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Expanding the range of the First Step to Success intervention: Tertiary-level support for children, teachers, and families

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ABSTRACT

This study presents the findings of a quasi-experimental feasibility study examining the Tertiary First Step intervention, an enhanced version of the First Step to Success early intervention program. Tertiary First Step was developed to engage families more effectively and influence and improve parenting practices for children having challenging behavior. Process (fidelity, dosage, and social validity) and outcome data were collected for all participants in the Tertiary First Step condition ($N = 33$). Parent- and teacher-reported outcomes were collected for the comparison condition ($N = 22$). Process data suggest the intervention was implemented with fidelity, and that teachers, parents, and coaches perceived the intervention as socially valid. This study presents the first empirical examination of the Tertiary Frist Step variation. The outcomes provide compelling evidence that the Tertiary First Step intervention is promising for improving student outcomes on social-behavioral indices, decreasing problem behavior, and improving academic engaged time.

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Introduction

Successfully navigating the social and behavioral expectations of today's schools and classrooms is a challenging undertaking for young children. This task requires the acquisition of a series of social-behavioral competencies including the ability to self-regulate, initiate positive interactions with teachers and peers, attend to instruction, and engage in academic tasks (Walker, Ramsey, & Gresham, 2004). Children who are unsuccessful in meeting these expectations often experience teacher and peer rejection and have less than satisfactory teacher and peer relationships (Kegan, 1990). Unfortunately, there has been a sharp increase in the incidence of children who begin their school careers unable to navigate these expectations (McCabe, Hernandez, Lara, & Brooks-Gunn, 2000). Children, whose serious school adjustment and behavior problems persist, are at risk for school social and emotional failure and detrimental outcomes later in life including possible affiliation with disruptive peer groups, juvenile delinquency, truancy, and school dropout (Patterson, Reid, & Dishion, 1992; Reid, 1993).

Intervening early in the school careers of these children is important and has been the focus of immense effort on the part of public, private, and national systems of education and research. Since the introduction of the Response to Intervention framework (Batsche et al., 2005), these efforts have been categorized based on a child's educational and social needs at three levels: (a) universal support (primary prevention), (b) targeted support (secondary prevention) and (c) intensive, individualized support (tertiary prevention). This approach, with its origin in the public health field, emerged as a model to address health concerns and evolved in the direction of public school application and subsequently early education. In a comprehensive review and analysis of more than 2000 articles published between 1990 and 2006 on school-based, mental health interventions for at-risk students, Hoagwood et al. (2007) identified 64 methodologically rigorous studies for inclusion. Of these, 24 examined both educational and mental health outcomes, and only 15 of these studies showed a positive impact on both outcomes. Of the remaining 15, 11 included home and school components with a focus on engaging and coordinating the efforts of parents and teachers. Hoagwood and her associates also noted

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that school interventions judged as effective for students requiring tertiary-level prevention strategies contain a well-designed and intensive family component to deliver the necessary strength and dosage levels to impact substantively school outcomes as well as address the focus on student's social, emotional, and mental health problems. In addition to including a family component, the empirical literature advocates for interventions that are sufficiently flexible to be responsive to the unique situations and needs of families requiring intensive, individualized support. Hoagwood et al.'s review included effective secondary prevention programs such as The Incredible Years (Reid, Webster-Stratton, & Hammond, 2003; Webster-Stratton, Reid, & Hammond, 2004) and First Step to Success (Walker et al., 1997), but did not include any programs designed to address the complex needs of children and families requiring tertiary level support.

First Step to Success is an early intervention program designed for at-risk elementary school children in the primary grades (K-3) who show clear signs of emerging externalizing behavior patterns including aggression toward others, oppositional-defiant behavior, tantrums, rule infractions, and confrontations with peers and adults (Walker et al., 1997). The behaviorally at-risk student is the primary focus of the First Step to Success program; however, teachers, peers, and parents are crucial intervention agents whose participation is under the direction and supervision of a trained First Step behavioral coach. This professional is frequently a related service provider (e.g., school social worker, school counselor, school psychologist, behavioral specialists, special educator), and has overall responsibility for coordinating the intervention.

The First Step intervention was developed through a model development grant (1992–1996) from the U.S. Office of Special Education Programs and was a cooperative effort between investigators at the University of Oregon, the Oregon Social Learning Center, and the Oregon Research Institute. In the past two decades, the First Step program has been the focus of a large number of federal and state-funded grants to support a range of research activities centering on its initial validation, replication, efficacy, and effectiveness. These grants have also supported examining the use of the program with students exhibiting elevated ADHD symptomatology (Seeley et al., 2009) and other student subpopulations (Feil et al., 2014; Frey, Small, et al., 2013). A recently released overview of the evidence base for the First Step to Success Early Intervention program summarizes research efforts and empirical outcomes that document the program as both efficacious and effective (Walker et al., 2014). The efficacy of the First Step intervention has been replicated repeatedly (Loman, Rodriguez, & Horner, 2010; Walker et al., 1998; Walker et al., 2009). Overall, this body of empirical evidence demonstrated the First Step intervention is socially valid, can be implemented with fidelity, and is associated with decreases in problem behavior, increases in social competency, and improvements in academically engaged time. A description of the First Step program's complete research and development history along with its evidence-base is contained in Walker et al. (2012). This comprehensive description also has appendices containing respectively (1) a listing of key First Step journal and chapter publications and (2) compilations of recommended lists of early interventions for behaviorally at-risk children (in which First Step was included) that were assembled and broadly disseminated by federal agencies and advocacy groups.

A mixture of experimental, quasi-experimental, and replication designs, involving group randomized and single case research methods, have been used to establish the First Step evidence base. First Step has been the focus of three randomized controlled trials to date—two of which were efficacy trials and one that was a national effectiveness study of the program's effects involving five sites across the U.S. and 286 participants in grades K-3. The First Step program has been implemented successfully in Canada, Australia, the Netherlands, and Turkey. First Step has also been successfully implemented with American Indian, African American, and Native Hawaiian students. In 2013, the First Step program was certified as a promising practice after a review by the What Works Clearinghouse of the Institute for Education Sciences.

Walker et al. (2014) noted that students having the most severe impairments have highly variable and sometimes unsatisfactory responses to the First Step program. Additionally, this review demonstrates that the intervention consistently has less dramatic impact on behavior in the home than the school setting. One possible explanation for the finding of inconsistent results with more severe children is that the homeBase component of First Step does not provide a similar intensity or dosage of the First Step intervention in the setting, as the school component does for the student in the classroom. Another explanation may be that the family component has not been successful at engaging and fostering parental motivation to change their parenting practices so as to positively impact child outcomes.

In a classic study of parent noncompliance within mental health settings, Patterson and Forgatch (1985) demonstrated that therapists' efforts to change parental behavior through direct teaching elicited immediate parent noncompliance, whereas efforts to support parents decreased the likelihood of their noncompliance. Patterson and Chamberlain (1994) have systematically studied parental resistance, and concluded that parental motivation to change is a critical yet often neglected ingredient in improving parenting practices. Thus, the need for school mental health interventions that include a home component and attend carefully to parent engagement, motivation, and follow through is substantial. In fact, the importance of engaging families is recognized as one of eight themes requiring systematic attention in order for the field of school mental health to advance (Weist, Lever, Bradshaw, & Owens, 2014).

Over the past four years, developers of the First Step intervention have been engaged in an iterative development process to create enhancements to the program that extend the range of the intervention. Two manualized enhancements of the First Step intervention were developed through this process. The first, the Tertiary First Step Resource Manual, is described in the methods section (Frey, Walker, et al., 2013c). The second, the First Step Classroom Check-up Resource Manual (Frey, Walker, et al., 2013d) can be implemented flexibly at the secondary and tertiary program levels, as a stand-alone intervention, or as one of several components of a yet-to-be-developed universal program variation within an overarching First Step System of Support.

This manuscript reports an initial empirical study of the First Step program's tertiary-level adaptation for more severely involved students. This adapted program variation differs from the original First Step in that it is designed for tertiary level students and includes (a) a new, more intensive home component (Tertiary homeBase), (b) screening procedures that require behavioral impairment in *both* home and school settings, and (c) modifications to the school component necessary for successful implementation with tertiary-level students.

