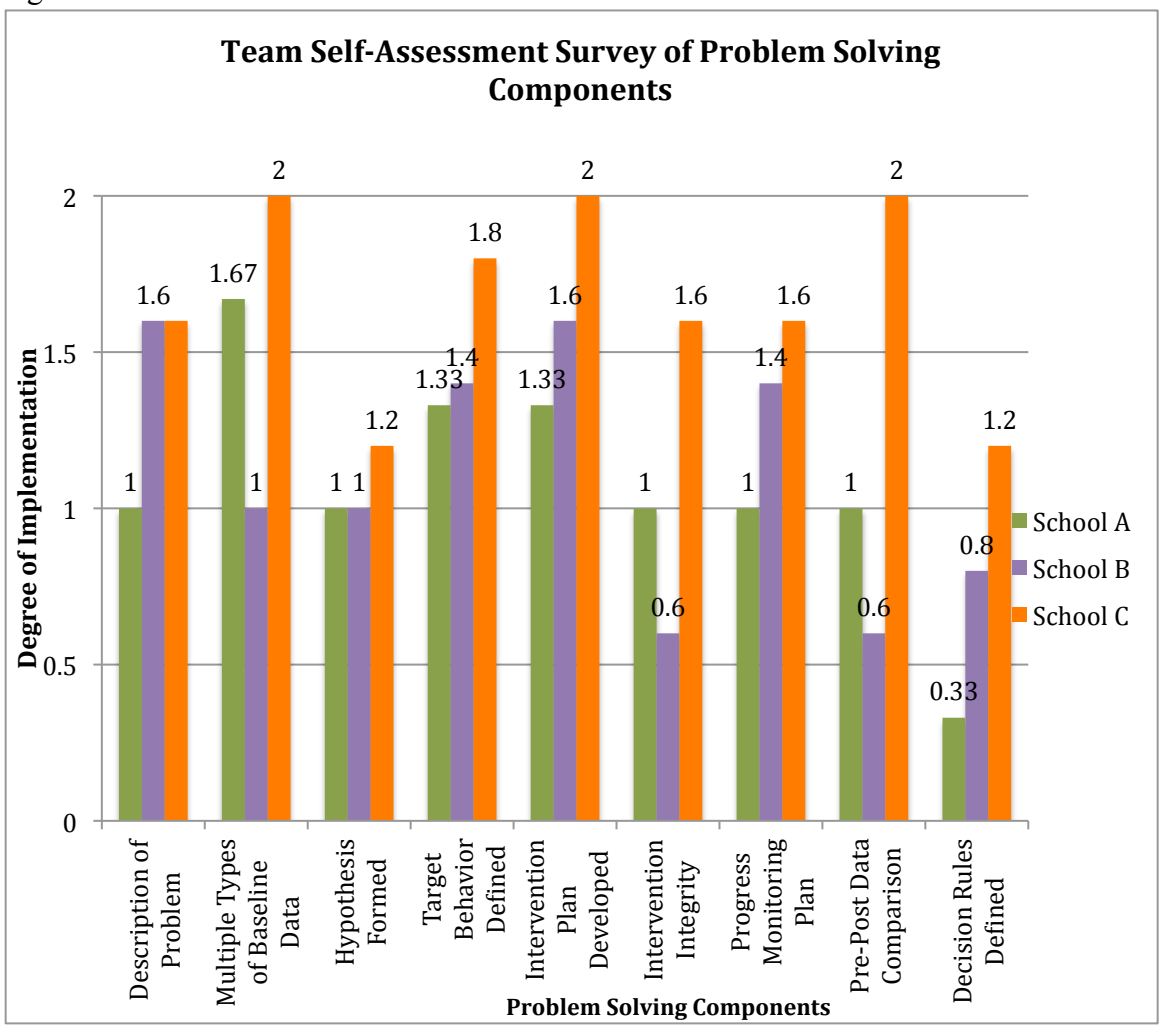
Nine items on the *PST Self-Assessment Survey* asked PST members to rate the degree to which their team currently implemented problem-solving procedures. Components were scored on a 0 to 2 scale, whereby a score of 0 suggested little to no implementation of the component, a

score of 1 suggested partial implementation of the component, and a score of 2 suggested full implementation with integrity. To address this exploratory question, responses from the pre (i.e., baseline) *PST Self-Assessment Survey* were evaluated. Table 17 provides the scoring interpretation for items on the PST Self-Assessment Survey. Figure 4 depicts average self-assessment ratings for each team at baseline. School A self-identified poor implementation (i.e., average scores less than 1) of "developing clear decision rules for continuing or changing intervention." School A identified at least partial implementation (i.e., average scores between 1 and 1.5) of "defining the target behavior" and "developing a systematic intervention plan." School A did not identify strong implementation (i.e., average scores more than 1.5) in any of the measured problem-solving components. School B self-identified poor implementation of "collecting intervention integrity data," "defining decision rules for intervention maintenance/change" and "comparing pre and post intervention data." School B rated partial implementation for "defining the target behavior" and "developing a systematic progress monitoring plan." School B rated strong implementation for "developing a clear, observable definition of the referral concern," and "developing a systematic intervention plan." School C did not rate any of the measured problem-solving components with scores lower than 1 (i.e., partial implementation). School C rated several components with an average score of 2 (i.e., full implementation), including "collecting multiple types of baseline data," "developing a systematic intervention plan," and "comparing pre and post intervention data."

Table 17
Scoring Interpretation on PST Self Assessment Survey

Score on PST Self-Assessment Survey	Interpretation
0	Little to no implementation of problem-solving component
1	Partial implementation of problem-solving component
2	Full implementation of problem-solving component

Figure 4.


Team Self-Assessment Survey of Problem Solving Components
Degree of Implementation
2
1.5
1
0.5
0
1
1.6
1.6
1.67
1
2
1
1
1.2
1.33
1.4
1.8
1.33
1.6
2
1
0.6
1.6
1
1.4
1.6
1
0.6
2
0.33
0.8
1.2
Description of Problem
Multiple Types of Baseline Data
Hypothesis Formed
Target Behavior Defined
Intervention Plan Developed
Intervention Integrity
Progress Monitoring Plan
Pre-Post Data Comparison
Decision Rules Defined
Problem Solving Components
School A
School B
School C

CHAPTER 5

Discussion

The purpose of this study was to investigate the effects of a problem-solving intervention package consisting of (a) training in the use of a problem-solving protocol, (b) performance feedback, and (c) coaching in three elementary schools. This study evaluated the procedural integrity with which school-based problem solving teams conducted the problem-solving process during the development and implementation of individualized interventions for students. Previous research regarding problem solving teams (e.g., Burns et al, 2008) has consistently identified low problem solving procedural integrity, specifically in the areas of developing systematic progress monitoring and implementation integrity plans. Consistent with previous research (e.g. Noell et al., 1997; Witt et al., 1997), Burns et al. (2008) reported improved procedural integrity of problem solving teams with the implementation of performance feedback interventions. A replication study by Lundahl (2010) extended previous research through the development of a more comprehensive problem solving integrity checklist and incorporation of targeted coaching sessions as part of the problem solving intervention. The replication study reported improved problem solving procedural integrity after the implementation of targeted coaching sessions. The current study replicated and extended the Lundahl (2010) study by providing a preliminary problem solving training and published problem-solving protocol (i.e., Outcomes: PME) to school-base problem solving teams prior to the provision of performance feedback and targeted coaching sessions.

Previous research investigating problem solving procedural integrity (e.g., Lundahl, 2010) has utilized district administrators as problem solving team coaches. This study was aimed at embedding systematic problem-solving procedures in schools through a train-the-trainer

model with school psychologists, as these individuals serve as permanent members on their respective problem solving teams, and have expertise in data-based decision making and leadership responsibilities on problem solving teams (Burns, 2008; Ysseldyke e al., 1997). To address limitations to systematic problem solving procedures, the literature has suggested "on-the-job training" by "local experts" such as school psychologists or special educators as opposed to large district-wide in-services (Doll et al., 2005). School psychologists spend a significant amount of professional time engaged in consultation services with teachers focused on academic and behavioral concerns (Bramlett, Murphy, Johnson, Wallingsford, & Hall, 2002). The purpose of this study was to provide a systematic protocol that would assist school psychologists and teachers as they implement problem solving procedures for individual students. A randomized multiple baseline design across schools was utilized to assess the direct effects of the problem solving intervention on the overall integrity of problem solving implementation. A correlation analysis was conducted to examine the relationship between (a) the procedural integrity of the overall problem solving process, and (b) student outcomes. To evaluate the effect of the problem solving intervention on PST member self-perception of knowledge and skills in problem solving procedures, a pre and post self-assessment survey was completed. Additionally, acceptability of the problem solving intervention was evaluated, as a primary goal of this study was to increase the sustainability of systematic problem solving components like those presented through the problem solving intervention. The following chapter outlines the results and implications of the four research questions and two exploratory questions, limitations of the study, and future research directions.

Research Question # 1

What is the impact of providing problem-solving teams with a problem solving intervention, consisting of (a) problem-solving information and training in the use of a manualized problem-solving protocol, (b) performance feedback, and (c) targeted coaching relative to the teams' procedural integrity of conducting problem solving stages?

During baseline, low problem solving procedural integrity was identified across all participating elementary schools, as measured by direct observations of problem solving meetings and educator-completed permanent products. Procedural integrity scores using the *Problem Solving Integrity Checklist* indicated that the average percentage of problem solving procedural integrity for School A was 38.0%, School B was 40.0%, and School C was 44.0%. This finding is consistent with problem solving integrity scores reported by Lundahl (2010) (i.e., School A= 52.67%; School B= 39.70%; School C= 46.67% in her schools) and Burns et al. (2008) (i.e., School A= 29%; School B=45%; School C= 14.4% in his schools). Consistent with previous findings, the three participating schools demonstrated low integrity of problem solving procedures at baseline. The current study utilized moderately similar methods of measurement for problem solving procedural integrity as Lundahl (2010); therefore, a direct comparison of results across studies is appropriate. Overall, all three schools demonstrated a stable baseline of integrity scores. School B demonstrated a moderately variable baseline prior to its intervention phase; however, a trend analysis indicated a stable rather than upward or downward trend. School C demonstrated a stable baseline after intervention implementation in both School A and School B, indicating a stable level of problem solving integrity over the first 6 months of the academic year. Across schools, a significant increase in problem solving integrity was not observed until after implementation of the problem solving intervention. Visual analysis of

problem solving integrity scores across schools identified 100% non-overlapping data between baseline and intervention phases.

A primary goal of this study was to provide participating schools with an effective and feasible problem solving intervention package aimed at increasing problem solving procedural integrity with the secondary goal of improving student outcomes. The literature highlights the importance of providing educators with substantial training, support, and resources for problem solving procedures. The current study identified a school psychologist on each school's problem solving team to serve as a coach by delivering preliminary problem solving training and providing ongoing performance feedback and coaching. Previous research has investigated the effects of performance feedback on treatment integrity of intervention plans when provided to teachers through a consultative process. These studies reported improved initial integrity scores (e.g., Burns et al., 2008a; Hagermoser-Sanetti, Luiselli, & Handler, 2007; Martens, et al., 1997; Noell et al., 1997; Witt, et al, 1997); however integrity typically declined after cessation of ongoing performance feedback. Burns et al. (2008a) and Lundahl (2010) also reported immediate improvement in integrity scores following the introduction of performance feedback. A weakness of these studies was that participating schools were not provided with the same standard form of training with respect to essential problem solving components. The purpose of this study was to provide participating problem solving teams with preliminary training in effective problem solving procedures and a systematic problem solving protocol. Thus, a strength of this study was that each participating school was given the same problem solving protocol as a guide during the problem solving process. Performance feedback was specific to each school's integrity of the problem solving process and use of the problem solving protocol. The focus of targeted coaching was based on the school's utilization of the problem solving

protocol during previous problem solving cases. The use of a systematic problem-solving protocol also contributed to the internal consistency with which problem solving procedural integrity was measured.

The first component of the problem solving intervention, preliminary information and training, resulted in an immediate increase in problem solving procedural integrity across all three problem-solving teams. Because each school conducted varying numbers of problem-solving sessions per month, the number of data points within the first phase of the intervention was variable across schools. At least two problem-solving sessions for each school were evaluated after the initial problem solving training. Using visual analysis, all schools demonstrated 100% non-overlapping data between baseline and first intervention component phases, and an immediate difference in level was observed.

The second intervention component, performance feedback, was provided to School A and B. Schools A and B each received two performance feedback sessions over the course of two months; however, because School B conducted several problem-solving sessions back-to-back, therefore more outcome data were collected after each successive performance feedback session in School B. In total, two problem-solving sessions were evaluated in School A during the performance phase whereas five problem-solving sessions were evaluated in School B during the performance phase. Schools A and B demonstrated an overall increase in procedural integrity following two consecutive performance feedback sessions; however, School B did not demonstrate an immediate increase in procedural integrity after the initial performance feedback session. Schools A and B did not evidence significant problem solving integrity gains with the implementation of multiple performance feedback sessions. Previous research, specifically Burns (2008a) and Lundahl (2010) reported an immediate increase in procedural integrity following

initial performance feedback and consistently greater integrity of problem solving with subsequent performance feedback sessions. For example, results from the performance feedback phase of the Lundahl (2010) study demonstrated an upward trend in problem solving integrity after participating in 3 to 4 performance feedback sessions. The results of this study were inconsistent with previous research by the fact that Schools A and B demonstrated considerably stable levels of procedural integrity after receiving a second session of performance feedback. Because three demonstrations of the second intervention component were not observed (based on the WWC Single-Case Design Standards), we cannot draw conclusions about the effectiveness of this part of the intervention package. Previous studies have reported positive outcomes of performance feedback on intervention integrity; however integrity levels declined shortly after the removal of performance feedback (e.g., Noell et al., 1997). Due to time constraints of the academic year and multiple baseline design, this researcher was unable to evaluate the sustainability of the problem solving intervention. Future studies should investigate whether improved levels of procedural integrity are maintained after the removal of ongoing intervention support. This variable could be assessed during the subsequent academic year.

