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Beyond behavior modification: Benefits of social–emotional/self-regulation training for preschoolers with behavior problems

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ABSTRACT

The current study evaluated the initial efficacy of three intervention programs aimed at improving school readiness in preschool children with externalizing behavior problems (EBP). Participants for this study included 45 preschool children (76% boys; M_{age} = 5.16 years; 84% Hispanic/Latino background) with at-risk or clinically elevated levels of EBP. During the summer between preschool and kindergarten, children were randomized to receive three newly developed intervention packages. The first and most cost effective intervention package was an 8-week School Readiness Parenting Program (SRPP). Families randomized into the second and third intervention packages received not only the weekly SRPP, but children also attended two different versions of an intensive kindergarten summer readiness class (M-F, 8 a.m.–5 p.m.) that was part of an 8-week summer treatment program for pre-kindergarteners (STP-PreK). One version included the standard behavioral modification system and academic curriculum (STP-PreK) while the other additionally contained social–emotional and self-regulation training (STP-PreK Enhanced). Baseline, post-intervention, and 6-month follow-up data were collected on children's school readiness outcomes including parent, teacher, and objective assessment measures. Analyses using linear mixed models indicated that children's behavioral functioning significantly improved across all groups in a similar magnitude. Children in the STP-PreK Enhanced group, however, experienced greater growth across time in academic achievement, emotion knowledge, emotion regulation, and executive functioning compared to children in the other groups. These findings suggest that while parent training is sufficient to address children's behavioral difficulties, an intensive summer program that goes beyond behavioral modification and academic preparation by targeting socio-emotional and self-regulation skills can have incremental benefits across multiple aspects of school readiness.

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1. Introduction

Externalizing behavior problems (EBP), including aggression, defiance, inattention, hyperactivity, and impulsivity are the most common reason for early childhood mental health referral (Cormier, 2008). In addition to having a highly stable and persistent course (Lee, Lahey, Owens, & Hinshaw, 2008), early-onset EBP are associated with a developmental trajectory of psychosocial

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impairment, including increased risk for later antisocial behavior (Moffitt, Caspi, Harrington, & Milne, 2002), substance use disorders (Lee, Humphreys, Flory, Liu, & Glass, 2011), peer rejection (Hoza, 2007), and negative academic outcomes (Loe & Feldman, 2007). The transition to kindergarten marks a particularly important period as preschool children exhibiting EBP are more likely to have poor school readiness outcomes including academic and social difficulties (Bulotsky-Shearer & Fantuzzo, 2011; Keane & Calkins, 2004). Therefore, preschool children with EBP represent an optimal at-risk population for early intervention.

1.1. Self-regulation and social–emotional competence in children with EBP

When conceptualizing the host of factors that contribute to the challenges that children with EBP face upon school entry, it is important to examine the self-regulation deficits that are inherently part of EBP. Broadly speaking, self-regulation refers to the skills and processes associated with the direction, planning, and control of attention and/or cognition, emotion, and behavior/action that are necessary for optimal adaptive functioning (Calkins, 2007). Children with EBP are more likely to exhibit self-regulation difficulties across behavioral, attentional, and/or cognitive, and emotional domains compared to typically developing children (Barkley, 2010; Calkins, 2007).

A related, yet distinct, construct to self-regulation is social–emotional competence, which includes children's social skills, social problem solving, emotional expressiveness, and understanding or knowledge of emotions (Denham, 2006). Children's social competence typically involves active enactment of prosocial behaviors such as sharing, helping others, and expressing concerns for others (Eisenberg, Spinrad, & Sadovsky, 2006). Children's emotion understanding and/or knowledge includes the ability to recognize and verbally label various internal states (Denham, 2006). Similar to the self-regulation deficits previously mentioned, young children with EBP are also more likely to have lower levels of social–emotional competence (DuPaul, McGoey, Eckert, & VanBrakle, 2001), perform more poorly on emotion recognition and/or knowledge tasks (Dyck, Ferguson, & Shochet, 2001), and are more likely to demonstrate deficits in social skills (see Nixon, 2001 for a review).

1.2. Importance of self-regulation and social–emotional competence for school readiness

As outlined by Rimm-Kaufman and Pianta's (2000) Ecological and Dynamic Model of Transition, the kindergarten environment is markedly different from that of preschool with novel academic and social demands under higher expectations of autonomy. This can be challenging and/or stressful for children as they must then use their self-regulation skills and social–emotional competence to learn and effectively interact with teachers and peers (Rimm-Kaufman & Pianta, 2000). Indeed, research has linked higher levels of social–emotional competence with more positive student-teacher relationships (Pianta & Stuhlman, 2004) and greater academic skills, even when earlier academic success is taken into consideration (Denham, 2006; Eisenberg, Valiente, & Eggum, 2010).