The purpose of this article is to report the feasibility and potential impact of the Tertiary First Step intervention. Specifically, we examined a number of process variables associated with these program enhancements, such as fidelity of implementation, dosage, and satisfaction. Further, we examined the extent to which participation in the intervention was associated with reductions in parental distress and improvements in parenting efficacy, children's social competency, and academic engaged time. Finally, we examined the associations between our process and outcome variables for the school and home components, respectively.

Method

Participants

Thirty-three families from Kentucky and Indiana participated in the classroom and home components of the Tertiary First Step feasibility study and 22 additional families completed baseline and post-intervention measures as part of a quasi-experimental, comparison group. Children participating in Tertiary First Step were from K-3 classrooms, ranged in age from 5 to 9 years old ($M = 6.8$ years, $SD = 1.3$), and were predominantly male (79%). The majority of students receiving Tertiary First Step qualified for free or reduced lunch (75%) and one third of participating children received special education services. Roughly one-third of participating children lived in two-parent households when they completed baseline data, according to parent self report. Prior to recruitment, the university-affiliated and school-affiliated institutional review boards approved the study.

Intervention

First Step to Success. First Step consists of three modular components designed to work together (though each can be implemented as a stand-alone procedure). These are (1) universal screening and identification, (2) school component, and (3) home component.

The school component of First Step was developed by Hops and Walker (1988). The program begins with a 20-minute daily implementation period that is gradually extended to the entire school day. Initially, the coach, in close proximity to the target child, monitors her or his classroom behavior using the green or red card. The coach awards points if the child's behavior is appropriate, based on an interval system. When the daily performance criterion of 80% or more of the available points is met, a brief rewarding activity involving the target child and peers is made available immediately and a daily home note also communicates the results of the game to the parents. Parents then provide positive reinforcement with an individual activity or reward immediately when the child returns home. If the criterion isn't met, that program day is then repeated and/or the child is recycled to an earlier, successfully completed program day before proceeding. The school component of First Step requires 30 program days for successful completion. The coach phase (program days 1–10) is the responsibility of a First Step behavioral coach, who coordinates the implementation process. The teacher phase (program days 10–20) is operated by the teacher who assumes control of the program's operation on program day six but with close supervision and support from the coach. It is during the teacher phase that the program is gradually extended to include the entire school day. The maintenance phase lasts from program day 21 to 30 after which the formal school intervention ends. In this phase, the target child is rewarded primarily with praise and expressions of approval or recognition from the teacher and peers at school and the parents at home. An attempt is made during this phase to reduce the child's dependence on the program by substituting adult recognition for points, reducing the amount of daily feedback given, and making occasional rewards contingent upon exemplary performance.

After the transition to the teacher phase, the coach's focus turns from school to home. The coach invites the focus student's parents to participate in homeBase, which involves learning how to teach school success skills at home and to collaborate with the teacher and coach to facilitate the transfer and demonstration of these skills at school. Over a six-to-eight-week period, parents meet weekly with the First Step coach, usually in their home, and participate in homeBase via reading, discussion, role-play, and demonstrations. Each week's meeting focuses on one skill with review and discussion of previously learned skills as needed. The specific homeBase skills taught are: *communication and sharing*, *cooperation*, *limit setting*, *problem solving*, *friendship making*, and *self-confidence*. Parents are provided with a manual containing all the information, guidelines, and accompanying materials needed to implement homeBase. These materials provide a useful reference for parents and the coach during and following implementation of the First Step program. The coach provides support, supervision, and trouble shooting of any problems and issues that arise during and following the program's implementation, while serving as a communication bridge between the parent and school.

Tertiary First Step. Michie, van Stralen, and West (2011) have developed a framework for intervention designers that places a premium on participant motivation. These authors note that many intervention designers develop new interventions without relying on a framework to guide and rationalize the creation of various components, in part because useful frameworks do not exist. In response to this need, they created the Behavior Change Wheel to provide a basis for designing interventions. The behavior system in this framework is comprised of three components that interact dramatically to influence behavior change at the individual level: capability, opportunity, and motivation. Capability, which includes knowledge and skills, involves the individual's psychological and physiological capacity to alter the behavior change target. Opportunity is comprised of factors that are external to the individual that prompt behavior or make it possible. Motivation is defined as all of the "brain processes that energize and direct behavior" (p. 4). Michie et al. suggest that a given intervention might change only one or more of these components, and that an initial task of intervention developers is to consider what the behavior target of the intervention is, and what components of the system need to be addressed to achieve the desired goals.

The importance of parental motivation has led to an increase in collaborative approaches for caregivers of students with challenging behavior (Frey et al., 2011; Smith, Dishion, Shaw, & Wilson, 2013; Smith, Handler, & Nash, 2010; Smith, Wolf, Handler, & Nash, 2009). Recent efforts in this context have adopted strategies from motivational interviewing. Motivational interviewing is a burgeoning approach to more effectively influence parents' engagement and behavior change. Miller and Rollnick (2012) define motivational interviewing as "a collaborative, goal-oriented style of communication with particular attention to the language of change" and go on to say "...it is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion" (p. 29). Motivational interviewing is based on the belief that how one talks about change is related to how they act. Simply stated, the more one talks about or argues for change, the more likely it is he or she will change. Conversely, the more one verbalizes reasons against change, the less likely he or she is to change. Motivational interviewing, therefore, is an approach that helps accelerate the change process "by literally talking oneself into change" (p. 168). Developing a supportive environment/relationship and evoking change talk, or any self-expressed language that is an argument for change is critical in the facilitation of motivational interviewing. The evidence for motivational interviewing provides compelling verification for the notion that the therapist can influence clients' expression of change talk and that there is a relationship between change talk and behavior (Forgatch & Patterson, 1985; Glynn & Moyers, 2010; Miller, Yahne, Moyers, Martinez, & Pirritano, 2004; Moyers & Martin, 2006).

Nock and Kazdin (2005) pioneered the application of motivational interviewing in the context of parenting with their Parent Enhancement Intervention, a model that assesses caregiver perception of readiness and that attempts to improve parental engagement and adherence (i.e., attendance). Additionally, The

Family Check-up, which is part of the multi-component EcoFIT intervention, includes three brief, family-centered sessions to motivate caregivers to change parenting practices and use intervention services addressing their specific needs (Dishion & Stormshak, 2007).

Tertiary First Step includes three components of First Step that have been enhanced for children with extremely challenging behavior who require tertiary-level prevention strategies. The first includes screening procedures for identifying appropriate participants. The second is very similar to the original school component, but includes modifications often necessary for successful implementation with tertiary-level students. Examples of school component modifications include: (1) completion of a functional behavioral assessment; (2) increased coach–teacher contact; (3) participation in current service coordination efforts internally within the school and with external service providers; and (4) reductions to the length of the First Step program (in total number of days). Finally, Tertiary homeBase, the home component, is an adaptation of motivational interviewing. Since the Tertiary homeBase component represents the primary enhancement to the tertiary First Step variation, it alone is described below. This study presents the first empirical examination of the Tertiary Frist Step variation.

Tertiary homeBase. Tertiary homeBase addresses all three components of Michie et al.'s (2011) Behavior Change Wheel. Capability is addressed by including content consistent with the theoretical and empirical literature concerning family management practices and the development of children with challenging behavior described in the introduction. During the Tertiary homeBase intervention, parents are encouraged to modify their parenting practices consistent with one or more of the five universal principles of positive behavior support that are central to the First Step intervention: (1) establish clear expectations; (2) directly teach the expectations; (3) reinforce the display of expectations; (4) minimize attention for minor inappropriate behaviors; and (5) establish clear consequences for unacceptable behavior (Sprague & Golly, 2013).

Addressing the motivation component of the Behavior Change Wheel was a primary focus of our Tertiary homeBase development efforts. Because no existing processes, models, or frameworks, based on the motivational interviewing approach, were available to inform a detailed procedural write up for its application across home and school settings, our efforts to adapt motivational interviewing for this purpose resulted in the development of the Motivational Interviewing Navigation Guide. The Motivational Interviewing Navigation Guide is a process for increasing intrinsic motivation to adopt and implement an evidence-based practice with integrity, applicable to both school and home settings. The five steps include: (1) engage in values discovery; (2) assess current practices; (3) share performance feedback; (4) offer extended consultation, education & support; and (5) provide closure (Frey, Lee, et al., 2013a; Frey, Lee, et al., 2013b; Lee et al., in press). It is this conceptualization that was infused into the Tertiary homeBase intervention procedures to increase parents' motivation to change their behavior.