Research Question #2

Does higher problem solving procedural integrity correlate to improved student outcomes?

Systematic problem solving is a process through which student concerns are identified and analyzed, intervention plans are developed, and intervention outcomes are evaluated. A primary goal of systematic problem solving is to provide appropriate, effective instruction and intervention to students experiencing academic, social-emotional, or behavioral concerns and to improve these students' outcomes. Teams that practice problem solving with high procedural integrity utilize data-based decision making when analyzing referral concerns, developing

interventions, and monitoring progress. With the use of quantitative student performance, interventions are appropriately matched and monitored for effectiveness. Therefore, it was hypothesized that higher problem solving integrity scores would correlate to improved student outcomes (e.g., Fuchs, Deno, & Mirkin, 1984). It was suspected that teams demonstrating poor problem solving integrity (i.e., low evidence data-based problem identification, problem analysis, intervention planning, and evaluation) would correlate to poorer student outcomes. Research has identified numerous positive systemic and student outcomes associated with problem-solving procedures, including (a) decreased referrals to, and placements in special education, (b) increased appropriateness of special education referrals, (c) positive satisfaction by teachers and principals, and (d) positive academic and behavioral progress for students, and (e) improved attitudes and teaching practices of teachers (McNamara, 1998; Schrag & Henderson, 1996; Nelson et al., 1991, Kovaleski et al., 1999). A meta-analysis of prereferral intervention teams (PITs) and their relation to student and systematic outcomes found PITs to be effective in positive student and systemic outcomes (Burns & Symington, 2002). The relationship between prereferral intervention teams and systemic/student outcomes has been evaluated across university-based and field-based studies, reporting a significant difference in effect sizes between university-based (1.32) and field-based (0.54) prereferral intervention teams and their relation to desired outcomes. The current study found a strong positive correlation between problem solving integrity and student outcomes ($r = 0.69$) across participating schools, with a range of $r=0.54$-0.89, as measured by the Problem Solving Integrity Checklist and Student Outcomes Rubric. Previous research reported overall integrity of the problem-solving process as a significant predictor of student outcomes, accounting for 33% of variance in student outcomes (Lundahl, 2010). During the baseline phase, student outcomes were measured by permanent

products, which were provided by referring teachers and PST team members. For each problem solving case, the referring teacher and PST were prompted to provide baseline and progress monitoring data after the student had received intervention for at least 4 weeks. Student outcomes were evaluated based on teacher report and progress monitoring data and were scored on a scale of 1 to 5. Although teachers and PST members were prompted to provide quantitative data, the majority of outcome information collected did not include graphed progress monitoring data. A lack of quantitative progress monitoring and outcome data during the baseline phase may be indicative of poor problem solving integrity, but also limited the ability to quantitatively evaluate student response to intervention. The majority of student outcome information provided during the baseline phase consisted of teacher report of student gain or lack thereof. This trend was consistent across all three participating schools. Although minimal quantitative data were provided during the baseline phase, teacher reports typically indicated a lack of progress (i.e., a score 2) or regression from baseline (i.e., a score of 1). During baseline, students in Schools A and B demonstrated an average outcome score of 1.25 and 1.5 respectively, indicating slight regression from baseline level of performance and/or insufficient data. Students in School C demonstrated an average outcome score of 2.42, indicating minimal improvement from baseline performance levels.

During the intervention phase, each PST received introductory information and training in problem solving components, including progress-monitoring strategies. PSTs were encouraged to use Outcomes: PME protocols as a tool for intervention planning and evaluation. Each Outcomes: PME protocol provided a template for measuring and graphing progress monitoring data for each problem solving case (i.e., blank graphs, Goal Attainment Scale template). PST members and referring teachers were directed to use this tool to track baseline

and intervention data for each problem solving case. To measure student outcomes, graphed data (e.g., Goal Attainment Scale scores, CBMs, observational data, etc.) and summative qualitative information were assessed. Post intervention, Schools A and B demonstrated an average student outcomes score of 3.2 and 3.4 respectively, indicating that on, average, students made moderate progress but did not reach intervention goals. School C demonstrated an average student outcome score of 3.5, indicating that, on average, students evidenced some progress or teachers reported moderate progress, but did not provide data. Each school demonstrated a minimal to moderate increase in average student outcomes scores during the intervention phase. Of the 32 student cases evaluated across schools, only three students earned a student outcome score of 5 on the Student Outcomes Rubric. A score of 5 on the Student Outcomes Rubric was earned if there was quantitative data that the student's performance improved significantly from baseline levels of performance and the student was on target to achieve or exceed target goals. Therefore, only 9% of the students within this study met or exceeded intervention goals (i.e., achieved a score of 5 on the Student Outcomes Rubric). It is important to note that there was not a standard procedure for identifying appropriate intervention goals; therefore, there are limitations to generalizing student outcome data across and within schools. It is possible that the goals for certain problem solving cases were considerably higher or lower than appropriate given the students' baseline performance. It is also difficult to compare student outcome data given the great variability in referral concerns, student characteristics, and intervention plans. Future research into this concept may provide problem-solving teams with systematic procedures for identifying student goals for behavioral and academic referral concerns.

Research Question #3

What impact does the problem solving intervention have on problem-solving team members' perceptions of their (a) knowledge/familiarity and (b) ability to implement problem- solving components?

The research literature recommends that problem-solving teams examine their problem solving procedures by conducting a self-assessment (Burns et al., 2008a). Conducting self-assessment is a tool for identifying strengths and weaknesses in a team-based problem solving, in addition to barriers to effective implementation. Research into this area has identified various barriers including (a) lack of familiarity with recommended consultation procedures, (b) inconsistency with current staff roles, (c) perceived complexity of procedures, and (d) perceived inefficiency of procedures (Doll et al., 2005). Teams rated higher competence in (a) identifying the problem, (b) identifying treatment goals, (c) planning the intervention and (d) maintaining treatment integrity. Teams rated lower competence in components related to data collection, including (a) collecting baseline data, (b) collecting intervention integrity data, and (c) comparing pre- and post-intervention data. This researcher found similar trends with respect to team member-identified strengths and weaknesses. At the start of baseline, all schools reported relative weakness in knowledge and skill in collecting intervention integrity data. School A's PST also identified weaker problem solving skills in the areas of developing hypotheses regarding the referral concern, and developing and using clear decision rules for continuing and/or changing intervention. At baseline, Schools B and C identified additional weakness in the areas of collecting intervention integrity data and comparing baseline performance to post-intervention performance. Although PSTs demonstrated low problem solving integrity scores at baseline, as measured by observations and permanent products, PST member perceptions of their

problem solving knowledge and ability were moderately high, with the majority of scores falling in the "moderately to very familiar/able" range.

With the implementation of the problem solving intervention, participating schools demonstrated variable improvement in self-perceived knowledge and skill for essential problem solving components. Because the self-assessment ratings were considerably high at baseline (i.e., average scores of 2 or higher), improvement in self-perceived knowledge and skill may not be captured appropriately, as the scale has a ceiling score of 3. Interestingly, Schools A and B reported a decline in self-perceived knowledge and skill in numerous problem-solving skills, as compared to baseline ratings. The same was not found with respect to School C. Investigation into this drop may reveal a possible explanation related to the intervention components provided to each respective school. Whereas Schools A and B received intervention components related to individualized performance feedback and coaching, School C received intervention related to general problem-solving information. This trend may be related to impact performance feedback has on self-efficacy (i.e., a belief in one's ability to perform a particular task; Bandura, 1986). It is possible that PST members in School B evidenced a decline in self-perceived knowledge and skill because they has recently participated in performance feedback sessions, which highlighted specific problem solving skills in need of improvement. On the other hand, School A and C had recently participated in the coaching and preliminary problem solving training, which provided general training and support in the problem solving protocol. It is possible that performance feedback lowered self-efficacy of problem solving members with respect to their knowledge and skill in core problem-solving components. In contrast, non-evaluative training and coaching in problem solving components may have increased self-efficacy in knowledge and skill of conducting the problem solving process. It has been noted that "because performance feedback

conveys information regarding trainee knowledge and skills in relation to the task at hand, it follows that feedback will influence self-efficacy perceptions" (Karl, O-Leary-Kelly, & Martocchio, 1993, p. 360). It has been argued that positive, constructive performance feedback is more likely to enhance self-efficacy, whereas negative, destructive performance feedback is more likely to decrease self-efficacy (Bandura, 1986). In this study, the performance feedback and targeted coaching sessions provided constructive information regarding specific strengths and weaknesses in the problem solving process. However, because overall integrity scores were moderately low, particularly during baseline, it is possible that performance feedback data lowered the self-efficacy of problem-solving team members' problem-solving knowledge and skill. School C did not receive constructive feedback in their problem-solving procedural integrity, but received information and support in systematic problem solving. School C's improved self-perceived knowledge and skill in essential problem-solving components may be related to the preliminary problem-solving training. Future research may more explicitly evaluate perceptions of problem-solving knowledge and skill after the delivery of each respective intervention component (i.e., general training, performance feedback, and coaching). Doing so may more directly evaluate intervention effectiveness and secondary outcomes regarding self-efficacy and perception of knowledge and skill.

Research Question #4

What is the problem solving team acceptability of each problem solving intervention component?

The problem-solving intervention acceptability questionnaire requested that problem solving team members rate their agreement or disagreement with 25 statements on a seven point Likert scale (i.e., 1= strongly disagree; 2= moderately disagree; 3= slightly disagree; 4= neutral, 5=slightly agree; 6= moderately agree; 7= strongly agree). When the entire sample was analyzed,

the mean PST member acceptability rating was 5.67 out of a possible of 7 points. Thus, on average PST members reported that they agreed with the statements on the survey. When responses were analyzed across items and schools, PST members reported the highest acceptability for the following statements: (1) the intervention would be appropriate for a variety of students, (2) the intervention would not result in negative side effects for students, (3) the intervention is a good way to meet the specified purpose, (4) I like the procedures used in the intervention, and (5) I would be willing to use the intervention in the school setting. PST members reported the lowest acceptability for the following statements: (1) the targeted coaching session was clear, (2) the targeted coaching session was convenient, (3) the targeted coaching session was beneficial for me, (4) the targeted coaching session was beneficial for the team, and (5) the performance feedback sessions were convenient. The majority of low-acceptability items pertained to the targeted coaching session, indicating that the lowest acceptability scores came from School A PST members and were directed specifically at the targeted coaching session. The results of this research question suggests that the format of the targeted coaching session may not have been clear, effective, and convenient for School A's PST. Future study may investigate more comprehensive feedback regarding elements of the training session that were less acceptable to PST members. In order to ensure the targeted coaching session was efficient and convenient for the PST, it was designed to be considerably brief (i.e., implemented within 15 minutes). This is considerably shorter than training models, which have utilized approximately 25 hours of focused training in problem solving consultation strategies. Although time-intensive training may be less convenient and feasible for school teams, it may be necessary to achieve significant and sustainable gains in staff knowledge, skill, and implementation of training targets.

Exploratory Question #1

What types of barriers do educators/team members identify as limitations to conducting "best practice" problem solving procedures?

At the start of the academic year (i.e., baseline; September 2011) core problem-solving teams members on each participating PST were asked to identify barriers to systematic problem solving procedures. The most common barrier identified by PST members was “time intensiveness of the problem solving process.” The second most common barrier noted by problem solving team members was “complexity of the problem solving process.” These results were consistent with Doll et al. (2005) and Meyers and Kline (2001) who reported (a) time demands of procedures and (b) unfamiliarity with procedures due to limited training as the most common team member-identified barriers to effective problem solving. In the current study, PST members identified several other barriers to problem solving, including unfamiliarity of problem-solving procedures, limited staff and intervention resources, staff follow-through, and high number of students refereed to the PST. These results suggest that PST members do not feel that the problem solving systems and schedules in their schools are time-effective and feasible, and that they lack training to support effective problem solving procedures.

Each of the three participating schools conducted problem-solving cases in approximately 45 minutes per student. These 45-minute initial problem-solving sessions were aimed at executing problem identification, problem analysis, intervention development, and progress monitoring development for student referral concerns. PSTs did not hold a second meeting to discuss the problem solving case until well after the intervention plan had been implemented (i.e., approximately 5 weeks). Although the PSTs in the current study reported that their current problem solving system was too time-intensive, researchers in the literature have recommended

that teams meet multiple times to ensure effective use of time. For example, it has been suggested that teams meet once to define the referral concern and devise a plan for baseline data collection, and subsequently meet to review baseline data and develop the intervention plan (Fuchs & Fuchs, 1996; Gutkin & Curtis, 1990). Additional problem solving meetings may result in more efficient problem solving procedures and student intervention planning; however, it requires additional flexibility and resources (i.e., time) from staff (Doll et al., 2005). Although research suggests that effective multidisciplinary teams may ultimately reduce the amount of time expended on special education evaluations (Fuchs, Fuchs, Harris, & Roberts, 1996), teams who demonstrate poor problem solving integrity may not achieve this outcome. Therefore, school teams may be expending additional resources to address referrals for regular education students and special education evaluations, yet they are not experiencing a decrease in the number of students referred for academic and behavioral concerns. Problem solving integrity may be an important part of this obstacle; however, additional factors such as access and use of evidence-based core curricula and supplemental intervention are critical when considering referral rates to problem solving teams (Tilly, 2008).

Prior and current researchers have identified procedural complexity as primary limitation to conducting systematic problem solving (Doll et al., 2005). Previous research reported that problem solving team members found problem solving forms to be lengthy, repetitive, and not user-friendly, thereby negatively affecting the efficiency of their problem solving procedures. That study noted that problem-solving teams eliminated or modified specific problem solving steps that were regarded as less critical to the success of their problem solving procedures (Doll et al., 2005). Results from the current study may also demonstrate this principle. For example, the PSTs from School A and B often did not complete the final step of the Outcomes: PME

protocol: “Evaluate intervention outcomes and plan next steps” for their problem solving cases. It is possible that PSTs found this step to be irrelevant, unfeasible, or complex. School A and B identified “comparing baseline performance to post intervention performance and “developing and using clear decision rules for continuing and/or changing intervention” as weaknesses, (as measured by self-assessment report); therefore, PST members may have regarded the final step of the Outcomes: PME protocol as difficult, unnecessary, complex, or time-consuming.

It is important to note that although teams indicated that problem solving procedures were too complex to implement with fidelity, PST members reported considerably high knowledge of and skill in problem solving procedures. This discrepancy suggests that perhaps a lack of resources or support impedes problem solving integrity as opposed to a lack of familiarity or skill in problem solving components. Previous research has identified specific working conditions that improve effectiveness of teams, including streamlined paperwork, administrative support, effective training in procedures, egalitarian framework, and a framework of accountability (e.g., McDougal et al., 2000). Future investigation may more directly evaluate process variables related to the efficiency of school teams engaging in the problem solving process. Currently, there is not empirical evidence to support which of the problem solving stages is most critical to achieving student improvement. Understanding this may assist in planning more appropriate and efficient use of time during the problem-solving process. In the current study, qualitative observations during baseline problem solving sessions noted that PSTs spent a significant amount of meeting time describing the student referral concerns, and significantly less time sharing/analyzing baseline data and planning progress monitoring methods. If a significant amount of session time is dedicated to irrelevant or less effective

procedures, problem solving integrity and student outcomes may be negatively impacted, and the problem-solving process may be viewed as ineffective or inefficient.

Exploratory Question #2

Which problem solving components do educators/team members identify as areas of strength and weakness, with regard to their team implementation of problem-solving components?

In addition to assessing problem solving team member's self-perception of their individual knowledge base and skill with regard to problem solving components, team members rated the degree to which their team carries out effective problem solving components. Analysis of this question provided an opportunity to consider accuracy of self-report and trends in strengths/weaknesses with regard to problem solving procedural integrity. At baseline, School A and B rated the majority of problem solving components as typically implemented with partial fidelity, whereas School C rated the majority of problem solving components as typically implemented with moderate to high fidelity. In comparing baseline self-assessment ratings to those obtained from observations of baseline problem solving sessions, School C consistently demonstrated moderately higher problem solving integrity, as measured by self-report and direct observation. Schools A and B consistently demonstrated weaker problem solving integrity, as measured by self-report and direction observation. Future study may more directly evaluate inter-rater agreement between problem solving team members' perceptions of procedural integrity and objective assessment of procedural integrity. If problem solving teams can accurately complete a needs assessment regarding their implementation of systemic problem-solving, they may more effectively acquire specific training for those components.

The findings of this study are somewhat consistent with previous research that investigated team self-assessment of problem solving implementation. In the Doll et al, (2005)

study, teams reported implementing the following problem solving components with low integrity (i.e., average scores less than 1): progress monitoring data collection and pre- post-intervention data comparison. Teams in the present study identified lower problem solving integrity for defining decision rules, comparing pre- and post-intervention data, and collecting intervention integrity data. In the Doll et al. (2005) study, teams rated highest procedural integrity for problem identification, goal identification, and intervention plan development. Teams in the present study generally reported stronger procedural integrity for defining the target behavior and developing an intervention plan. Trends in previous and current research suggest that teams demonstrate weaker procedural integrity for components related to data collection and usage and stronger procedural integrity for components related to describing referral concerns and planning intervention.

Limitations

One of the limitations of this study was the reliance on information discussed during preliminary problem solving sessions and/or reported on subsequent outcomes forms. Although assessment measures and dependent variables were consistent across baseline and intervention phases, it is possible that the assessment measures in this study did not capture the implementation of all problem-solving components. Informal consultation frequently occurs between school psychologists and teachers outside of formal sessions, such as in the hallway (Rosenfield, 2008). Because of this practice, it is possible that problem-solving integrity scores were an underestimate of actual implementation. During the baseline phase, it is possible that essential problem solving components were not discussed during the problem-solving meeting (i.e., received a score of 0), but were discussed informally at a subsequent time. The Student Plan and Outcome Report was designed to probe for information that night have been missed during

observational data collection, but it is possible that specific data were not documented on the form. During the intervention phase, it is possible that relevant problem solving components were discussed during problem solving meetings, but were not documented on the Outcomes: PME protocol (i.e., received a score of 1). Although data were analyzed using a consistent rubric (i.e., Problem Solving Integrity Checklist), accurate analysis was reliant on thorough documentation by problem solving team members and educators.

On a related note, referring teachers typically took more ownership over completing permanent products during the baseline phase, whereas school psychologists took the lead role in completing the materials during the intervention phase. The Student Plan and Outcomes Report and Outcomes: PME protocol were both introduced as measures that were to be completed collaboratively by those involved in the student's intervention. It is assumed that after participating in the first component of the problem solving training, PST coaches (i.e., school psychologists) took more of a leadership role in assisting teachers during the problem-solving process. Although this can be seen as a positive outcome of the problem solving intervention, it risks the reliability of the data collected for each problem solving case.

All components of the problem solving intervention were not introduced to all participating schools, limiting the degree to which we can interpret intervention outcomes. Several factors contributed to this limitation, including infrequent problem solving meetings, declined consent from several parents and teachers, and exclusionary criteria (e.g., students served in special education). For example, five problem-solving cases were excluded from School A due to declined parent and teacher consent. Moreover, because this study followed a multiple baseline design, stable baselines had to be documented across schools prior to intervention implementation. Due to this design, School C did not receive the first intervention

component until April 2012, which was the last month during which the problem solving team accepted problem solving referrals. Had additional problem-solving cases been included in the study, additional intervention outcome data might have been collected. This assessment would have increased the validity of intervention outcome data. The presence of graduate observers at all problem solving sessions during the intervention phase would also have improved the validity of problem-solving integrity scores. This process would have accounted for the possibility that relevant problem solving components were discussed but not recorded on Outcomes: PME protocols.

Integrity data for problem-solving intervention implementation were collected through self-report measures (i.e., checklists, verbal report). The integrity of intervention implementation would have been more valid through checklists completed by direct observation. Due to conflicting schedules among graduate assistants and schools, it was not feasible to collect integrity data through third party observers. On a related note, referring teachers typically completed the Student Plan and Outcomes report, and affirmed that intervention plans were implemented with integrity. By providing a general affirmation that the intervention was implemented as planned, the team received a score of 1(i.e., partial implementation). School psychologists who completed the Outcomes: PME forms typically left the implementation integrity item blank, thereby receiving a score of 0 (i.e., no implementation). It is possible that school psychologists generally left this item blank due to a lack of supporting data with regard to intervention integrity (e.g., observations, checklists); however, this reporting impacted problem-solving integrity scores. Future study may require quantitative data to support intervention integrity, rather than accepting general affirmation as evidence of intervention integrity.

Student outcomes were of primary interest in this study; however, it is difficult to generalize outcomes within and across schools. Several factors make student outcome comparisons difficult, including discrepant referral procedures, discrepant goal setting procedures, and discrepant criterion for success (Shinn, 2002). It has been stated that schools following problem solving-procedures define problems *situationally*, making judgments as to whether student performance is discrepant from what is expected (Shinn, 2002). For example, it is possible that the academic performance of a 2nd grade student in School A is considerably lower than grade-level peers; therefore, she was referred to the problem solving team for individualized intervention planning. That same student, however, may not have been referred to the PST had she been a student in School C, if the grade-level performance of peers at that school were comparable to the target student. Educators may adopt different approaches for identifying student goals. For example, by employing a *norm-* or *peer-referenced* approach, goals and decisions are made by comparing target student performance to a local norm group (e.g., students from same class, school, district). If, however, schools employ an *individually referenced* approach, student performance is compared to his or her previous or expected performance (Shinn, 2002). Schools may adopt varying approaches to setting ultimate intervention goals. Several approaches for evaluating student outcomes exist, including the use of local norms, instructional placement standards, and expert judgment. Resulting intervention evaluation and student progress/outcome analysis is not standard. Given the inconsistencies that exist within problem identification and plan evaluation across cases and schools, it is difficult to draw reliable and valid conclusions regarding problem solving integrity and student outcomes.

The current study utilized a problem solving integrity checklist on which items were scored along a 0-2 scale. Each of the 25 problems solving components carried equal weight with

regard to overall problem solving integrity scores. It is possible that certain problem solving components are more critical to effective problem solving than others, and should therefore be scored with greater weight.

A number of students were excluded from the study due to several factors, including teacher decline, parent decline, and special education eligibility. Inclusion of additional students would have improved the reliability with which study outcomes can be interpreted. It is somewhat surprising that teachers declined participation; however, it may be indicative of some of the barriers previously identified, including time-intensiveness and complexity of problem solving procedures. It should be considered that perhaps teachers who agreed to participate in the study were more interested in the problem-solving process than those who did not.

Future Research

Future research into the topic of problem solving integrity should evaluate long-term procedural integrity outcomes using a multi-year design across schools. Doing so my more appropriately capture system-wide issues that contribute to challenges with systematic school procedures, including staff turnover, funding instability, educational legislation, etc. If future study measures the effectiveness of professional development and/or problem solving intervention on school-based problem solving, the removal and reintroduction of the treatment should be considered, following an A-B-A design. A multiple-baseline design within schools would strengthen the internal validity of intervention effectiveness. Future study might conduct functional analyses to more directly measure contextual factors (e.g., school team dynamics, school resources) that hinder or facilitate systematic problem solving. It is critical that future research investigate whether specific components related to data-based decision making and problem solving consultation are more integral in effective student programming and

intervention implementation. If specific procedures within the problem solving process are shown to strongly correlate to improved student outcomes, training should be focused on these aspects. This may streamline training procedures that are currently perceived as complex and time-intensive, and may reduce the amount of time and other resources that are currently expended on ineffective training.

Summary

Problem solving teams are critical to the development, implementation, and evaluation of interventions to address academic, behavioral, and social-emotional challenges of students. The integrity with which problem solving teams conduct the problem solving process has been considerably low. The purpose of this study was to provide problem solving teams with a multi-component intervention focused on enhancing the degree to which problem solving teams demonstrate systematic problem solving. The intervention provided teams with preliminary training in the use of a problem solving protocol (i.e., Outcomes: PME) in addition to subsequent performance feedback and training in the use of the protocol. School psychologists served as problem solving team coaches and were trained in the delivery of the intervention, as this enhanced the social validity and sustainability of the intervention.

Consistent with previous research, the three problem-solving teams in this study demonstrated low baseline problem solving procedural integrity (i.e., <50% integrity), often scoring lower for problem-solving components related to data collection and analysis (e.g., treatment integrity data, progress-monitoring data, and pre-post intervention data). Each school evidenced an increase in problem solving integrity following implementation of the first intervention component: problem solving information and Outcomes: PME training. Procedural integrity also increased in schools that received the second intervention component: performance

feedback. An increase in procedural integrity was not found in the school that received the third intervention component: targeted coaching; however, incomplete data was collected for that problem solving case. During baseline and again at the succession of the intervention, problem solving team members were asked to rate their knowledge and skill in multiple components of problem-solving. Variable outcomes were identified across schools. Although each school demonstrated an increase in knowledge a skill for the majority of measured problem-solving components, teams also indicated a decline in knowledge and skill for several problem-solving components. Evaluation for possible trends in this finding suggests that participation in the performance feedback intervention component may be related to a decline in self-perceived knowledge and skill, and warrants further evaluation.

Of interest to this study was the possible correlation between problem-solving procedural integrity and student outcomes. This study found a strong correlation between teams' problem solving integrity scores and the goal attainment of students referred to the problem solving team—higher problem solving procedural integrity scores were strongly correlated with higher student outcome scores. This finding indicates the importance of systematic problem solving procedures, as it is likely related to effective intervention development and positive student outcomes. Given the relationship between problem solving integrity and student outcomes, it was important to evaluate current barriers to systematic problem solving in schools. Teams indentified time as the primary obstacle to their teams' ability to conduct systematic problem solving, indicating that problem solving procedures are time-intensive and complex.

Teams report time-intensiveness and complexity of problem solving procedures as barriers to effective problem solving implementation; therefore, it was of interest to evaluate problem solving team members' acceptability of this intervention. Acceptability of the

intervention would provide useful information regarding feasible problem solving training and protocol. Participating teams indicated an overall acceptability rating that suggests mild to moderate acceptability of related intervention components and the problem solving protocol. The primary goal of this study was to provide school problem solving teams with an effective, feasible intervention that was convenient and sustainable. This study provided notable findings with respect to the significance of effective problem solving procedures, system-wide challenges to conducting problem solving with integrity, and limitations of transferring knowledge and skill to practice.

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Appendices

Appendix A
Problem Solving Team Coach Consent Form

UNIVERSITY OF WISCONSIN-MADISON

PROBLEM SOLVING TEAM COACH CONSENT FORM

Effects of a Problem Solving Team Intervention on the Problem-Solving Process: Improving Concept Knowledge, Procedural Integrity, and Student Outcomes

DESCRIPTION OF THE RESEARCH

You are invited to participate in a research study about the problem-solving process that your school uses to develop and implement interventions for students struggling academically and/or behaviorally. Specifically, the study will examine the ability of a problem-solving team (PST) intervention consisting of training, feedback, and coaching strategies to improve the team problem-solving process and enhance student outcomes. You have been asked to participate as a problem-solving coach for your school's problem-solving team.

WHAT WILL MY PARTICIPATION INVOLVE?

If you decide to participate in this study, you will be asked to serve as your problem-solving team's problem-solving coach. Responsibilities of the problem-solving coach include: (a) communicate your problem-solving team meeting schedule to the researchers, (b) complete a 60- minute problem-solving training with materials provided by the researchers, (c) provide a 30- minute problem-solving training session to your problem-solving team at the start of the intervention phase of the study, (d) provide your problem-solving team with performance feedback and coaching at approximately 6 PST meetings, (e) collect documents relevant to project aims, (f) complete a questionnaire rating your acceptability of the problem-solving team intervention, and (g) communicate regularly with the researchers regarding intervention steps.

Our goal is to work within the problem-solving framework that already exists in your schools. Thus, we will present the problem-solving team intervention material in an efficient manner. The preliminary training will be provided to you as a DVD and paper materials. The remainder of the intervention components, which you will deliver as coach, can be delivered to your PST during a single 30-minute meeting and approximately 6 PST meetings for 5-10 minutes each. The researchers will provide you with intervention materials (including scripts) before each meeting so that you will not have to develop these materials.