The motivational component is addressed at each of the Motivational Interviewing Navigation Guide steps; it is attended to constantly during steps 1 and 2, and as needed in steps 3 and 4. The capability of the caregiver, primarily parenting knowledge and skills, is addressed in steps 3 and 4. Opportunity is addressed throughout the intervention since it occurs in the home, and specifically in step 4 with creation of a behavior change plan which individualizes the application of new knowledge and skills to address routines or family tasks that parents have identified as important, needing attention, and consistent with their values. Alternatively, parents can choose to complete any of the six original homeBase skill-focused curricular topics. A summary of the intervention activities is provided in Table 1. Tertiary homeBase typically includes two to five home visits designed to increase their motivation and capacity to implement effective parenting practices. The Tertiary First Step to Success Resource Manual provides detailed support for interventionists (Frey, Walker et al., 2013c).

Recruitment and screening. Project staff recruited teachers across two cohorts to participate in a feasibility study of the Tertiary First Step to Success intervention. We used a two-step process incorporating teacher and parent report to identify students eligible for inclusion in the study. At step 1, teachers completed the first two stages of the Systematic Screening for Behavior Disorders (SSBD; Walker & Severson, 1990). At stage 1, teachers identified five students within their classrooms who were at elevated risk for externalizing behavior problems. At stage 2, teachers completed brief behavior rating scales for each of the students identified at stage 1. Stage 2 data were used to (a) identify the students who met SSBD criteria, (b) rank order students within classrooms in terms of severity, and (c) target the highest ranked student in each classroom. At step two, we collected the externalizing scale of the Child Behavior Checklist (CBCL; Achenbach, 1991) from the parents of the highest ranked student to verify the child's behavioral status across school and home settings. If the student met criteria on the parent-reported CBCL (T Score > 60), we recruited the family to participate in the study. Thus, for each classroom, the highest ranked student who met SSBD screening criteria *and* CBCL screening criteria were eligible to participate in the study. If the highest-ranked student on the SSBD did not meet CBCL criteria, we repeated the process with the next highest rank student in the classroom. The first step of the screening process (SSBD) is consistent with the screening procedures for the original First Step intervention. However, requiring parents to document substantial impairment in the home setting is unique to the tertiary application. We provided teachers $20 to complete the screening process.

We recruited teachers for the Tertiary First Step intervention across two cohorts during the 2010–2011 and 2011–2012 school years. Participating teachers were from ten elementary schools in Kentucky and Indiana. Seventy of 78 consented K-3 teachers (90%) participated in SSBD screening, completing stages 1 and 2 for 268 students. Of the 70 teachers completing screening, 33 (47%) had an eligible consented student who participated in the study and received the intervention. For the remaining teachers, we were unable to identify ($n = 14$) or obtain consent for a student who met full inclusion criteria ($n = 23$).

Research staff recruited teachers for a quasi-experimental comparison group during the 2011–2012 school year to examine between-subject effects and control for potential history effects. Comparison-group teachers were not recruited from the same schools as the experimental-group teachers. We utilized the same screening and inclusion criteria for the comparison classrooms. Thirty teachers completed SSBD gates 1 and 2 for 149 students. Twenty-six of the 30 classrooms (86.7%) had at least one student who met SSBD eligibility criteria. Twenty-two students met full inclusion criteria (i.e., SSBD and CBCL criteria described above). For the remaining eight classrooms, students did not meet inclusion criteria ($n = 4$) or project staff were unable to recruit the family to participate ($n = 4$). Students and families in the quasi-experimental comparison group may have been receiving school- or community-based intervention and support services, but *did not* receive intervention support from our research team prior to the collection of posttest data. They were offered a home-based consultation following the collection of posttest data.

Training and support. Participating coaches were employees of the University of Louisville. All three coaches had Masters Degrees: one in education, one in social work, and one in school counseling. Prior to the study, the three coaches had no previous experience with motivational interviewing. All three received three days of

Table 1
Summary of the Tertiary homeBase intervention activities.

MING Step # and title (duration)	Description
Step 1 Engage in Values Discovery (60 minutes)	The main purpose of this step of the MING is to learn about the family through an ecological assessment, and discover the parent's values, goals, and hopes for their children's future using a values discovery activity.
Step 2 Assess Current Practices (60 minutes)	Successfully completed the universal principles interview and observational protocol associated with this step of the MING allow the coach to learn about existing parenting practices that are consistent with – or potentially in conflict with – the universal principles. This information is used to structure the provision of performance feedback in Step 3.
Step 3 Share Performance Feedback (60 minutes)	Step 3 of the MING is used to provide performance feedback. The debriefing interview is structured to encourage the parent to reflect on their implementation of the universal principles, and if necessary, increase the extent to which they believe implementing the principles is important. At the end of the interview, parents are given the option of ending the consultation relationship or replicating Steps 2 and 3 after having articulated specific goals for improvement.
Step 4 Extended Consultation, Education, and Support (60 minutes)	During this (optional) step of the process, the coach and parent negotiate the specifics of a behavior change plan. Once the specifics are decided upon and step 4 is completed, the coach may deem it appropriate to take an educational stance, more freely offering advice and teaching skills through consultation, or direct education. We recommend educational strategies including modeling, role-playing, pre-correcting for implementation problems by exploring barriers to implementation, and the more MI focused strategy of Elicit-Provide-Elicit (EPE). If the parent chooses to participate in this aspect of the intervention, Steps 2 & 3 are repeated in order to provide continuing support for parent-established goals.
Step 5 Closure (60 minutes)	Whether a parent selects closure due to high confidence in their ability to change on their own or due to low motivation, steps should be taken to insure that the relationship ends on a positive note and that the parent leaves with tools they may choose to use in the future.

pre-intervention training and a year of ongoing professional development support learning how to apply motivational interviewing skills within the context of our intervention protocols. Their pre-intervention training was provided by a substance abuse clinician with expertise in motivational interviewing and professional development involved weekly supervision sessions over the first year of implementation. As part of their professional development, they were required to obtain audio recordings of their interactions with teachers and parents. These recordings were analyzed and processed in the context of group supervision. Frey, Lee, et al. (2013a) provides a detailed description of the training procedures, as well as coaches' proficiency applying motivational interviewing with parents.

Teachers participating in the Tertiary First Step intervention received a 3-hour training describing the intervention procedures. Coaches assisted the teachers with the school component implementation.

Data collection. Prior to beginning the intervention, parents and teachers participating in Tertiary First Step completed a baseline questionnaire containing demographic and outcome measures. At post-intervention, participants completed two questionnaires: one containing outcome measures and another containing process measures addressing program satisfaction and barriers to participation. Teachers and parents from the comparison group completed an outcome questionnaire at each time point but did not complete process measures given that they didn't receive the intervention. For the comparison group, baseline and post measures were collected roughly 60 days apart to approximate the window of time between baseline and post-intervention for the intervention group. Teachers and parents from the intervention group and comparison group received $50 for completing a questionnaire at each time point (i.e., $100 for completing baseline and post-intervention packets). For participants receiving the intervention, coaches distributed questionnaires to parents and teachers. For participants in the comparison group, project staff distributed questionnaires. Participants returned completed questionnaires via mail using a postage-paid envelope distributed with the questionnaire or, when needed, project staff or the coach collected the questionnaire from the participant. Direct observation data (described below) were collected at baseline and post-intervention for all students participating in Tertiary First Step but were not collected for the comparison group due to time and budgetary constraints.