ARE THERE ANY RISKS TO ME? HOW WILL CONFIDENTIALITY BE PROTECTED?

There are minimal risks associated with participating in this study. Considerable steps will be taken to mitigate risks such as breach of confidentiality. All of the information from this study will be stored in a locked filing cabinet. Researchers will not have access to student names or any other identifying information. Identification numbers will be used on all documents that contain information about students. Data collected from remaining participants will be confidential. The names of participants will not be used in any publication of this study. Only group characteristics will be published.

ARE THERE ANY BENEFITS TO ME?

There are no direct benefits for participating in this research. We hope that participation in this study will be beneficial for your school because it will provide educators with the opportunity to strengthen their abilities to develop, implement, and evaluate interventions developed through the problem-solving process. We believe that participating in this study will also be beneficial because you will learn more about the key components of the problem-solving process and how to implement specific coaching techniques to improve the process.

WILL I BE COMPENSATED FOR MY PARTICIPATION?

You will receive $300 for participating in this study and completing all previously listed responsibilities. If you withdraw from the study, you will receive no compensation.

CAN I CHANGE MY MIND?

Yes. Your participation is completely voluntary. If you decide to help with this study, please sign the attached permission form and return it at your earliest convenience.

WHOM SHOULD I CONTACT IF I HAVE QUESTIONS?

You may ask any questions about the research at any time. If you have questions about the study, please contact me, Cara Vaccarello, at (708) 828-1007 or my research advisor, Thomas Kratochwill, at (608) 262-5912. Our addresses are provided below. If you have questions regarding your rights as a research participant, please contact the Education Research and Social & Behavioral Science IRB Office at (608) 263-2320.

Thank you for your assistance.

Sincerely,

Cara Vaccarello, M.S.
Student Researcher
1025 West Johnson Street
Madison, WI 53706
vaccarello@wisc.edu

Thomas Kratochwill, Ph.D.
Principal Investigator / Professor
1025 West Johnson Street
Madison, WI 53706
tomkat@education.wisc.edu

I have read the description of this study. I understand that my confidentiality and my student's confidentiality will be protected in any presentation or written report of this study. I understand that participation is voluntary and involves no significant risks. I may withdraw my consent at any time. I give permission for the activities described above.

Name of Problem-Solving Team Coach (please print):

Signature: Date:

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Protocol: SE-2011-0450
Approved: 8/4/2011
Expires: 8/3/2012

Appendix B

Problem Solving Team Member Consent Form

UNIVERSITY OF WISCONSIN-MADISON

PROBLEM SOLVING TEAM MEMBER CONSENT FORM

Effects of a Problem Solving Team Intervention on the Problem-Solving Process: Improving Concept Knowledge, Procedural Integrity, and Student Outcomes

DESCRIPTION OF THE RESEARCH
You are invited to participate in a research study about the problem-solving process that your school uses to develop and implement interventions for students struggling academically and/or behaviorally. Specifically, the study will examine the ability of a problem-solving team (PST) intervention consisting of training, feedback, and coaching strategies to improve the team problem-solving process and enhance student outcomes. You have been asked to participate because you are a problem-solving team member directly involved in the problem-solving process.

WHAT WILL MY PARTICIPATION INVOLVE?
If you decide to participate in this study you will be asked to (a) participate in the problem-solving intervention, which consists of a preliminary 30-minute training session and approximately five 5-10 minute feedback and coaching sessions delivered by your school's problem solving coach (i.e., school psychologist), (b) be observed by graduate student researchers during approximately 5 problem solving meetings (c) complete a questionnaire evaluating your familiarity and use problem solving components, and (d) complete a problem solving intervention acceptability questionnaire.

ARE THERE ANY RISKS TO ME? HOW WILL CONFIDENTIALITY BE PROTECTED?
There are minimal risks associated with participating in this study. Considerable steps will be taken to mitigate risks such as breach of confidentiality. All of the information from this study will be stored in a locked filing cabinet. Researchers will not have access to student names or any other identifying information. Identification numbers will be used on all documents that contain information about students. Data collected from remaining participants will be confidential. The names of participants will not be used in any publication of this study. Only group characteristics will be published.

ARE THERE ANY BENEFITS TO ME?
There are no direct benefits for participating in this research. We hope that participation in this study will be beneficial for your school because it will provide educators with the opportunity to strengthen their abilities to develop, implement, and evaluate interventions developed through the problem-solving process. We believe that participating in this study will also be beneficial because you will learn more about the key components of the problem-solving process and how to carry out effective student intervention procedures.

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WILL I BE COMPENSATED FOR MY PARTICIPATION?
You will receive $50 for participating in this study and completing all previously listed responsibilities. If you withdraw from the study, you will receive no compensation.

CAN I CHANGE MY MIND?
Yes. Your participation is completely voluntary. If you decide to help with this study, please sign the attached permission form and return it at your earliest convenience.

WHOM SHOULD I CONTACT IF I HAVE QUESTIONS?
You may ask any questions about the research at any time. If you have questions about the study, please contact me, Cara Vaccarello, at (708) 828-1007 or my research advisor, Thomas Kratochwill, at (608) 262-5912. Our addresses are provided below. If you have questions regarding your rights as a research participant, please contact the Education Research and Social & Behavioral Science IRB Office at (608) 263-2320.

Thank you for your assistance. Sincerely,

I have read the description of this study. I understand that my confidentiality and my student's confidentiality will be protected in any presentation or written report of this study. I understand that participation is voluntary and involves no significant risks. I may withdraw my consent at any time. I give permission for the activities described above.

Name of Problem-Solving Team Member (please print):

Signature Date:

Sincerely,

Cara Vaccarello, M.S.
Student Researcher
1025 West Johnson Street
Madison, WI 53706
vaccarello@wisc.edu

Thomas Kratochwill, Ph.D.
Principal Investigator / Professor
1025 West Johnson Street
Madison, WI 53706
tomkat@education.wisc.edu

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Expires: 8/3/2012

Appendix C
Referring Teacher Consent Form

UNIVERSITY OF WISCONSIN-MADISON

TEACHER CONSENT FORM

Effects of a Problem Solving Team Intervention on the Problem-Solving Process: Improving Concept Knowledge, Procedural Integrity, and Student Outcomes

DESCRIPTION OF THE RESEARCH

You are invited to participate in a research study about the problem-solving process that your school uses to develop and implement interventions for students struggling academically and/or behaviorally. Specifically, the study will examine the ability of a problem-solving team (PST) intervention consisting of training, feedback, and coaching strategies to improve the team problem-solving process and enhance student outcomes. You have been asked to participate in this study because you are directly involved in your school's problem-solving process for developing and delivering student intervention plans.

WHAT WILL MY PARTICIPATION INVOLVE?
If you sign this consent form it indicates that you are willing to participate in the following activities, if you refer a student to the problem-solving team during the 2011-2012 academic year: (a) have a graduate student observer present at problem-solving meetings, (b) share de-identified intervention data (e.g., progress monitoring data) and your impressions of the student's outcomes with the researchers, and (c) complete a questionnaire rating your acceptability of the problem- solving team intervention. We will use the intervention data to analyze the effectiveness of the team problem-solving process. The questionnaire will help us learn more about your experience throughout the process and ways to improve the problem-solving process to better meet your needs, and those of your students, in the classroom.

ARE THERE ANY RISKS TO ME? HOW WILL CONFIDENTIALITY BE PROTECTED?
There are minimal risks associated with participating in this study. Considerable steps will be taken to mitigate risks such as breach of confidentiality. All of the information from this study will be stored in a locked filing cabinet. Researchers will not have access to student names or any other identifying information. Identification numbers will be used on all documents that contain information about students. Data collected from remaining participants will be confidential. The names of participants will not be used in any publication of this study. Only group characteristics will be published.

ARE THERE ANY BENEFITS TO ME?
There are no direct benefits for participating in this research. We hope that participation in this study will be beneficial for your school because it will provide educators with the opportunity to strengthen their abilities to develop, implement, and evaluate interventions developed through the problem-solving process. We believe that participating in this study will also be beneficial

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because you will learn more about the key components of the problem-solving process and how to carry out effective student intervention procedures.

WILL I BE COMPENSATED FOR MY PARTICIPATION?
You will receive $30 for participating in this study and completing all previously listed responsibilities. If you withdraw from the study, you will receive no compensation.

CAN I CHANGE MY MIND?
Yes. Your participation is completely voluntary. If you decide to help with this study, please sign the attached permission form and return it at your earliest convenience.

WHOM SHOULD I CONTACT IF I HAVE QUESTIONS?
You may ask any questions about the research at any time. If you have questions about the study, please contact me, Cara Vaccarello, at (708) 828-1007 or my research advisor, Thomas Kratochwill, at (608) 262-5912. Our addresses are provided below. If you have questions regarding your rights as a research participant, please contact the Education Research and Social & Behavioral Science IRB Office at (608) 263-2320.

Thank you for your assistance.

Sincerely,

Cara Vaccarello, M.S.
Student Researcher
1025 West Johnson Street
Madison, WI 53706
vaccarello@wisc.edu

Thomas Kratochwill, Ph.D.
Principal Investigator / Professor
1025 West Johnson Street
Madison, WI 53706
tomkat@education.wisc.edu

I have read the description of this study. I understand that my confidentiality and my student's confidentiality will be protected in any presentation or written report of this study. I understand that participation is voluntary and involves no significant risks. I may withdraw my consent at any time. I give permission for the activities described above if I refer a student to the problem-solving team during the 2011-2012 academic year:

Name of Teacher (please print):

Signature: Date:

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Protocol: SE-2011-0450
Approved: 8/4/2011
Expires: 8/3/2012

Appendix D
Parent Consent Form for Participating Students

UNIVERSITY OF WISCONSIN-MADISON

PARENT/GUARDIAN CONSENT FORM

Effects of a Problem Solving Team Intervention on the Problem-Solving Process: Improving Concept Knowledge, Procedural Integrity, and Student Outcomes

DESCRIPTION OF THE RESEARCH
Your student's school is participating in a research study about the problem-solving process it uses to develop and implement interventions for students struggling academically and/or behaviorally. Of interest is whether problem-solving team training will improve the team problem-solving process and enhance student outcomes. You have been asked to participate because your student was referred to his/her school's problem-solving team.

WHAT WILL MY PARTICIPATION INVOLVE?
If you decide to participate in this study, you consent to your student's teacher(s) to providing the researcher with general baseline, progress-monitoring, and post-intervention data. All student information will be de-identified (i.e., student names will be removed). You also consent to graduate student researchers observing problem-solving meetings during which your student may be discussed. This is to gather information about the general problem-solving process practiced by the school's problem-solving team.

ARE THERE ANY RISKS TO ME? HOW WILL CONFIDENTIALITY BE PROTECTED?
There are minimal risks associated with participating in this study. Considerable steps will be taken to mitigate risks such as breach of confidentiality. All of the information from this study will be stored in a locked filing cabinet. Researchers will not have access to student names or any other identifying information. Identification numbers will be used on all documents that contain information about students. Data collected from remaining participants will be confidential. The names of participants will not be used in any publication of this study. Only group characteristics will be published.

ARE THERE ANY BENEFITS TO ME?
There are no direct benefits for participating in this research. We hope that participation in this study will be beneficial for your student's school because it will provide educators with the opportunity to strengthen their abilities to develop, implement, and evaluate interventions developed through the problem-solving process.

WILL I BE COMPENSATED FOR MY PARTICIPATION?
You will receive no compensation for participation in this study.

CAN I CHANGE MY MIND?
Yes. Your participation is completely voluntary. If you decide to help with this study, please sign the attached permission form and return it at your earliest convenience.

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Approved: 8/4/2011
Expires: 8/3/2012

WHOM SHOULD I CONTACT IF I HAVE QUESTIONS?
You may ask any questions about the research at any time. If you have questions about the study, please contact me, Cara Vaccarello, at (708) 828-1007 or my research advisor, Thomas Kratochwill, at (608) 262-5912. Our addresses are provided below. If you have questions regarding your rights as a research participant, please contact the Education Research and Social & Behavioral Science IRB Office at (608) 263-2320.

Thank you for your assistance.

Sincerely,

Cara Vaccarello, M.S.
Student Researcher
1025 West Johnson Street
Madison, WI 53706
vaccarello@wisc.edu

Thomas Kratochwill, Ph.D.
Principal Investigator / Professor
1025 West Johnson Street
Madison, WI 53706
tomkat@education.wisc.edu

I have read the description of this study. I understand that my confidentiality and my student's confidentiality will be protected in any presentation or written report of this study. I understand that participation is voluntary and involves no significant risks. I may withdraw my consent at any time. I give permission for the activities described above.

Name of Student's Parent or Guardian (please print):

Name of Student:

Signature: Date:

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Approved: 8/4/2011
Expires: 8/3/2012

Appendix E

Training Materials for Intervention Component 1: Problem Solving Information

(see Training DVD and Outcomes: PME Manual)

Outcomes PME™
Planning, Monitoring, Evaluating

Record Form

Karen Callan Stoiber and Thomas R. Kratochwill

Student: Nathan Worthy School: Sunset Ridge Grade: 4
Birth Date: July 1, 1991 Sex: ☒ Male ☐ Female
Teacher: John Wiley
Parent(s): John and Sara Worthy

Team Members

Paul Beck, School Psychologist
Ronda Johnson, Reading
Mattie Molton, Teacher

Team Meeting Date

December 8, 2000
Month/Day/Year

Outcomes: PME Purpose
(check all that apply)

- ☑ Design and Monitor Intervention
- ☑ Pre-referral Documentation
- ☐ Problem-Solving/Consultation Team
- ☐ Special Education Eligibility Determination
- ☐ IEP Team
- ☐ Program Evaluation
- ☐ Other

1 *Identify concern, describe context, and establish baseline.*

Concern Description

Nathan is a transfer student with significant reading problems. The Wisconsin State Standards will be applied to Nathan's problems. Specifically, Nathan does not use effective reading strategies to read and analyze literature to acquire information.

Context (When and Where) of Occurrence: 4th grade classroom when reading required.
Frequency, Intensity, Duration of Occurrence: Daily

Student Assets to Build On: Nathan has good math skills.
Resources to Build On: Excellent reading program at school.
Parents' Concerns: Completion of homework.

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ISBN 015400433-2
9 780154 004338

2 Set meaningful goal(s) and benchmarks.

Goals and Benchmarks

Statement of Goal: Nathan will use post-reading strategies to improve his skills in interpreting, analyzing, and acquiring information from reading.

Context of Goal Behavior/Performance: During daily silent reading

Target Date for Goal Attainment: 10 weeks
Length of Time or Month/Day/Year

Benchmark Scaling

Benchmarks associated with the goal should be selected for a 7-point scale ranging from –3 to +3 or from 0 to +6; descriptions of performance correspond to the following:

–3 to +3 Progress Scaling

+3	Best Possible Outcome; Much Improved
0	No Change in Behavior (Baseline)
–3	Worst Possible Outcome; Much Worse

0 to 6 Progress Scaling

+6	Exceeding or Reaching Goal; Competent
3	Unacceptable Competence Level; Poor Progress
0	Extremely Unacceptable Competence Level; Skill Not Evident

Circle one: +3 to –3 or 0 to 6

+3	+6	Benchmark After reading a short chapter, Nathan will provide correct responses to 5 simple factual questions about what he has read.
+2	+5	Benchmark After reading a short chapter, Nathan will provide correct responses to 4 simple factual questions about what he has read.
+1	+4	Benchmark After reading a short chapter, Nathan will provide correct responses to 3 simple factual questions about what he has read.
0	+3	Benchmark After reading a short chapter, Nathan will provide correct responses to 2 simple factual questions about what he has read.
–1	+2	Benchmark After reading a short chapter, Nathan will provide correct responses to 1 simple factual question about what he has read.
–2	+1	Benchmark After reading a short chapter, Nathan will provide incorrect responses to all 5 questions about what he has read.
–3	0	Benchmark After reading a short chapter, Nathan will refuse to attempt to answer questions about what he has read.

Social-Validation Criteria

To What Standards or Social-Comparison Criteria Class average

3 Plan the intervention and specify progress-monitoring procedures.

Intervention Planning

Brainstorm Possible Interventions: Use peer tutoring to assist in answering post-reading questions; self-monitor reading strategies; one-on-one program with reading resource teacher; after-school literature circle.

Specify Selected Interventions: Pair with peer tutor for 10 weeks; self-monitor number of correct responses.

Specify Individuals Who Will Implement Strategies: Teacher writes questions, peer assists with reviewing answers, self-monitoring correct number of answers.

Specify Strategies and Resources Needed: Add Nathan to existing peer tutoring program; Teacher prepares simple probes such as, "What happened when..." or "Who is..."

Progress-Monitoring Procedures

Outcome Measures	Specify Type	By (initials)	Daily	Twice Daily	Weekly	Twice Weekly	Monthly	Twice Monthly
☑ Goal-Attainment Ratings	Teacher GAS ratings (0-6)	Teacher	☐	☐	☑	☐	☐	☐
☐ Behavioral Observations			☐	☐	☐	☐	☐	☐
☑ Work Samples	Class assignments related to reading strategies (reported as % correct tasks)	Teacher	☐	☐	☑	☐	☐	☐
☐ Test Scores			☐	☐	☐	☐	☐	☐
☐ Curriculum Probes			☐	☐	☐	☐	☐	☐
☐ Checklist Ratings			☐	☐	☐	☐	☐	☐
☐ Anecdotal Reports			☐	☐	☐	☐	☐	☐
☑ Self-Monitoring	Number of correct answers	Nathan	☑	☐	☐	☐	☐	☐
☐ Other:			☐	☐	☐	☐	☐	☐

Individuals Responsible for Summarizing Data Recording/Charting: Teacher and Nathan

4 Monitor progress and analyze data.

Beginning Point 02/01/2001 (Month/Day/Year) Ending Point 04/15/2001 (Month/Day/Year)

Select from one of the following scales

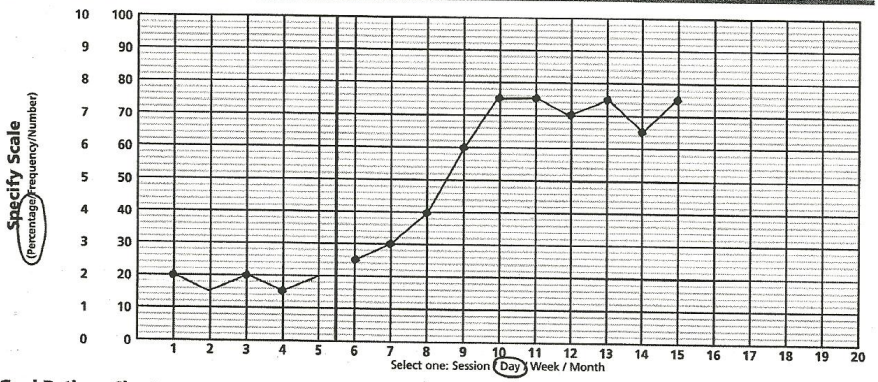
0	Extremely Unacceptable
1	Very Unacceptable
2	Somewhat Unacceptable
3	Unacceptable
4	Emerging
5	Somewhat Developed
6	Competent

OR

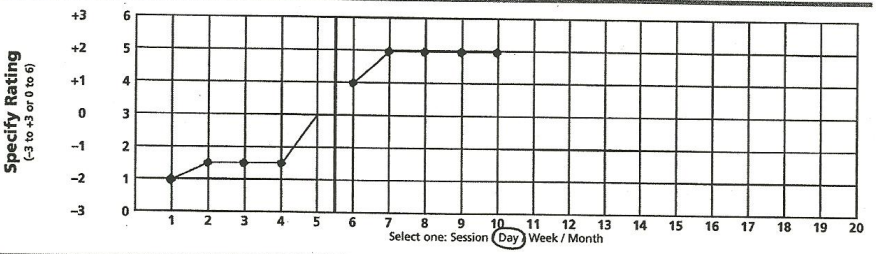
−3	Much Worse
−2	Somewhat Worse
−1	Minimally Worse
0	Baseline
+1	Minimally Improved
+2	Somewhat Improved
+3	Much Improved

Highlight the data points that will be used for the baseline reference or draw a phase line.

Progress Chart Outcome Measure: Point for number of correct answers



Goal Ratings Chart



Progress Analysis

Evidence in Support of Ratings: Classroom work assessments in the curriculum will be conducted by the classroom teacher.

Strategies That Facilitated Progress: Focused peer feedback, Nathan checking parts for correct answers.

Strategies That Impeded Progress: Nothing was found to impede progress.

Social-Comparison Evidence: Nathan is getting close to the class average in levels of performance on comprehension work.

5 *Evaluate intervention outcomes and plan next steps.*

Evaluation of Outcomes

GOAL	Goal Rater	Final Goal Rating −3 to +3 or 0 to +6	Other Outcome Data Measures and CES Goal Index Measure 1 (Work)	Measure 2 ( )	Measure 3 ( )
	Rater 1 MM	+5	+5		
	Rater 2 RJ	+5	+5		
	Rater 3				
	Average	+5	+5		

Intervention Outcome Decision: ☐ Better than Expected ☑ Expected ☐ Less than Expected ☐ More Data Needed

Next-Step Planning

Specify Convergent-Evidence and Intervention Outcome Considerations

Established Sound Intervention Quality and Integrity ☑ Yes ☐ No Specify: Good follow through

Monitoring Data and Convergent Data Sufficient ☑ Yes ☐ No Specify: Peer, teacher, Nathan agree

Statement of Revised Goal(s) (if indicated): Move on to goals 2 and 3

Next-Step Strategies

Strategy 1: Add some inferential reading comprehension questions

Strategy 2: Use all higher level post-reading questions, drop use of peers

Individuals Responsible for Implementing Strategies: Ronda Johnson will set up program

Specify Special Education Considerations (if applicable)

Reasons Documenting Unresponsiveness to Intervention (check all that apply):

☐ Severity of Concern and Level of Tolerance Specify:

☐ Significant Discrepancy From Expected Progress Specify:

☐ Continued or Ongoing Need for Intervention Specify:

☐ Level of Resources Needed for Implementing Intervention Specify:

Eligibility Decision-Making (check options):

☐ Team determines no disability

☐ Team determines need for referral for special education determination

☐ Team determines disability but no special services needed

☐ Team determines disability and special services needed

☐ The team or committee mutually agreed to the plan in this document and reached consensus on documented outcomes.

☐ The team or committee has not reached agreement on the intervention plan or outcomes documented and will reconvene on_____.

Final Recommendations:

Problem Solving Intervention: Preliminary Training Component

Integrity Checklist

School: _____

PST Coach: _____

Intervention Implementation Date: _____

___Completed PowerPoint presentation viewing independently

___Completed PowerPoint presentation viewing with remaining PST members

___Completed Team Activity 1: Describing referral concerns in measurable terms

___Completed Team Activity 2: Developing goal attainment scales

___Completed Team Activity 3: Identifying appropriate interventions and progress-monitoring methods

___Completed Team Activity 4 Identifying appropriate social comparison data

___Subsequent PST meeting(s) scheduled within the next two weeks

Appendix F

Problem Solving Integrity Checklist

Instructions for baseline phase*:* Please score items 1-16 during problem solving meeting observation. Please score items 17-25 using completed *Student Plan and Outcomes Report*. Each item may be scored as 0,1, or 2. A score of 0 indicates an absence of that problem-solving component. A score of 1 indicates partial or incomplete implementation of that problem-solving component. A score of 2 indicates adequate and complete implementation of that problem-solving component. Please see scoring examples beneath each component.

Instructions for intervention phase*:* Please score items 1-25 using completed Outcome: PME protocol. Each item may be scored as 0,1, or 2. A score of 0 indicates an absence of that problem-solving component. A score of 1 indicates partial or incomplete implementation of that problem-solving component. A score of 2 indicates adequate and complete implementation of that problem-solving component. Please see scoring examples beneath each component.

*Items 1-16 = *Problem Identification and Analysis* (Please see right column for corresponding Outcomes: PME section)		
Problem Solving Components	**Degree of Implementation (circle one)**	**Item(s) on Outcomes: PME (intervention)**
1. Problem solving team members identified and purpose of meeting is articulated.	**0**: Component not implemented **1:** One of the components below is missing. **2:** Team members are listed on form *and* purpose of meeting is identified on form.	Outcomes: PME Step 1: "Team Member" section.
2. Behavioral and/or academic concern defined in observable, measurable terms.	**0**: Component not implemented **1:** Problem is vaguely defined. Only part of the problem is objectively defined. (e.g., Problem: Carrie is out of her seat during individual seatwork time (*objective*) and messing around at her desk (*not objectively defined*). **2:** Entire problem is objectively defined (Problem: Carrie is out of her seat during individual seatwork time *or* engaging in a behavior other than writing, reading, or asking teacher a question relevant to the seatwork).	Outcomes: PME Step 1: "Concern Description" section.
3. Baseline established on behavioral and/or academic concern.	**0:** Component not implemented **1:** Baseline data includes 1-2 types of data (e.g., **R**ecords, **I**nterviews, **O**bservations, **T**est results= **RIOT**) **2:** Baseline data included 3-4 types of data (e.g., **RIOT**)	Outcomes: PME Step 1: "Concern Description" section.
4. Context of concern evaluated (e.g., routine, expectation-skill match, contingent	**0**: Component not implemented **1:** Context where concern occurs is identified (e.g., during math class) **2:** Context where concern occurs *and* frequency,	Outcomes: PME Step 1: "Concern Description" section.

relationships, teacher support required).	intensity, or duration of occurrence is identified (e.g., during math class 3-5 days/week).	
5. Student and situational assets to build on identified.	**0**: Component not implemented. **1:** Student assets to build on are identified (e.g., good relationships with peers) *or* resources to build on are identified (e.g., teachers involved in classroom management training; standard protocol intervention available). **2:** Student assets *and* resources to build on are identified.	Outcomes: PME Step 1: "Concern Description" section.
6. Parental input about behavioral or academic concern obtained.	**0**: Component not implemented **1:** (no partial implementation score) **2:** Parental input is obtained.	Outcomes: PME Step 1: "Concern Description" section.
7. Goal statement focusing on controllable, measurable behaviors written.	**0**: Component not implemented **1:** Goal statement is vaguely defined. Only part of the goal was objectively defined (e.g., Goal: Jimmy will read 75 words correctly per minute (*objective*) and comprehend what he is reading (*less objective)*. **2:** Entire goal was objectively defined (e.g., Goal: Jimmy will read 75 words correctly per minute and score in the average range on a standardized measure of reading comprehension.	Outcomes: PME Step 2: "Goals and Benchmarks" section.
8. Target date for goal attainment established.	**0**: Component not implemented **1:** Date is indicated for goal attainment (e.g., by May 15th); goal statement received score of 1. **2:** Date is indicated for goal attainment (e.g., by May 15th); goal statement received score of 2.	Outcomes: PME Step 2: "Goals and Benchmarks" section.
9. Benchmarks (i.e., performance indicators) that reflect the student's progress toward the general outcome goal are established.	**0**: Component not implemented **1:** No partial implementation **2:** Team identified objective, quantifiable, age-appropriate benchmarks to measure student performance (e.g., goal-attainment scale, graphed aim line).	Outcomes: PME Step 2: "Goals and Benchmarks" section.
10. Standard or social-comparison criteria against which to measure progress selected.	**0**: Component not implemented **1:** Social comparison criteria are identified, but are vaguely defined and not in measurable terms. **2:** Social comparison criteria are identified and are defined in measurable terms that correspond to target student's benchmark skills.	Outcomes: PME Step 2: "Goals and Benchmarks" section.
11. Specific academic skill or replacement behavior identified and evidence-based intervention strategies are identified.	**0**: Component not implemented **1:** Team identified a specific academic skill or replacement behavior and intervention strategies, but the intervention is not evidence-based or not linked to the function of the behavior based on baseline data. **2:** Team identified a specific academic skill or replacement behavior and intervention strategies, and	Outcomes: PME Step 3: "Intervention Planning" section