Fidelity

A 20-item implementation fidelity checklist was used to evaluate the fidelity of implementation for the school component. This observer-completed measure assesses the extent to which the coach and teacher adhere to implementation guidelines for the school component of the First Step program. For each question, the observer indicates (a) whether the component was implemented and (b) the quality of implementation. Adherence items are scored dichotomously (i.e., *yes* or *no*) and quality items are scored on a 5-point scale (0 = *very poor*, .25 = *poor*, .50 = *okay*, .75 = *good*, to 1.0 = *excellent*). Adherence scores were calculated as the proportion of procedures correctly implemented. An observer collected the fidelity data on three occasions: once during the coach phase and twice during the teacher phase. Adherence to 80% or more of observed program components represents adequate adherence and quality ratings of .75–.90 represent adequate levels of implementation quality. We used the data from the fidelity checklist to compute adherence and implementation quality scores. Measures of teacher and coach implementation quality represent the mean quality rating across the observed program components. We also calculated overall adherence and quality measures (i.e., the mean of the two implementers) across both the coach and teacher.

Dosage

The monitoring log, completed by the coach and teacher, is used to record the focus student's daily participation in the school component. Upon completion of the intervention, it provides a summary of the total number of program days completed, the number of program recycle days, and a summary of the points and rewards earned daily by the child. In accordance with other studies of the First Step program (Sumi et al., 2013; Walker et al., 2009),

we calculated classroom dosage as the proportion of program days delivered out of the possible 30 available days.

A checklist was also completed by the coach to measure the dosage for the home component. This checklist required coaches to document the number of the steps of the Tertiary homeBase intervention completed. Dosage was calculated as a percentage of steps completed.

Social validity

Social validity items for all informants were scored on a five-point Likert scale from *strongly disagree* to *strongly agree*. Parent report included 12 items that assess usability, support, and effectiveness of the program in the home setting. Coefficient alpha (α), a measure of internal consistency reliability, is .93 for the 12-item, parent-reported satisfaction scale. Subsequent coefficient alphas reported below for social validity and outcome measures are estimated from sample data collected for this study. Teacher report included a 13-item scale assessing satisfaction with the school component (α = .93). The coach also completed a 6-item satisfaction scale (α = .84) pertaining to the compatibility and effectiveness of the classroom component, and six items (α = .90) addressing the compatibility and effectiveness of the home components of the program (i.e., Tertiary homeBase). For each measure, we calculated a mean rating across items.

Outcomes

Parent outcomes. Parental distress and parenting efficacy served as proximal outcomes, and were measured at baseline and post-intervention. The parental distress subscale of the Parenting Stress Index – Short Form (PSI-SF; Abidin, 1995) determines the distress a parent is experiencing in his or her role as a parent and expresses the distress as a function of personal factors that are directly related to parenting. The subscale includes 12 items (α = .92) scored on a 5-point rating scale. Total raw scores range from 12 to 60 with higher scores indicating increased levels of parental distress.

The Parenting Ladder (NCP Research, 2000) measures parent-reported self-efficacy for parenting. The Parenting Ladder consists of 6-items (α = .91). Parents rate confidence in their parenting knowledge and abilities on a 7-point rating scale ranging from *low* to *high*. Total raw scores range from 0 to 42 with higher scores indicating higher levels of perceived self-efficacy.

Teacher- and parent-reported outcome measures. The Social Skills Improvement System Rating Scales (SSiS; Gresham & Elliott, 2008) is a multi-informant assessment tool that measures (a) social behaviors that facilitate positive interactions with peers, teachers, siblings, and parents, (b) problem behaviors that impede the acquisition of social skills, and (c) general academic functioning. The teacher-completed version of the measure includes 46 social skills items (α = .90), 30 problem behavior items (α = .74), and 7 academic competence items (α = .96). The parent-completed version includes 46 social skills items (α = .93), and 33 problem behavior items (α = .82). Items are rated on a 4-point frequency scale (*Never*, *Seldom*, *Often*, and *Almost Always*). Academic competence items, scored on a 5-point scale from *lowest 10%* to *middle 40%* to *highest 10%*, assess the student's reading and math skills, motivation, cognitive functioning, and parental support relative to his or her classmates. We converted raw scores to standard scores using gender-specific normative data from the SSiS manual.

The SSBD Combined Frequency Index was collected at screening, baseline, and post-intervention. This index, part of the SSBD stage-2 rating scales (Walker & Severson, 1990), includes the Adaptive Behavior Index (ABI) and Maladaptive Behavior Index (MBI). The ABI and MBI are 12-item (α = .88) and 11-item (α = .86) scales, respectively, that assess a student's adaptive and maladaptive behavioral adjustments with interactions with teachers and peers. Items are scored on a 5-point rating scale ranging from *never to frequently*. The SSBD is nationally normed, has excellent psychometric properties, and has been used in a number of research studies (Seeley et al., 2009; Severson, Walker, Hope-Doolittle, Kratochwill, & Gresham, 2007; Walker et al., 2009). Raw scale scores were computed for each measure with higher scores on the ABI indicating better levels of adaptive functioning and higher scores on the MBI indicating higher levels of maladaptive functioning.

Observation outcome measures. Project staff collected Academic Engaged Time (AET) data using a direct-observation measure (three 20-minute observations), on separate days at baseline and again at post-intervention (Walker & Severson, 1990). For each time point, we computed the mean percent of AET across the three observations. AET is an estimate of the amount of time a student spends engaged in academic activities and is an important indicator of a student's academic success and adjustment to classroom expectations. We collected inter-rater reliability for 15% of collected AET observations at baseline and at post intervention. The intra-class correlation assessing inter-rater reliability for the AET was excellent at baseline (ICC[3,1] = .98) and post-intervention (ICC[3,1] = .94).

The Peer Social Behavior (PSB) coding system was also recorded. The PSB is a partial-interval observation procedure used to record the percentage of intervals the target student is engaged in positive and negative interactions with peers in unstructured or semi-structured settings (Walker & Severson, 1990). Project staff conducted three 20-minute observations at baseline and three at post-intervention on separate days using an adapted version of the instrument. Over the 20-minute session, observers recorded at one-minute intervals whether the student was engaged in positive social engagement, negative social engagement, parallel play, or was playing alone. For each time point, we aggregated data from the three observation sessions and calculated the percent of positive and negative engagement by dividing the number of positive engagement intervals and the number of negative engagement intervals by the total number of intervals observed. We collected inter-rater reliability data for 15% of baseline and post-intervention observations. The intra-class correlation for positive interactions was excellent at baseline (ICC[3,1] = .97) and acceptable at post-intervention (ICC[3,1] = .86). For negative interactions, the intra-class correlation was also acceptable at baseline (ICC[3,1] = .89) and post-intervention (ICC[3,1] = .91).

Statistical analyses

We examined between-subject and within-subject effects on teacher and parent-reported outcome measures. To evaluate between-subject effects, we estimated a series of covariate-adjusted regression models using Mplus 6.0 statistical software (Muthèn & Muthèn, 1998–2010). For the regression models, each outcome was regressed on a dichotomous variable indicating intervention group (1 = EFS group, 0 = comparison group) and one covariate, the baseline value of the outcome. Preliminary models included an interaction term (i.e., intervention group × baseline value of the outcome) to test that the slopes of the regression lines were equivalent for each group. If non-significant, the interaction term was removed from the model.

For the comparison group, only parent- and teacher-reported outcomes were collected. In turn, for the intervention group, we also examined within-subject effects for our observation measures and primary teacher- and parent-reported outcomes. We examined within-subject effects in an analysis of variance (ANOVA) framework using the general linear model (GLM) procedure in SPSS 19.

For the between-subject analysis, we report Hedges' *g* as a measure of effect size. The *What Works Clearinghouse* (WWC) recommends Hedges' *g* as the preferred measure of effect size for continuous outcomes. Hedges' *g*, the standardized mean difference, is calculated by taking the difference between the mean outcome of each group and dividing it by the pooled within-group standard deviation (WWC, 2011). Effect sizes of .2 are considered small, .5 are considered medium and .8 are considered large effects. For the within-subject analysis, we report partial point-biserial *r* as a measure of effect size (Rosnow & Rosenthal, 2008). Effect sizes of .14, .36, and .51 are considered small, medium, and large, respectively, for the partial *r* (Cohen, 1988).

We also report the WWC (2011) improvement index as a measure of practical significance. To calculate the improvement index, we (a) converted each effect size estimate to a Cohen's U3 index using a standard normal distribution *z*-score table and (b) subtracted the U3 index from 50%, the percentile rank of an average student in the comparison group. The WWC improvement index represents the expected change in percentile rank for an average student in the comparison sample if that student had received the Tertiary First Step intervention.