	the intervention is evidence-based and/or linked to the function of the behavior based on baseline data.	
12. Intervention plan is clearly outlined in objective terms.	**0**: Component not implemented **1:** Some, but not all, of the intervention components were clearly outlined. Some intervention components vaguely defined (e.g., One on one reading group, behavior chart, reinforcement plan) **2:** All of the intervention components were clearly outlined, verbally or in writing.	Outcomes: PME Step 3: "Intervention Planning" section
13. Resources needed to implement intervention determined.	**0**: Component not implemented **1:** Individuals responsible for implementing intervention are identified (e.g., teacher, one peer) *or* specific strategies and resources needed are identified (e.g., reduced reading group size for target student, peer tutor) **2:** Individuals responsible for implementing intervention *and* specific strategies and resources needed are identified.	Outcomes: PME Step 3: "Intervention Planning" section
14. Progress-monitoring procedures specified, including individuals responsible for collecting progress-monitoring data.	**0**: Component not implemented **1:** A progress-monitoring plan identified but was missing 1-2 critical details (i.e., who, what, or when). **2:** A progress-monitoring plan was stated and clearly defined who, what, and when.	Outcomes: PME Step 3: "Progress Monitoring Procedures" section
15. Individuals responsible for summarizing and charting progress monitoring data are identified.	**0**: Component not implemented **1:** (no partial implementation) **2:** Individuals responsible for summarizing and charting progress-monitoring data were identified.	Outcomes: PME Step 3: "Progress Monitoring Procedures" section
16. Progress monitoring data are objective, empirical, and directly linked to the problem.	**0**: Component not implemented **1:** Progress-monitoring plan/data are not quantitative/empirical. **2:** The progress-monitoring plan/data are directly linked to the problem and are quantitative/empirical.	Outcomes: PME Step 3: "Progress Monitoring Procedures" section
Problem Identification and Analysis Integrity Total =		
*Items 17-25 = *Plan Implementation and Evaluation*		
17. Progress-monitoring data and/or goal-attainment data are plotted.	**0**: Component not implemented **1:** Progress-monitoring data plotted, but at least one of these components is missing: start date, end date, outcomes measure, labeled axes. **2:** Progress-monitoring data are plotted, and all essential components are included.	Outcomes: PME Step 4: "Progress Monitoring Procedures" section

18. Direct comparison of the student's post-intervention performance with baseline data.	**0**: Component not implemented **1:** One type of progress-monitoring data plotted. Chart indicates baseline and intervention phases. **2:** Two types of progress-monitoring data plotted. Charts indicate baseline and intervention phases.	Outcomes: PME Step 4: "Progress Monitoring Procedures" section
19. Reasons for positive and/or negative progress reviewed.	**0**: Component not implemented **1:** Reason(s) for positive and/or negative progress are identified, but do not have relevance to the intervention or target student. **2:** Reason(s) for positive and/or negative progress are listed, and have relevance to the intervention or target student.	Outcomes: PME Step 4: "Progress Analysis" section
20. Social-comparison evidence used to evaluate intervention outcomes.	**0**: Component not implemented **1:** Social comparison evidence provided but is not quantifiable and/or not consistent with intervention goals. **2:** Quantifiable social comparison evidence is provided and is consistent with the intervention goals.	Outcomes: PME Step 4: "Progress Analysis" section
21. Based on convergent-evidence procedures, consensus on progress toward goal occurred.	**0**: Component not implemented **1:** Intervention outcome decision is indicated, but summary of outcome data is not provided for each measure. **2:** Summary of outcome data is provided for each measure/rater *and* intervention outcome decision is indicated.	Outcomes: PME Step 5: "Evaluation of Outcomes" section
22. Treatment integrity of the intervention was assessed.	**0**: Component not implemented **1:** Vague, general statement about the integrity of the intervention is provided (e.g., assertion that the intervention occurred) **2**: At least one type of treatment integrity data is provided (e.g., attendance records, home notes, checklists, observation notes, rating scale, permanent products from student).	Outcomes: PME Step 5: "Next-Step Planning" section
23. Intervention goals revised, if applicable (e.g., due to lack of progress). Otherwise, maintenance/generalization goal identified.	**0**: Component not implemented **1:** If applicable, revised goal statement is provided, but is not objectively defined (e.g., Erik will participate in large group activities). **2:** If applicable, revised goal statement is provided and is objectively defined. Otherwise maintenance/generalization goal is identified.	Outcomes: PME Step 5: "Next-Step Planning" section
24. Feasible next-step strategies for meeting student's needs are developed.	**0**: Component not implemented **1:** Team identifies next-step strategies to meet student's needs, but strategies/steps are not objectively defined (i.e., type and frequency of intervention). **2:** Team identifies next-step strategies to meet student's needs, and strategies/steps are objectively defined (i.e., type and frequency of intervention).	Outcomes: PME Step 5: "Next-Step Strategies" section

25. Individuals responsible for implementing next-step strategies are identified.	**0**: Component not implemented **1:** (no partial implementation score) **2:**Team identifies person(s) responsible for implementing next-step strategies.	Outcomes: PME Step 5: "Next-Step Strategies" section
Plan Implementation and Evaluation Integrity Total =		
Total Problem Solving Integrity Score =		

**Note: Adapted from Outcomes: PME Procedural Checklist* (Stoiber & Kratochwill, 2001*)* and *Problem-Solving Team Process Fidelity Checklist* (Burns, et al., 2008a)

Appendix G

Training Materials for Intervention Component 2: Performance Feedback

School B: Problem Solving Integrity Performance Feedback #2

Instructions: At the beginning of the meeting, pass out the performance feedback graph and tables to all team members. Only you should have a copy of this script. Read the italicized paragraphs below to the team. On the performance feedback document, check off each of the numbered items after you have presented the information.

1. GRAPHS 1, 2, and 3: Direct the team to look at the graph on the top of page one. *The first graph depicts the overall percentage of problem-solving components that were implemented during recent problem solving cases using the Outcomes: PME protocol. You conducted three meetings in February after your initial problem solving training, and earned overall integrity scores of 66%, 64%, and 66%. Your scores from those meetings increased by 17 points (35%) from your first problem solving meeting in October. Nice work!*

The second graph depicts the percentage of problem solving components that were implemented for the problem solving stages: "Problem Identification and Problem Analysis." Your team's scores for the problem identification and problem analysis stages increased considerably from an average of 46% to 91% after your participation in the training. The third graph depicts the percentage of problem solving components that were implemented for the problem solving stages: "Plan Implementation and Plan Evaluation." Your team's plan implementation and plan evaluation stages decreased slightly from an average of 30% to 22% after your participation in the training.

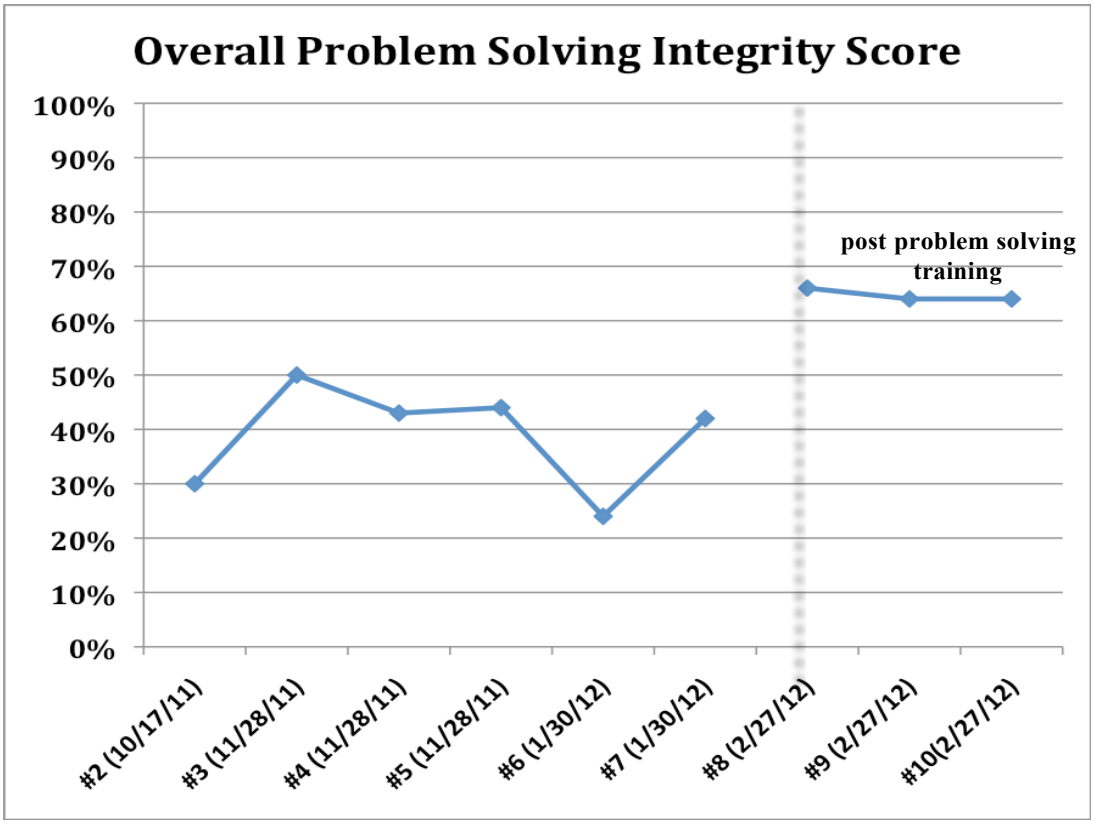
2. TABLES 1 & 2
As you may remember from last meeting, a score of 2 is awarded if a component is implemented perfectly. If a component is partially implemented, the team earns 1 point. A score of 0 is given if the component is not discussed during the meeting. The table at the bottom of the second page shows how many components earned a score of 2, 1, and 0 at the last meeting in February. As you can see, the team earned a total of 33 points during a meeting conducted on Feb. 27th,with an overall problem solving integrity score of 66%.

3. TABLE 3
On the next page, Table 3 lists the components that were not implemented at this meeting. I will read through each of the components. If you are unsure of the meaning of a component, feel free to read the definition to yourself.
(Read each component in the left hand column aloud.)

4. **TABLE 4**
Table 4 shows the components that were partially implemented.
(Read each component in the left hand column aloud.)
5. **TABLE 5**
Finally, table 5 shows the components that were fully implemented.
(Read each component in the left hand column aloud.)

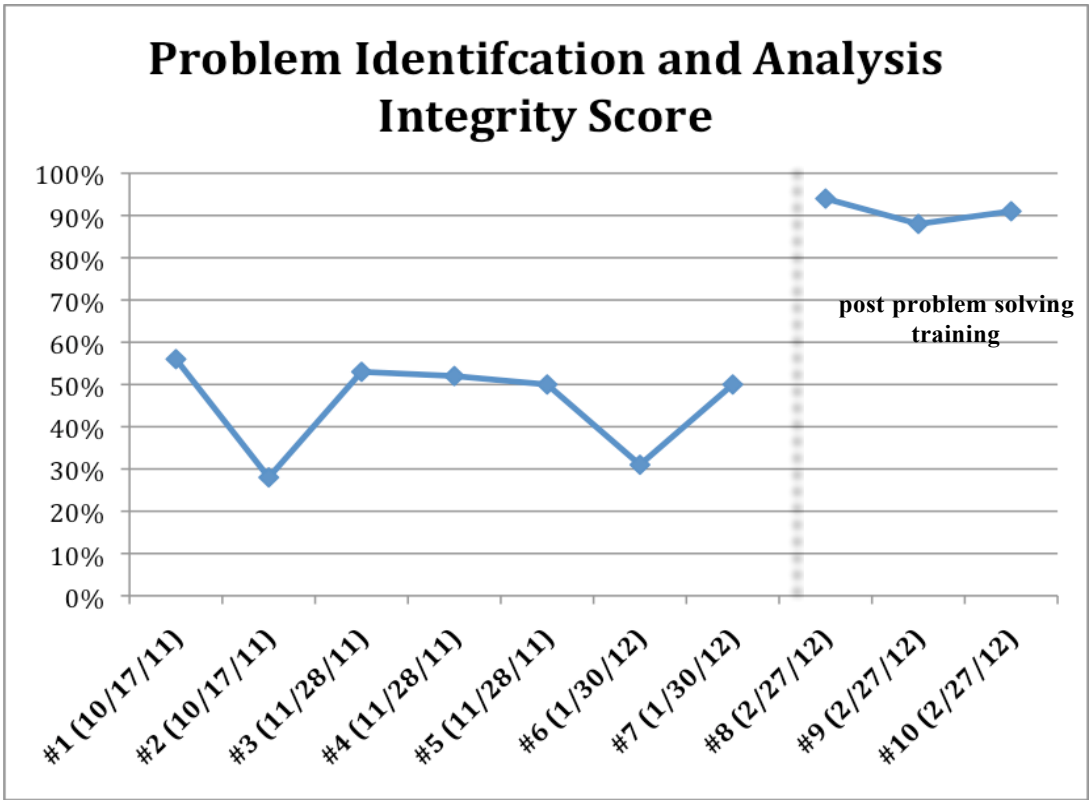
Consider this information as you conduct the current problem-solving meeting.

Graph 1.



_____(check when #1 is completed)

Graph 2.



Graph 3.