Finally, to examine associations between these process measures and change in parent and child outcomes, we specified covariate-adjusted regression models. We regressed post intervention outcomes on the baseline value of the outcome measure and the process measure of interest. We anticipated that process measures specific to the classroom component of the program would have the strongest associations with school-based or teacher-reported student outcomes and that process measures specific to the home component would have the strongest associations with parent outcomes and parent-reported student outcomes. Thus, we examined whether dose, adherence, and implementation quality of the school component were associated with change in teacher-reported prosocial behavior (i.e., ABI and SSiS social skills), problem behavior (i.e., MBI and SSiS problem behavior), and academic competence (i.e., SSiS academic competence, and AET). For the home component, we examined whether parent-reported satisfaction, coach-reported parent compliance, and dose were associated with improvements in parenting efficacy, reductions in parental distress, and changes in parent-reported prosocial and problem behavior as reported on the SSiS.

Missing data

We used the full information maximum likelihood (FIML) estimator in MPlus 6.0 to address missing data in the covariate-adjusted regression models. FIML, a state-of-the-art technique for handling missing data, uses all available data to calculate unbiased parameter estimates and standard errors (Schafer & Graham, 2002). We included seven auxiliary variables in the models (i.e., child's SSBD rank, child's gender, parent's current marital status, parent's education level, estimated annual household income, number of children in the parent's household, and teacher-reported number of years teaching) as potential correlates of missingness in order to improve the accuracy of FIML estimation. Potential correlates of missingness increase statistical power, reduce bias, and improve the plausibility of the missing at random assumption without altering the interpretation of parameter estimates (Collins, Schafer, & Kam, 2001; Enders, 2010).

Results

Fidelity

During coach and teacher phases of the school component, Tertiary First Step program adherence was excellent. Coaches implemented 96% (range = 64–100%) and teachers implemented 90% (range = 63–100%) of the school component. Implementation quality was excellent during the coach phase (.96; range = .90–1.00) and good during the teacher phase (.84; range = .61–1.00).

Dosage

Students received, on average, 78% (*SD* = 28%) of the requisite program days for the school component. Twenty-five parents (76%) completed 75% or more of the steps of the home component as described in Table 1. Seven parents completed two or fewer steps and were considered non-completers. Of the 25 parents who completed the required components, 14 (60%) committed to and developed a change plan, and most (87%) of those parents implemented it. Seven families were referred for community-based mental resources to receive on-going, additional support for the child or family, based on coach discretion. Eight parents (24%) ended their participation in the program before the formal invitation for closure was offered.

Social validity

Parents' responses to the satisfaction questionnaire ranged from 3.2 to 5.0 with mean scores of 4.6 (*SD* = 0.5) on the 12-item scale. Item-level means were above 4.0 on all items. The lowest mean rating was in response to a question asking whether the program had a positive effect on the rest of the family (*M[SD]* = 4.3[0.8]) and the highest mean rating was in response to a question about the goals of the program being clearly explained (*M[SD]* = 4.8[0.4]). Our coaches reported satisfaction that can be classified as moderate overall (*M* = 3.73, *SD* = 0.74).

Outcomes

Baseline equivalence. Students who received the tertiary version of the First Step intervention did not differ significantly from the comparison group on baseline behavioral and academic outcome measures and most student, parent, and teacher demographic characteristics. Table 2 contains a summary of student demographic and behavioral characteristics for each group. The two groups differed only on the number of African American students in the comparison sample as compared to the Tertiary First Step condition (68% vs. 39%, respectively).

Although there were no statistically significant differences between the groups with respect to parent demographic characteristics, there were a disproportionate number of African American parents in the comparison group (61%) as compared to the intervention group (42%). Other parent demographic characteristics were comparable across the groups. Parents in the intervention condition had a mean age of 38 years (*SD* = 10.4), were primarily female (88%), and were predominantly the biological or adoptive mother of the participating student (81%). Nearly 30% reported having an Associate's degree or higher and the majority were currently employed (61%). Approximately 36% of participating students lived in two-parent households. Parents in the comparison group had a mean age of 35 years (*SD* = 9.2), were predominantly female (96%), and were the biological or adoptive mother of the student (82%). Thirty-two percent had an Associate's degree or higher and 68% were employed. Roughly 32% of students in the comparison group lived in a two-parent household.

There were no differences on teacher characteristics between the two groups. All teachers participating in the Tertiary First Step intervention reported being the lead teacher of the classroom. The majority were female (93.3%) and half reported having a Master's degree or higher. Teachers reported having worked in the field for an average of 14.1 years (*SD* = 8.8) and had taught students

Table 2
Baseline equivalence of student demographic and behavioral characteristics.

	Total (n = 55)	Comparison (n = 22)	Tertiary FS (n = 33)	Test statistic	p-Value
Demographic characteristic					
Age, *M(SD)*	7.0 (1.2)	7.3 (1.1)	6.8 (1.3)	1.53	.133
Percent female	20.0	18.2	21.2	0.08	.783
Percent African American	50.9	68.2	39.4	4.38	.036
Percent Caucasian	36.4	22.7	45.5	2.95	.086
Percent free/reduced lunch	82.2	90.5	75.0	1.84	.176
Percent IEP	25.5	13.6	33.3	2.70	.100
Screening measures					
SSBD stage 2 rank				2.78	.249
Percent ranked 1st	69.1	59.1	75.8		
Percent ranked 2nd	23.6	27.3	21.2		
Percent ranked 3rd	7.3	13.6	3.0		
Percent in clinical range on CBCL externalizing scale	88.9	85.7	90.9	0.35	.554
Critical Events Index, *M(SD)*	8.1 (3.2)	8.5 (3.1)	7.8 (3.2)	0.90	.370
Adaptive Behavior Index, *M(SD)*	29.6 (6.3)	30.5 (7.0)	29.0 (5.8)	0.85	.401
Maladaptive Behavior Index, *M(SD)*	38.2 (6.9)	39.7 (6.3)	37.1 (7.1)	1.39	.170

Notes: SSBD, Systematic Screening for Behavior Disorders; CBCL, Child Behavior Checklist.

who receive special education services for an average of 11 years (SD = 9.1).

Attrition and missing data. For the Tertiary First Step group, data were available for 94% of teachers and 94% of parents at baseline. At post-intervention, 32 teachers (97%) and 28 parents (88%) returned a questionnaire. For the comparison group, data were available for all 22 teachers and parents at baseline, all teachers at post intervention, and 19 parents (86%) at post intervention. Students with complete assessment data from the comparison group did not differ from those with a missing assessment. Tertiary First Step students with complete data across time points and informants did not differ significantly from those with missing assessments on student demographics, student behavioral characteristics, or parent characteristics. The two groups did differ, however, on the number of years the teacher had been working in the field. The teachers of students with complete data had been working in the field longer than the teachers of students with missing data (15.6 years [SD = 9.0] as compared to 7.7 years [SD = 4.1], respectively).

Between-subject results. Results from the covariate-adjusted regression models as well as baseline and post-test intervention means and standard deviations for the Tertiary First Step and comparison conditions are presented in Table 3. For the three teacher- and parent-reported outcomes in the pro-social behavior domain, students who received the tertiary version of First Step had statistically significant improvement in adaptive behavior and social skills at post-test as compared to students in the comparison sample. Hedges' g effect sizes for the three pro-social outcomes ranged .36–1.11. Students who participated in the intervention also had statistically significant reductions in maladaptive and problem behaviors across both school and home settings. The Hedges' g effect sizes for the teacher- and parent-reported problem behaviors ranged from −.77 to −1.17. There were no statistically significant changes in student academic competence after completion of the intervention (Hedges' g = .19).

Within-subject results. We also examined within-subject effects for our observation measures, parenting measures, and primary teacher- and parent-reported outcomes. Within-subject effect sizes for the academic domain were .25 for academic competence (F[1,29] = 1.80, p = .190) and .82 for AET (F[1,32] = 62.17, p < .001). After receiving the intervention, student AET improved on average from 59% (SD = 17%) to 75% (SD = 16%). Effects for the PSB observation data were in the medium to large range. The effect size for positive interactions (F[1,30] = 6.04, p = .020) was .42 and .53 for negative interactions (F[1,30] = 11.59, p = .002). Positive interactions with peers increased from baseline ($M[SD]$ = 27.3[16.5]) to post intervention ($M[SD]$ = 35.2[17.1]) and negative interactions with peers decreased from 4.3 (SD = 4.1) to 1.7 (SD = 1.9).