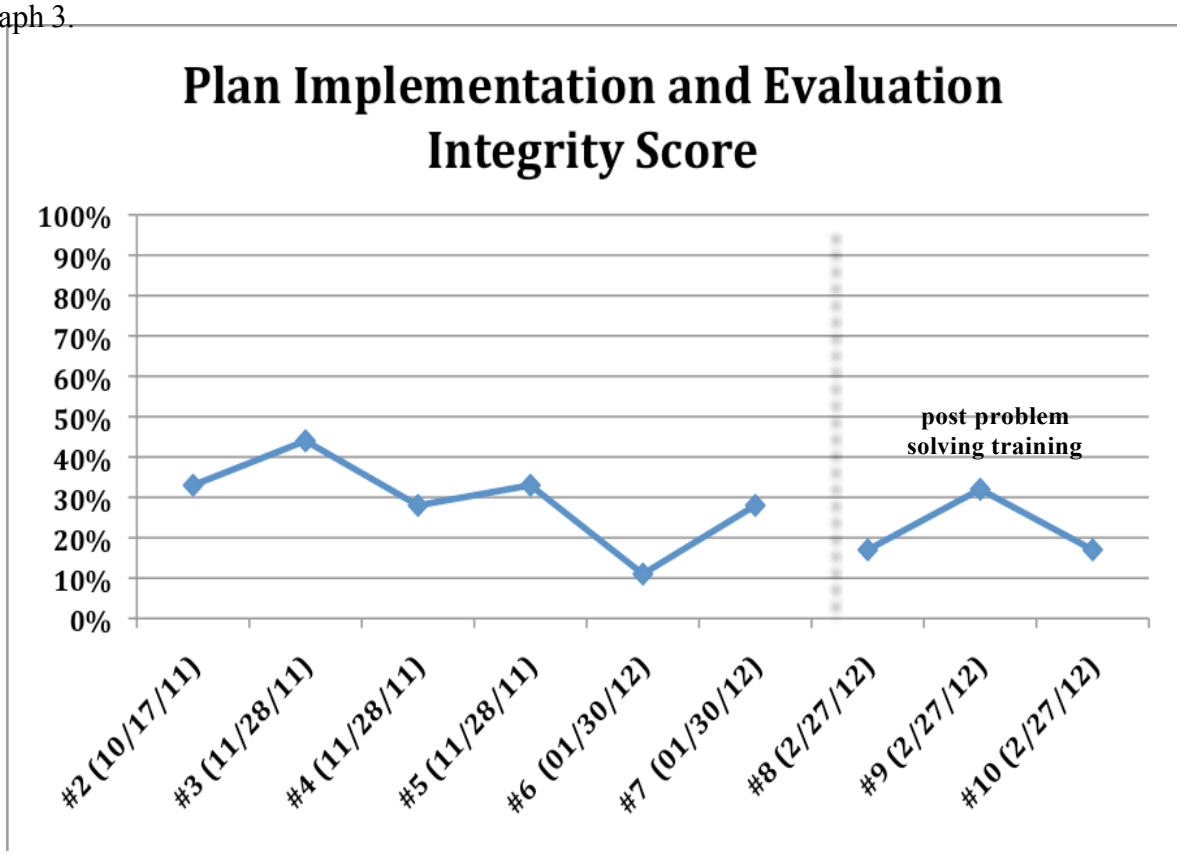


Table 1.

Score Descriptors		
Score of 2: Component was fully implemented	Score of 1: Component was partially implemented	Score of 0: Component was not implemented

Table 2.

Score Summary for last meeting (Feb. 27th)		Total: 33
Not Implemented: 7/25 components	Partially Implemented: 3/25 components	Fully Implemented: 15/25 components

_____(check when #2 is completed)

Table 3.

Problem-Solving Components Not Implemented (score of 0)	Definition of Component
Based on convergent-evidence, consensus on progress toward goal occurred.	Summary of outcome data is provided for each measure/rater *and* intervention outcome decision is indicated.
Social-comparison evidence used to evaluate intervention outcomes.	Quantifiable social comparison evidence is provided and is consistent with the intervention goals
Treatment integrity of the intervention was assessed.	At least one type of treatment integrity data is provided (e.g., attendance records, checklists, observation notes, rating scale, permanent products from student).
Reasons for positive and/or negative progress reviewed.	Reason(s) for positive and/or negative progress are listed, and have relevance to the intervention or student.
Intervention goals revised, if applicable (e.g., due to lack of progress). Otherwise, maintenance goal is identified.	If applicable, revised goal statement is provided and is objectively defined. Otherwise maintenance/generalization goal is identified.
Individuals responsible for implementing next-step strategies are identified.	Team identifies person(s) responsible for implementing next-step strategies.
Based on convergent-evidence, consensus on progress toward goal occurred.	Summary of outcome data is provided for each measure/rater *and* intervention outcome decision is indicated.

_____(check when #3 is completed)

Table 4.

Problem-Solving Components Partially Implemented (score of 1)	Definition of Component
Behavioral and/or academic concern defined in observable, measurable terms.	Entire problem is objectively defined (Example: Carrie is out of her seat during individual seatwork time *or* engaging in a behavior other than writing, reading, or asking teacher a question relevant to the seatwork.
Direct comparison of the student's post-intervention performance with baseline data.	Two types of progress-monitoring data plotted. Charts indicate baseline and intervention phases.
Standard or social-comparison criteria against which to measure progress selected.	Social comparison criteria are identified and are defined in measurable terms that correspond to target student's benchmark skills (comparison peer, norms).

_____(check when #4 is completed)

Table 5.

Problem-Solving Components Fully Implemented (score of 2)	Definition of Component
Problem solving team members identified and purpose of meeting is	Team members are identified/listed on form *and* purpose of meeting is stated/identified on form.
Baseline established on behavioral and/or academic concern.	Baseline data included 3-4 types of data Records, Interviews, Observations, Test results= RIOT)

Context of concern identified (i.e., setting, frequency, intensity, and duration of concern).	Context where concern occurs *and* frequency, intensity, or duration of occurrence is identified (e.g., during math class 3-5 days/week).
Student and situational assets to build on identified.	Student assets to build on are identified (e.g., good relationships with peers) and resources to build on are identified (e.g., teachers involved in classroom management training; standard protocol intervention available).
Parental input about behavioral or academic concern obtained.	Parental input is obtained, mentioned, and used during problem solving meeting.
Goal statement focusing on controllable, measurable behaviors written.	Entire goal was objectively defined (e.g., Goal: Jimmy will read 75 words correctly per minute and score in the average range on a standardized measure of reading comprehension.
Target date for goal attainment established	Date is indicated for goal attainment (e.g., by May 15th)
Specific academic skill or replacement behavior identified and evidence-based intervention strategies are identified.	Team identified a specific academic skill or replacement behavior and intervention strategies, and the intervention is evidence-based and/or linked to the function of the behavior based on baseline data.
Benchmarks (i.e., performance indicators) that reflect the student's progress toward the general outcome goal are established.	Team identified objective, quantifiable, age-appropriate benchmarks to measure student performance (e.g., goal-attainment scale, graphed aim line).
Intervention plan is clearly outlined in objective terms.	All intervention components were clearly outlined. Vague definitions include: one on one reading group, behavior chart, reinforcement plan.
Resources needed to implement intervention determined.	Individuals responsible for implementing intervention *and* specific strategies/resources needed are identified (e.g., reduced reading group size, peer tutor, etc.)
Progress-monitoring procedures specified, including individuals responsible for collecting data.	A progress-monitoring plan was stated and clearly defined who, what, and when.
Progress monitoring data are objective, empirical, and directly linked to the problem.	The progress-monitoring plan/data are directly linked to the problem and are quantitative/empirical (CBMs, observation frequency data, goal attainment data, etc.)
Individuals responsible for summarizing and charting progress monitoring data are identified.	Individuals responsible for summarizing and charting progress-monitoring data were identified.
Progress-monitoring data and/or goal-attainment data are plotted.	Progress-monitoring data are plotted, and all essential components are included (e.g., start date, end date, outcomes measure, labeled axes).

_____(check when #5 is completed

Appendix H

Training Materials for Intervention Component 3: Targeted Coaching

Coaching Target: Setting Goals and Identifying Benchmarks

Read italicized parts below to your team. Check when each step is completed.

___Read the following paragraph aloud as your team follows along.

Today, we're going to briefly review an important step during our problem-solving process. This includes identifying goals and benchmarks. When a student is referred to our team for an academic or behavioral concern it is important that we clearly identify a treatment goal for the student and indicate benchmarks that we'd like them to meet as we measure progress. Progress monitoring data are only useful if utilized to systematically assess a student's progress toward the goal. Benchmark goals provide a framework for evaluating a student's progress toward the goal. Rather than waiting to the end of the intervention to decide if it was effective, benchmark goals can save a team time and resources by helping teachers identify when to revise an ineffective intervention (i.e., when the student is not meeting benchmark goals). It's also critical that we use social--comparison data to ensure that our goals and benchmarks for the student are appropriate. This also helps us identify whether the student is demonstrating adequate progress compared to the student's peers. On your handout, you'll see Table 1. Which describes the components of identifying goals and benchmarks. Please follow along as your coach reads them aloud.

___Read the following components aloud as your team follows along.

Component of Goal Identification	Description of each component
1. Identify and write a goal statement in controllable, measurable terms	A goal should be clearly defined in measurable terms (hint: it should include numbers and relate directly to the referral concern!). When goals are written in vague terms, the team cannot adequately measure progress. Goal statements that include vague terms such as "will improve…." "Will decrease…" "Will understand…" are not observable and measureable.
2. Identify a target date for goal attainment.	The team should identify a clear date by which they anticipate the student to meet the treatment goal. This helps identify incremental goals by certain dates, and provides accountability for intervention implementation and progress monitoring.
3. Establish benchmarks (i.e., performance indicators) that reflect the student's progress toward the general outcome goal.	Examples of benchmarks include Goal Attainment Scaling (which are student-specific and team-developed) and

	graphed aim lines using such as DIBELS and AIMSweb.
4. Select a standard or social-comparison criterion to measure the student's progress against.	Examples of standards or social comparison data to measure student progress against include: •Norm-referenced/standardized tests (e.g., WKCE) •Curriculum-based assessment benchmarks (e.g., DIBELS, AIMSweb) •Peer comparison (e.g., observational data regarding time on-task, number of assignments missed, etc.) •Local, state, or national standards

Below is a case example of a student referral concern. Please follow along as your team coach reads the case example aloud. Consider how this example is relevant to student referrals at your school.

___Read the following paragraph aloud as your team follows along.

Case Example
You have developed a behavioral plan for a student who is not completing his individual seatwork in math class. You have determined that the student can do the work but is easily distracted by his peers (i.e., performance problem). The behavioral intervention includes the following components: reviewing the goal with the student, self-monitoring, verbal praise, reward when benchmark goal is met, and parent communication. **What is the goal (include the timeframe)?** You schedule 15 minutes of seatwork at the end of each math class. You collect this work from students when the bell rings. Your goal is for the student to complete the daily seatwork in the 15 minutes you allot, like other students with similar abilities in your classroom **(social comparison criterion)**. Specifically, within two months, you want 90% of the seatwork handed in to be complete (calculate weekly averages) with 0-1 daily prompts. **What is the student's current level of performance?** Two weeks of baseline data indicate that the student requires 3-4 daily prompts (e.g., reminders to sit down, take out pencil, get back to work, stop talking) and only 30% of assignments are handed in complete. **Benchmark goals:** **At 2 weeks**: 45% of assignments across the week are finished with 3 daily prompts or less **At 1 month**: 60% of assignments across the week are finished with 2 daily prompts or less **At 6 weeks**: 75% of assignments across the week are finished with 1 daily prompt or less **At 2 months (final goal):** 90% of assignments across the week are finished with 1 daily prompt or less

Let's consider effective goal and benchmark identification as we conduct our next meeting.

NEXT: As your team conducts the next problem solving meeting, provide support (e.g., answer questions, model, provide prompts) as they identity goals and develop benchmarks.

Appendix I
Student Plan and Outcomes Report

Student Plan and Outcomes Report

Teacher Name: _____ Date: _____

Student Identification #: _____

Directions: Please complete the following questionnaire and attach any supporting documentation. Please skip questions if you have a copy of the problem-solving team meeting notes and the notes provide the same information. If assessments not listed in the meeting notes were used to evaluate the intervention, please provide the names of those assessments in #4.

1. What type of concern/s did you have about this student (check all that apply)?
☐ Academic ☐ Behavioral ☐ Emotional ☐ Other_____

2. How was the problem defined by the problem-solving team?

3. What goals were identified during the problem-solving meeting?

4. Please describe the intervention plan for the student.

5. Was progress-monitoring data collected? ☐ Yes ☐ No

If yes, please check all types of progress-monitoring/outcome data collected and attach results.

☐ Behavioral referrals	☐ Attendance records	☐ Observational data
☐ Goal attainment scale	☐ Curriculum-based measures	☐ Work products:
☐ Rating scale	☐ Other:_____	

6. Did the team consider reasons for positive and/or negative progress? ☐ Yes ☐ No
If yes, please describe.

7. Was social comparison data used to measure student's progress against? ☐ Yes ☐ No

If yes, please describe.

8. Did the team reach a consensus on the student's progress towards intervention goal(s)?
☐ Yes ☐ No
If yes, please describe.

9. Was treatment integrity data collected? ☐ Yes ☐ No
If so, please identify the type of treatment integrity data that was collected and attach the data to this document:
☐ Self-report (e.g., checklist) ☐ Observation data
☐ Interview/s ☐ Permanent products (e.g., home-school notes)
☐ Other: _____

10. Were intervention goals and strategies revised? ☐ Yes ☐ No
If yes, please describe.

11. Were next steps for meeting student's needs considered? ☐ Yes ☐ No
If yes, please describe next steps and related resources.