For the parenting measures, mean scores on the parental distress subscale decreased from 26.7 (SD = 10.8) at baseline to 24.0 (SD = 8.9) at post-test. The F test for the within-subjects ANOVA was not statistically significant (F[1,27] = 3.51, p = .072) and the effect size was small (partial r = .34). Mean scores on parenting efficacy increased from 4.60 (SD = 1.10) at baseline to 5.00 (SD = 0.80) at posttest. The effect size for increases in parental efficacy was .41 (medium), and the differences from baseline to post-test were statistically significant (F[1,27] = 5.53, p = .026).

For the parent- and teacher-reported outcomes, within-subject partial r effect sizes were .57, .66, and .74 for teacher-reported ABI, SSiS social skills, and parent-reported SSiS social skills, respectively, within the pro-social domain. For the problem behavior domain, effect sizes were .70 and .65 for teacher-reported MBI and SSiS problem behavior, and .79 for parent-reported SSiS problem behavior.

Practical significance. The mean improvement index score for outcomes in the pro-social behavior domain was +28 percentile points (i.e., if an average control student received the EFS intervention, we could anticipate a mean improvement of 28% on pro-social outcomes). The improvement index for teacher-reported adaptive behavior was +31 percentile points and +37 percentile points for social skills. The improvement index for parent-reported social skills (+14.8 percentile points) was more modest. For the problem behavior domain, mean improvement across the three outcomes was +33 percentile points. Teacher-reported problem behavior outcomes ranged from +34 to +38 percentile points for maladaptive and problem behavior, respectively. Parent-reported improvement in problem behavior scale was +28 percentile points. There were positive improvements across all primary outcomes and settings. Mean improvement in the home setting was +34 percentile points and mean improvement in the home setting was +21 percentile points.

Process-outcome analysis. For the school outcomes, dose was associated with improvements in teacher-reported social skills (t = 2.60, p = .009) and reductions in teacher-reported problem behavior (t = −3.49, p < .001). For a one standard deviation increase in dose, post-intervention, teacher-reported social skills increased by .31 standard deviations and teacher-reported problem behavior decreased by .40 standard deviations. There were no statistically significant associations between dose and the other outcome measures. As well, there were no statistically-significant associations between school-based or teacher-reported outcomes and adherence or quality of implementation of the school component.

Table 3
Baseline and post-intervention means and standard deviation for outcome measures and covariate-adjusted regression results.

Domain/measure	Comparison ($n = 22$)			Tertiary FS ($n = 33$)			Condition effect		Effect size
	Baseline	Post-intervention		Baseline	Post-intervention		t	p-Value	Hedge's g
	$M(SD)$	$M(SD)$	M_{Adj}	$M(SD)$	$M(SD)$	M_{Adj}			
Pro-social behavior									
SSBD-ABI	29.5 (6.2)	29.5 (7.1)	30.6	32.3 (5.8)	39.2 (9.7)	38.4	3.60	< .001	.89
SSiS-SS-Teacher	76.1 (8.8)	75.4 (9.2)	76.0	77.7 (9.7)	91.7 (14.3)	89.8	4.55	< .001	1.11
SSiS-SS-Parent	73.9 (21.7)	78.9 (21.0)	80.1	77.2 (13.8)	88.1 (17.4)	87.0	2.18	.029	.36
Problem Behavior									
SSBD-MBI	37.6 (6.1)	37.7 (5.8)	37.4	36.6 (5.7)	28.1 (9.1)	28.2	−4.79	< .001	−1.17
SSiS-PB-Teacher	133.0 (11.0)	134.0 (12.0)	133.7	132.4 (11.8)	118.5 (16.2)	119.4	−4.15	< .001	−.98
SSiS-PB-Parent	129.1 (21.6)	126.8 (19.9)	128.0	129.9 (10.1)	116.7 (12.8)	115.6	−3.39	.001	−.77
Academic Competence									
SSiS-AC-Teacher	89.3 (17.9)	88.0 (16.9)	87.9	89.0 (15.3)	91.0 (13.9)	90.9	1.54	.125	.19

Notes: SSBD, Systematic Screening for Behavior Disorders; SSiS, Social Skills Improvement System Rating Scales; SS, Social Skills; MBI, Maladaptive Behavior Index; PB, Problem Behavior; AC, Academic Competence.

For the home component, parent satisfaction was associated with improvements in parent-reported social skills on the SSiS ($t = 2.48$, $p = .013$). For a one standard deviation increase in parent satisfaction at post-intervention, parent-reported social skills increased by .30 standard deviations. There were no statistically significant associations among parent satisfaction and the other home-based outcome measures. Coach-reported parent compliance was negatively associated with parent efficacy. For a one standard deviation increase in parent compliance, parent efficacy decreased by .40 standard deviations ($t = -2.81$, $p = .005$). Parent compliance was not significantly associated with the other outcome measures. There were no statistically significant associations among dose of the home component and the home-based outcome measures.

Discussion

Tertiary First Step provides a potentially effective, manualized intervention option for addressing the needs of an increasing number of children who are entering school requiring tertiary level support for behavior problems (McCabe et al., 2000; Walker et al., 2004). The program meets the criteria for effective interventions to impact educational and mental health outcomes for children with challenging behavior provided by Hoagwood et al. (2007) and Patterson and Chamberlain (1994). Specifically, it includes a family component that is responsive to unique situations and needs of families requiring intensive, tertiary-level support, and provides flexible, yet manualized procedures that address parental motivation to engage in the intervention process and facilitate change in their own behavior.

This study builds on two decades of efficacy, effectiveness, and replication research related to the First Step intervention (Walker et al., 2014) by providing preliminary evidence that the newly created variation for tertiary level students is promising for improving important educational outcomes such as social skills, problem behavior, and academic engaged time. The consistency noted in outcomes across multiple domains, measures, and informants is a strength of this evaluation, and contributes substantially to our assertion that these First Step enhancements appear promising for improving educationally relevant outcomes. It is important to note this is the only First Step study in which the students' behavioral impairments were identified in home and school settings prior to baseline assessments. The improvements in academic engaged time is perhaps the outcome that will be of the most interest to teachers and administrators and was the most powerful outcome associated with our within-subject analysis. Unfortunately, only a small effect size was observed for academic competence as assessed by the SSiS.

Process data demonstrated the interventions were delivered with fidelity. Although this is not surprising for the school component, given the minor modifications to this aspect of the program at the tertiary level, it is noteworthy since this study represents the first systematic application of the Tertiary homeBase intervention. Further, coaches, parents, and teachers all reported moderate to high levels of satisfaction with the revised home component. For the school component process-outcome analysis, dosage was associated with improvements in teacher-reported social skills and reductions in problem behavior, but adherence and quality were not. For the home component, parent satisfaction was associated with parent-reported social skills, but none of the other home-based outcomes. Given the small sample and high levels of adherence and implementation quality across teachers and coaches, we suspect that limited variability may be contributing to the lack of association among fidelity and outcome measures. Parent compliance and dosage were not associated with parenting efficacy or parental distress. Again, given the small sample size, these relationships must be interpreted with caution. The analysis, however, does provide a model for examining the relationship between process variables and outcomes in future research.

In addition to providing support for the notion that these enhancements to the First Step intervention are promising when implemented with children who require tertiary-level support, this study extends the literature to support the use of a motivational interviewing approach in school-based intervention research (Frey et al., 2011; Herman, Reinke, Frey, & Shepard, 2014; Reinke, Frey, Herman, & Thompson, 2014). This approach continues to appear worthy of future research.