12. Please identify the statement that best describes the student's progress toward the intervention goals. **Complete Part A*** if the student is no longer receiving the intervention. **Complete Part B**** if the student is still receiving the intervention. **If the student has received less than three weeks of the intervention, you may skip this question.**

***Part A**

The student regressed. ☐

The student did not make any progress (i.e., current performance is same as baseline. ☐

The student made minimal progress. ☐

The student made moderate progress. ☐

The student made significant progress and met or exceeded intervention goals. ☐

****Part B**

The student has regressed. ☐

The student has not progressed (i.e., current performance is same as baseline). ☐

The student has made minimal progress and is not likely to meet intervention goals. ☐

The student has made moderate progress and may meet intervention goals. ☐

The student has made significant progress and is on track to meet or exceed intervention goals. ☐

Appendix J
Outcomes: PME Procedural Checklist

Check all the steps completed

1. *Describe and establish the baseline of the behavioral or academic concern.*
   - ☐ 1. Behavioral or academic concern defined in observable, measurable terms.
   - ☐ 2. Baseline established on behavioral or academic concern.
   - ☐ 3. Situational analysis of concern conducted (e.g., routines, expectation, skill match, contingent relationships, adult/teacher support required).
   - ☐ 4. Student and situational assets to build on identified.
   - ☐ 5. Parental input about behavioral or academic concern obtained.
2. *Set meaningful goals and benchmarks.*
   - ☐ 6. Goal statement focusing on controllable, measurable behaviors written.
   - ☐ 7. Benchmarks specifying standard against which to compare and scaling format selected.
   - ☐ 8. Target date for goal attainment established.
   - ☐ 9. Standard or social-comparison criterion against which to measure progress selected.
3. *Plan the intervention and specify progress-monitoring procedures.*
   - ☐ 10. Intervention with empirical support or functional basis identified.
   - ☐ 11. Intervention strategies/steps developed and reviewed with the change agent(s) or interventionist(s), such as parent, teacher, language specialist, psychologist.
   - ☐ 12. Context, frequency, and resources needed to implement intervention determined.
   - ☐ 13. Progress-monitoring procedures specified, including individual responsible for implementing progress monitoring and individual responsible for collecting progress-monitoring data.
4. *Monitor progress and analyze data.*
   - ☐ 14. Goal scaled at beginning point, intervention with specified strategies implemented for specified time, goal scaled at ending point.
   - ☐ 15. Progress-monitoring data and goal-attainment data plotted.
   - ☐ 16. Evidence in support of child's progress documented.
   - ☐ 17. Reasons for positive and/or negative progress review.
5. *Evaluate intervention outcomes and plan the next steps.*
   - ☐ 18. Consensus on progress toward goal occurred based on convergent-evidence procedures.
   - ☐ 19. Intervention-quality and intervention-integrity data reviewed.
   - ☐ 20. Discrepancy between expected change and post intervention examined for significance.
   - ☐ 21. Sufficient monitoring data and convergent data established.
   - ☐ 22. Intervention goals and strategies revised, if indicated (e.g., due to poor progress).

Appendix K
Problem-Solving Team Process Fidelity Checklist

Item	Yes	No
1) Team meets on a consistent (e.g., weekly) basis.		
2) A request for assistance form is used to identify the problem and provide information before the meeting.		
3) The request for assistance form is brief, but provides adequate information about the problem.		
4) Documentation of consultant meeting with the teacher prior to problem-solving team meeting.		
5) Baseline data are collected and presented.		
6) Data are objective and empirical.		
7) Selected interventions are research based.		
8) Selected intervention is directly linked to assessment data.		
9) Start with interventions that have a high probability of success.		
10) Consulting personnel assist with implementation of intervention.		
11) Team develops specific implementation plan with the teacher.		
12) Parent information is discussed.		
13) Data collection plan is developed to monitor effectiveness and progress.		
14) Monitoring data are objective, empirical, and directly linked to the problem.		
15) A plan is developed to assess implementation integrity of the intervention.		
16) Follow-up consultation is scheduled between the teacher and one problem-solving team member.		
17) Follow-up meeting is scheduled.		
18) A case documentation form is used to track the team's activities.		
19) The building principal or administrative designee is present at the meeting.		
20) Problem-solving team members have designated roles (e.g., note taker, discussion facilitator).		

Burns et al., (2008a)

Appendix L
Problem Solving Observational Checklist

Component	**2 pts**	**1 pt**	**0 pt**

PROBLEM IDENTIFICATION AND ANALYSIS

**Problem was defined in observable/measurable terms

***Multiple types of relevant baseline data were collected and presented at the meeting (e.g., **R**ecords, **I**nterviews, **O**bservations, **T**est results= **RIOT**)

*Data were objective and empirical

**Data were presented in a useful format (e.g., CBM grade norms, graphs)

**A discrepancy statement was presented, based on the collected data

**Team decided if the problem was skill or performance based

**Selected hypothesis was validated with data (i.e., RIOT)

**Selected hypothesis was alterable

PLAN DEVELOPMENT

**Goal was written in observable, measurable terms

**Goal included a timeframe and criteria

**Goal was connected to the data collected

*Intervention plan was directly linked to assessment data

* Selected intervention strategies are supported by research (refer to operational definition)

*Intervention plan has a high probability of success (i.e., implemented with existing resources)

**Intervention plan included proactive/teaching strategies

**Intervention plan included motivational strategies

*The team developed a specific implementation plan with the teacher

*Consulting personnel offered to assist with the implementation of the intervention

* Parent information was discussed when developing intervention plan

***Data collection plan was developed to monitor the effectiveness and progress

*Monitoring data are objective, empirical, and directly linked to the problem.

**A decision making rule was selected for use (e.g., 3 days, or trend analysis)

*Plan was developed to assess treatment integrity of the intervention

*Follow-up consultation was scheduled between the teacher and one problem-solving team member

*Follow-up meeting was scheduled

Lundahl (2010)

Appendix M
Student Outcomes Rubric

Student Outcomes Rubric

Student Outcomes	**Scoring Rubric**
*A. Student Outcome: Degree to which the student's target goal was achieved	**1**= There is evidence the student regressed from the baseline level of performance *or* there is no, or insufficient data from which to draw conclusions about student outcomes **2**= Intermediate between 1 and 3 (e.g., student's performance remained close to baseline levels, teacher reports at least moderate progress but no data included to support assertion) **3**= There is evidence the student made some progress but that he/she did not achieve the target goals **4**= Intermediate between 3 and 5 (e.g., student made significant progress but the team did not clearly define target goals, or student met one goal but not another) **5**= There is evidence the student's performance improved significantly from baseline levels of performance and that the target goals were achieved or exceeded **Score=**
**B. Student Outcome: Degree to which the student is progressing	**1**= There is evidence the student has regressed significantly from baseline level of performance *or* there is no, or insufficient data from which to draw conclusions about student progress **2**= Intermediate between 1 and 3 (e.g., student's performance has remained close to baseline levels, teacher reports at least moderate progress but no data included to support assertion) **3**= There is evidence the student has made some progress but that he/she is unlikely to reach the target goals **4**= Intermediate between 3 and 5 (e.g., student has made significant progress but the team did not clearly define target goals, or student is on track to meet one goal but not another) **5**= There is evidence the student's performance has improved significantly from baseline levels of performance and that the student is on target to achieve or exceed the target goals **Score=**

Note: Lundahl (2010) rubric was adapted from the *Likert Scale and Scoring Rubric for Problem Solving Components and Student Outcomes* developed by Telzrow et al. (2000)
*Use rubric A to score the outcomes for students who are no longer receiving intervention services
**Use rubric B to score the progress students who are still receiving intervention services are evidencing

Appendix N
PST Self-Assessment Survey

PST Self-Assessment Survey

School: __[A,B,C,]_____

Your position: ☐ Regular Education Teacher ☐ Special Education Teacher ☐ Administrator ☐ School Psychologist ☐ Social Worker ☐ Counselor ☐ Parent ☐ Speech Language Pathologist, OT, PT

Number of years you have worked with problem solving team in [district]? _____

Directions: In answering the following questions, please choose the response that most closely describes your experiences with the problem solving team in your school over the past one or two years. For each question, please check only one response unless otherwise indicated.

1a. Best practices recommend that PST teams develop a behavioral description of each referred student's problem. This description should be clear, specific, observable, and measureable. How does your PST team typically describe the student's reason for referral?

☐ The team rarely develops a description of the referral problem.

☐ A description of the referral problem is developed by is defined in non-measureable terms (e.g., "weakness in," "trouble with")

☐ The referral concern is typically described in clear, specific, measurable, and observable terms.

1b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar
0	1	2	3

1c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

2a. Before developing an intervention plan, best practices recommend that PST teams collect multiple types of baseline data on the student's academic or behavioral concern (e.g., records review, interviews, observations, test results). How does your PST team typically collect baseline data on student referral concerns?

☐ Descriptions of the student's referral concern are collected, but no data.

☐ The team typically has <u>one type of baseline data</u> that describes the student's current academic or behavioral concern.

☐ The team typically has <u>at least two types of baseline data</u> that describe the student's academic or behavioral problems in the natural setting.

2b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar
0	1	2	3

2c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

3a. Once the referral concern is defined and baseline data is collected, PST teams should develop hypotheses about why the academic or behavioral problem is occurring. How does your team hypothesize reasons for the problem?

☐ Prior to planning the intervention, the team does not discuss reasons behind the referral concern ***or*** only child characteristics are considered (e.g., intelligence or motivation).

☐ In addition to child characteristics, the team considers instructional and/or environmental factors contributing to the problem.

☐ The team conducts a thorough analysis (e.g., functional assessment) of both instructional and environmental factors contributing to the problem.

3b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar
0	1	2	3

3c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

4a. Best practices recommend that PST teams develop a goal or target behavior for the student. The goal should be specific, measurable and describe acceptable behavior or academic performance. The goal should indicate the criteria and timeframe for meeting the goal. How does you PST team typically describe the students' goal or target behavior?

☐ No goal or target behavior is identified for students.

☐ A goal is typically identified, but does not outline criteria or timeframe for achieving goal.

☐ A clear goal is established that outlines specific criteria and a timeframe for achieving goal.

4b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar
0	1	2	3

4c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

5a. The team should develop a systematic, written intervention plan. The plan should outline step-by-step what will occur, who is responsible for doing it, where it will take place and when. How does your PST team develop intervention plans?

☐ The team vaguely describes the intervention, but does not develop a systematic, written plan.

☐ An intervention plan is developed but does not include all specifics. It may not be written down.

☐ An intervention plan is written with a specific description of intervention components including what will be done, who is responsible, and where it will take place and when it will be implemented.

5b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar
0	1	2	3

5c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

6a. Best practices recommend that teams collect evidence that the intervention was implemented as planned. For example, teams might collect copies of work samples, completed intervention components, checklists, or records of what happened during intervention. How does your team document that interventions were implemented according to the plan?

☐ No information is provided about how and how well the intervention was implemented.

☐ General statements are provided describing how and how well the intervention was implemented.

☐ Specific data are provided about how and how well the intervention was implemented such as copies of work samples, completed intervention components, checklists, or records of what happened during intervention.

6b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar
0	1	2	3

6c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

7a. PST teams should collect data on students' response to intervention plans. This data should be objective, quantifiable data that can be graphed and used to evaluate progress towards goals. How does your PST team collect data during the intervention?

☐ No data are collected, or only vague descriptions are provided with regard to student response to intervention.

☐ Some quantifiable data describing student response to intervention are collected, but data is not graphed.

☐ Objective, quantifiable data describing student response to intervention are collected, and data is graphed.

7b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar

0 1 2 3

7c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

8a. Best practices recommends that PST teams evaluate intervention plans by comparing students' post-intervention performance to the students' baseline performance. How does your team typically compare students' baseline and intervention data?

☐ No comparison is made between the student's performance before and during intervention.

☐ The team compares the student's post-intervention and baseline performance but does not use graphs and data may not be in numeric terms.

☐ The team compares the student's performance before and during intervention with graphed data that is in numeric terms.

8b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar
0	1	2	3

8c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

9a. It is recommended that PST teams develop clear decision rules for continuing or changing intervention (e.g., trend analysis, intermediate goals). Student response during intervention is collected and intervention changes are made based on decision rules. How does your PST team use decision rules when evaluating/modifying intervention?

☐ The team does not develop or use decision rules for continuing/changing intervention.

☐ The team makes decisions about continuing/changing intervention plans, but does not systematically use data when making intervention decisions.

☐ The team develops clear decisions rules for intervention continuation/change and systematically uses data to make intervention decisions.

9b. Please rate your general knowledge/familiarity of this problem-solving component.

Not at all familiar	Somewhat familiar	Moderately familiar	Very familiar
0	1	2	3

9c. Please rate your ability to implement this problem-solving component.

Not able	Slightly able	Moderately able	Very able
0	1	2	3

10. Once your PST team has worked with a referred student, how much progress is typically made towards the student's intervention goal?

☐ The student's academic or behavioral performance worsens.

☐ Typically no progress is made.

☐ The team's goal for the child is partially met.

☐ The team's goal for the child is moderately met. ☐ The team's goal fro the child is fully met.
11. Please indicate any barriers you believe limit you or your school's problem-solving team from conducting "best practice" problem solving procedures. (Check all that apply) ☐ **Unfamiliarity/limited training** in problem solving procedures ☐ **Time intensiveness** of problem solving procedures ☐ **Complexity** of problem solving procedures ☐ **Limited intervention resources** ☐ **Limited assessment resources** ☐ **Limited administrative support** in problem solving procedures ☐ **Other**

Note: Adapted from the SAT Self-Assessment Survey developed by Doll et al. (2005).

Appendix O
Problem Solving Intervention Acceptability Questionnaire

Problem Solving Intervention Acceptability Survey

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1. The problem solving intervention was acceptable for our school.							
2. Most educators would find the problem solving intervention appropriate.							
3. The problem solving intervention should prove effective.							
4. I would suggest the use of the problem solving intervention to other educators.							
5. The problem solving intervention is appropriate to meet the school's needs and mission.							
6. Most educators would find the intervention suitable for the described purposes and mission.							
7. I would be willing to use this intervention in the school setting.							
8. This intervention would *not* result in negative side-effects for students.							
9. The intervention would be appropriate for a variety of students.							
10. The intervention is consistent with those I have used in school settings.							
11. I like the procedures used in the intervention.							
12. The intervention is a good way to meet the specified purpose.							
13. The initial problem solving training was beneficial for me.							

14. The initial problem solving training was beneficial for the team.							
15. The initial problem solving training session was clear.							
16. The initial problem solving training was convenient.							
17. The performance feedback sessions were beneficial for me.							
18. The performance feedback sessions were beneficial for the team.							
19. The performance feedback sessions were clear.							
20. The performance feedback sessions were convenient.							
21. The targeted coaching sessions were beneficial for me.							
22. The targeted coaching sessions were beneficial for the team.							
23. The targeted coaching sessions were clear.							
24. The targeted coaching sessions were convenient.							
25. Overall, the problem solving intervention would be beneficial for my school.							