Limitations

There are a number of limitations related to these findings. The primary limitation is that our design fails to control for several threats to internal validity. Specifically, while the addition of a comparison group increases confidence that the impressive gains in teacher- and parent-reported social skills and problem behaviors were the result of participation in the Tertiary First Step intervention, the lack of randomization limits our ability to rule out selection bias, and to some extent, history as possible threats to internal validity. Our sample size also prohibited us from conducting a post hoc analysis on the families that completed two or fewer steps of Tertiary homeBase ($N = 7$), so that we might be able to identify patterns of families for whom we were unsuccessful at engaging. Additionally, while severity baseline scores for children in the intervention and comparison group were similar, more children in the intervention group were receiving

special education support through the school system. Additionally, observational data were not collected for the comparison group. Thus, history and maturation remain possible explanations for the changes observed from baseline to posttest within the intervention group.

Our study design also prohibits us from isolating the specific benefits the Tertiary First Step program may have had over the original First Step intervention, or for identifying the relative contributions of the home and school components. We have no way of knowing if the effect sizes for our main outcomes would have been as large had we implemented the original intervention with the same sample of children. It is important to note that the teacher-reported effect sizes are slightly more robust than they have been in previous First Step studies employing similar designs (Walker et al., 1998, 2009). This finding is particularly impressive given that the sample recruited is substantially more at risk than has been the case in previous studies, and that previous finding have been more variable for children at the tertiary level. Our sample size is also relatively small.

Next, there are a few limitations that constrain the external validity of the findings. For example, the coaches were all masters-level professionals who engaged in more training and supervision than could reasonably be expected to be available in educational settings under ordinary conditions. Additionally, our sample was drawn from only two school districts, which are not likely representative of districts generally. Finally, the intervention protocol changed slightly between the first and second cohort, although we do not view the changes as substantial.

Future research

Future research efforts should employ designs capable of establishing the efficacy of the Tertiary First Step intervention by controlling for the threats to internal and external validity mentioned above. Additionally, it will be important to determine the resources needed to train coaches who have not participated in the development of the intervention to implement it with fidelity. Next, it is important to add to the measurement protocol direct, sensitive measures of academic achievement. Further, because the Tertiary homeBase is intended to increase motivation to adopt effective parenting practices, it would be beneficial to incorporate measures of motivation and direct observations of parenting practices to assess change following participation in the intervention. Future studies should also examine the impact of the intervention after the coach support has been withdrawn, and during the following school year when the child's teacher and peer group have changed. Finally, it might also be to examine the relative contribution of the home and school components.

Conclusion

Few evidence-based interventions exist that are successful in altering the developmental pathways of young children with severe behavior problems who require tertiary level interventions. The enhancements to the First Step to Success early intervention program appear to be a promising option to address this need. Although the enhancements will require additional investigation and evaluation, the results from this initial implementation effort are encouraging, and suggest exposure to the intervention may lead to increases in social skills, decreases in problem behavior, and increases in academic engaged time. The evidence presented herein suggests the enhanced version of the First Step intervention is promising for expanding the reach of the program to children with tertiary-level needs.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.ecresq.2014.05.002.

References

Abidin, R. R. (1995). *Parenting Stress Index: Professional manual* (3rd ed.). Odessa, FL: Psychological Assessment Resources, Inc.

Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist 4-18 and the 1991 profile*. Burlington, VT: University of Vermont Department of Psychiatry.

Batsche, G. M., Elliott, J., Graden, J. L., Grimes, J., Kovaleski, J. F., & Prasse, D. (2005). *Response to intervention: Policy considerations and implementation*. Alexandria, VA: National Association of State Directors of Special Education.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.

Collins, L. M., Schafer, J. L., & Kam, C.-M. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods*, *6*, 330–351. http://dx.doi.org/10.1037/1082-989X.6.4.330

Dishion, T. J., & Stormshak, E. A. (Eds.). (2007). *Intervening in children's lives: An ecological, family-centered approach to mental health care*. Washington, DC: American Psychological Association.

Enders, C. (2010). *Applied missing data analysis*. New York, NY: The Guilford Press.

Feil, E., Frey, A. J., Walker, H. M., Seeley, J., Golly, A., & Small, J. (2014). *The efficacy of a home-school intervention for preschoolers with challenging behaviors: A randomized controlled trial of Preschool First Step to Success*. Manuscript submitted for publication.

Forgatch, M. S., & Patterson, G. R. (1985). Therapist behavior as a detriment for client noncompliance: A paradox for the behavior modifier. *Journal of Consulting and Clinical Psychology*, *53*, 846–851. http://dx.doi.org/10.1037/0022-006X.53.6.846

Frey, A. J., Cloud, R. N., Lee, J., Small, J. W., Seeley, J. R., Feil, E., et al. (2011). The promise of motivational interviewing in school mental health. *School Mental Health*, *3*, 1–12. http://dx.doi.org/10.1007/s12310-010-9048-z

Frey, A. J., Lee, J., Small, J. W., Seeley, J. R., Walker, H. M., & Feil, E. G. (2013a). Transporting motivational interviewing to school settings to improve engagement and fidelity of Tier 2 interventions. *Journal of Applied School Psychology*, *29*, 183–202. http://dx.doi.org/10.1080/15377903.2013.778774

Frey, A. J., Lee, J., Small, J. W., Seeley, J. R., Walker, H. M., & Feil, E. G. (2013b). The Motivational Interviewing Navigation Guide: A process for enhancing teachers' motivation to adopt and implement school-based interventions. *Advances in School Mental Health Promotion*, *6*, 157–173. http://dx.doi.org/10.1080/1754730X.2013.804334

Frey, A. J., Small, J. W., Feil, E., Seeley, J. R., Walker, H. W., & Golly, A. (2013). The feasibility of First Step to Success with preschoolers. *Children & Schools*, *35*, 171–186. http://dx.doi.org/10.1093/cs/cdt014

Frey, A. J., Walker, H. M., Seeley, J. R., Lee, J., Small, J. W., Golly, A., et al. (2013c). *Tertiary First Step to Success Resource Manual*. Retrieved from http://www.firststeptosuccess.org/resources.html

Frey, A. J., Walker, H. M., Seeley, J. R., Lee, J., Small, J. W., Golly, A., et al. (2013d). *First Step to Success Classroom Check-up Resource Manual*. Retrieved from http://www.firststeptosuccess.org/resources.html

Glynn, L. H., & Moyers, T. B. (2010). Chasing change talk: The clinician's role in evoking client language about change. *Journal of Substance Abuse Treatment*, *39*, 65–70. http://dx.doi.org/10.1016/j.jsat.2010.03.012

Gresham, F. M., & Elliott, S. N. (2008). *Social Skills Improvement System Rating Scales*. Minneapolis, MN: NCS Pearson.

Herman, K., Reinke, W., Frey, A. J., & Shepard, S. (2014). *Motivational interviewing in schools: Strategies to engage parents, teacher, and students*. New York: Springer Publishing Company.

Hoagwood, K. E., Olin, S. S., Kerker, B. D., Kratochwill, T. R., Crowe, M., & Saka, N. (2007). Empirically based school interventions targeted at academic and mental health functioning. *Journal of Emotional and Behavioral Disorders*, *15*, 66–92. http://dx.doi.org/10.1177/10634266070150020301

Hops, H., & Walker, H. (1988). *CLASS: Contingencies for Learning Academic and Social Skills*. Seattle, WA: Educational Achievement Systems.

Kegan, S. L. (1990). Readiness 2000: Rethinking rhetoric and responsibility. *The Phi Delta Kappen*, *72*, 272–279. http://dx.doi.org/10.1177/0192513X11415354

Lee, J., Frey, A. J., Seeley, J., Small, J., Walker, H. M., Golly, A, et al. (in press). Adapting motivational interviewing to an early intervention addressing challenging

behavior: Applications with teachers. In E. McNamera (Ed.), *Motivational interviewing with children and young people: Issues and further applications*. Ainsdale, Southport, Merseyside PR8, United Kingdom: Positive Behaviour Management.
Loman, S., Rodriguez, B., & Horner, R. (2010). Sustainability of a targeted intervention package: First Step to Success in Oregon. *Journal of Emotional and Behavioral Disorders*, *18*, 178–191. http://dx.doi.org/10.1177/1063426610362899
McCabe, L. A., Hernandez, M., Lara, S. L., & Brooks-Gunn, J. (2000). Assessing preschoolers' self-regulation in homes and classrooms: Lessons from the field. *Behavioral Disorders*, *26*, 53–69. http://dx.doi.org/10.1037/a0015861
Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, *6*, 42. http://dx.doi.org/10.1186/1748-5908-6-42. Retrieved from http://www.implementationscience.com/content/6/1/42
Miller, W. R., & Rollnick, S. R. (2012). *Motivational interviewing: Helping people change (Applications of motivational interviewing)* (3rd ed.). New York, NY: The Guilford Press.
Miller, W. R., Yahne, C. E., Moyers, T. B., Martinez, J., & Pirritano, M. (2004). A randomized trial of methods to help clinicians learn motivational interviewing. *Journal of Consulting & Clinical Psychology*, *72*, 1050–1062. http://dx.doi.org/10.1037/0022-006x.72.6.1050
Moyers, T. B., & Martin, T. (2006). Therapist influence on client language during motivational interviewing sessions. *Journal of Substance Abuse Treatment*, *30*, 245–251. http://dx.doi.org/10.1037/a0016830
Muthèn, L. K., & Muthèn, B. O. (1998–2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Author.
NCP Research. (2000). *Oregon Healthy Start Evaluation Manual*. Retrieved from http://www.npcresearch.com
Nock, M. K., & Kazdin, A. E. (2005). Randomized controlled trial of a brief intervention for increasing participation in parent management training. *Journal of Consulting and Clinical Psychology*, *73*, 872–879. http://dx.doi.org/10.1037/0022-006X.73.5.872
Patterson, G. R., & Chamberlain, P. (1994). A functional analysis of resistance during parent training therapy. *Clinical Psychology: Science and Practice*, *1*, 53–70. http://dx.doi.org/10.1111/j.1468-2850.1994.tb00006.x
Patterson, G. R., & Forgatch, M. S. (1985). Therapist behavior as a detriment for client noncompliance: A paradox for the behavior modifier. *Journal of Consulting and Clinical Psychology*, *53*, 846–851. http://dx.doi.org/10.1037/0022-006X.53.6.846
Patterson, G., Reid, J., & Dishion, T. (1992). *Antisocial boys*. Eugene, OR: Castalia Press.
Reid, J. B. (1993). Prevention of conduct disorder before and after school entry: Relating interventions to developmental findings. *Development and Psychopathology*, *5*(1/2), 243–262. http://dx.doi.org/10.1017/S0954579400004375
Reid, M. J., Webster-Stratton, C., & Hammond, M. (2003). Follow-up of children who received the Incredible Years intervention for oppositional defiant disorder: Maintenance and prediction of 2-year outcome. *Behavior Therapy*, *34*, 471–491. http://dx.doi.org/10.1016/S0005-7894(03)80031-X
Reinke, W., Frey, A. J., Herman, K., & Thompson, C. (2014). Improving engagement and implementation of interventions for children with behavior problems in home and school settings. In H. Walker, & F. Gresham (Eds.), *Handbook of evidence-based practices for students having emotional and behavioral disorders* (pp. 432–445). New York: Guilford Publishing, Inc.
Rosnow, R. L., & Rosenthal, R. (2008). Assessing the effect size of outcome research. In A. M. Nezu, & C. M. Nezu (Eds.), *Evidence-based outcome research: A practical guide to conducting randomized controlled trials for psychosocial interventions* (pp. 379–404). New York, NY: Oxford University Press.
Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*, 147–177. http://dx.doi.org/10.1037/1082-989X.7.2.147
Seeley, J. R., Small, J. W., Walker, H. M., Feil, E. G., Severson, H. H., Golly, A. M., et al. (2009). Efficacy of the First Step to Success intervention for students with attention-deficit/hyperactivity disorder. *School Mental Health*, *1*, 37–48. http://dx.doi.org/10.1007/s12310-008-9003-4
Severson, H. H., Walker, H. W., Hope-Doolittle, J., Kratochwill, T. R., & Gresham, F. M. (2007). Proactive, early screening to detect behaviorally at-risk students: Issues, approaches, emerging innovations, and professional practices. *Journal of School Psychology*, *45*, 193–223. http://dx.doi.org/10.1016/j.jsp.2006.11.003
Smith, J. D., Dishion, T. J., Shaw, D. S., & Wilson, M. N. (2013). Indirect effects of fidelity to the Family Check-Up on changes in parenting and early childhood problem behaviors. *Journal of Consulting and Clinical Psychology*, *81*, 962–974. http://dx.doi.org/10.1037/a0033950
Smith, J. D., Handler, L., & Nash, M. R. (2010). Therapeutic assessment for preadolescent boys with oppositional-defiant disorder: A replicated single-case time-series design. *Psychological Assessment*, *22*, 593–602. http://dx.doi.org/10.1037/a0019697
Smith, J. D., Wolf, N. J., Handler, L., & Nash, M. R. (2009). Testing the effectiveness of family therapeutic assessment: A case study using a time-series design. *Journal of Personality Assessment*, *91*, 518–536. http://dx.doi.org/10.1080/00223890903228331
Sprague, J., & Golly, A. (2013). *BEST behavior: Building positive behavior support in schools* (2nd ed). Longmont, CO: Sopris Learning.
Sumi, W. C., Woodbridge, M. W., Javitz, H. S., Thornton, S. P., Wagner, M., Rouspil, K., et al. (2013). Assessing the effectiveness of First Step to Success: Are short-term results the first step to long-term behavioral improvements? *Journal of Emotional and Behavioral Disorders*, *21*, 66–78. http://dx.doi.org/10.1177/1063426611429571
Walker, H. M., Kavanagh, K., Stiller, B., Golly, A., Severson, H. H., & Feil, E. G. (1998). First Steps: An early intervention approach for preventing school antisocial behavior. *Journal of Emotional and Behavioral Disorders*, *6*, 66–80. http://dx.doi.org/10.1177/106342669800600201
Walker, H. W., Ramsey, E., & Gresham, F. M. (2004). *Antisocial behavior in school: Evidenced-based practices* (2nd ed.). Belmont, CA: Wadsworth/Thompson Learning.
Walker, H., Seeley, J., Small, J., Severson, H., Graham, B., Feil, E., et al. (2009). A randomized controlled trial of the First Step to Success early intervention: Demonstration of program efficacy outcomes in a diverse, urban school district. *Journal of Emotional and Behavioral Disorders*, *17*, 197–212. http://dx.doi.org/10.1177/1063426609341645
Walker, H., & Severson, H. H. (1990). *Systematic Screening for Behavior Disorders (SSBD): User's guide and technical manual*. Longmont, CO: Sopris West.
Walker, H. M., Severson, H. H., Seeley, J. R., Feil, E. G., Small, J. W., Golly, S. R., et al. (2014). The evidence base of the First Step to Success Early Intervention for preventing emerging antisocial behavior patterns. In M. Walker, & F. M. Gresham (Eds.), *Handbook of evidence-based practices for students having emotional and behavioral disorders* (pp. 518–536). New York, NY: Guilford.
Walker, H. M., Severson, H. H., Seeley, J. R., Small, J. W., Golly, A., Frey, A.J, et al. (2012). *The evidence base of the First Step to Success Early Intervention for preventing emerging antisocial behavior patterns*. Unpublished document. Retrieved from http://www.firststeptosuccess.org/publications.html
Walker, H. M., Stiller, B., Golly, A., Kavanagh, K., Severson, H. H., & Feil, E. G. (1997). . *First Step to Success: Helping young children overcome antisocial behavior* (Vol. 6) Longmont, CO: Sopris West.
Webster-Stratton, C., Reid, M. J., & Hammond, M. (2004). Treating children with early-onset conduct problems: Intervention outcomes for parent, child, and teacher training. *Journal of Clinical Child and Adolescent Psychiatry*, *33*, 105–124. http://dx.doi.org/10.1207/S15374424JCCP3301_11
Weist, M. D., Lever, N. A., Bradshaw, C., & Owens, J. S. (2014). Further advancing the field of school mental health. In M. D. Weist, N. A. Lever, C. Bradshaw, & J. S. Owens (Eds.), *Handbook of school mental health: Research, training, practice, and policy* (2nd ed, Vol. 6, pp. 1–16). New York, NY: Springer.
What Works Clearinghouse. (2011). *Procedures and standards handbook (Version 2.1)*. Washington, DC: U.S. Department of Education, Institute of Education Sciences.