Self-regulation skills, such as executive function (EF) and emotion regulation (ER), are particularly important for children's early school success (Ursache, Blair, & Raver, 2012). Effective use of EF in the classroom allows children to attend to teacher instructions despite other classroom distractions, enables children to remember classroom rules while participating in activities, and enables inhibition of impulsive responses in favor of a more adaptive response (e.g., raising hand instead of shouting an answer). Not surprisingly, individual differences in EF have been shown to be concurrently and longitudinally associated with young children's math and literacy scores (Clark, Pritchard, & Woodward, 2010; McClelland et al., 2007), as well as with social outcomes (Hill & Taylor, 2004). Similarly, effective use of ER in the classroom allows children to modulate arousal levels that typically arise when faced with a novel and more demanding environment, which contributes directly to their academic performance by facilitating cognitive processes (Blair, 2002; Graziano, Reavis, Keane, & Calkins, 2007).

1.3. Early interventions that target social–emotional and behavioral difficulties

Given that preschoolers with EBP have significant deficits across self-regulation skills and social–emotional competence, both of which are critical for school readiness, it is not surprising that significant efforts have been made towards developing early intervention programs that directly target these concerns.

1.3.1. Parent training

Behavioral parent training (PT) programs such as Community Parent Education Program (COPE; Cunningham, Bremner, & Secord-Gilbert, 1998), Triple P-Positive Parenting Program (Sanders, Markie-Dadds, Tully, & Bor, 2000), The Incredible Years (IY; Webster-Stratton, Reid, & Stoolmiller, 2008), and Parent–Child Interaction Therapy (PCIT; Eyberg et al., 2001) are among the most well-established evidence-based interventions for EBP in young children (Eyberg, Nelson, & Boggs, 2008). The common treatment components of PT programs (e.g., increasing positive parent–child interactions, promoting consistency, and use of time out) are associated with large effect sizes on behavioral outcomes (Kaminski, Valle, Filene, & Boyle, 2008). However, despite substantial support, PT programs tend to have low participation rates and high attrition rates. Most relevant to the current study, PT programs do not directly address multiple aspects of school readiness, most notably academic impairment (Chronis, Chacko, Fabiano, Wymbs, & Pelham, 2004).

1.3.2. Classroom based

Classroom- based interventions, on the other hand, attempt to improve school readiness and increase academic success by targeting the social–emotional competency of preschool and young children at the classroom level. There are numerous evidence-based programs for (a) increasing social–emotional competence (e.g., Peaceworks: Peacemaking Skills for Little Kids; Pickens, 2009) and (b) decreasing EBP (e.g., promoting alternative thinking skills; Greenberg, Kusche, Cook, & Quamma, 1995). Although it is beyond the scope of the current paper to review all these programs (see Domitrovich, Durlak, Goren, & Weissberg, 2013), it is important to note that one of the only programs that directly targets preschool children with EBP's social–emotional competence via a multi-faceted approach including PT, teacher training, and direct child social–emotional competency training is IY (Webster-Stratton, Reid, & Hammond, 2004).

In addition to its PT component, IY also includes a child program (Dinosaur School) and a teacher training program (Webster-Stratton et al., 2008). The IY's child program is delivered by the classroom teacher as a class-wide prevention program, or used by counselors or therapists to treat children in small groups. Bi-weekly sessions focus on strengthening children's social–emotional competencies (e.g., understanding and communicating feelings, practicing conversational skills). The teacher training program consists of monthly workshops focused on strengthening teachers' classroom management strategies; promoting student's prosocial behavior and school readiness; reducing children's classroom EBP; and increasing home-school collaboration. IY's Teacher Training and Dinosaur School have been effective in improving students' social competence and ER (Webster-Stratton et al., 2008). However, no treatment effects on academic outcomes have been reported (Webster-Stratton & Herman, 2010).

1.4. Early interventions that target self-regulation

As observed by Lonigan and Phillips (2012), the associations between children's self-regulation skills and school readiness outcomes have resulted in an influx of early childhood programs focused on how to best promote children's self-regulation skills, especially EF and ER. Although the previously reviewed IY also addresses ER as part of their social–emotional curriculum (Webster-Stratton et al., 2008), other innovative preschool programs that have attempted to measure and/or remediate children's EF skills include the Research-Based Developmentally Informed (REDI) Head Start innovation (Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008), Chicago School Readiness Project (CSRP; Raver et al., 2009); Kids in Transition to School (KITS; Pears, Fisher, & Bronz, 2007), and the Tools of the Mind Curriculum (TOM; Bodrova & Leong, 2007). Improvements in self-regulation skills, including EF, have been observed in the REDI and CSRP studies and partially mediate the intervention's effects on emergent literacy skills (Bierman et al., 2008) and math skills (Raver et al., 2011). KITS has also been effective in improving children's self-regulation skills (including the inhibitory control aspect of EF and ER) and early literacy scores (Pears et al., 2013). The TOM curriculum is perhaps the most well-known, yet controversial, program given the mixed findings regarding its effectiveness on EF and academic outcomes (Blair & Raver, 2014; Diamond, Barnett, Thomas, & Munro, 2007; Lonigan & Phillips, 2012).

1.5. Goals of the current study

Taken together, it appears that improving young children's school readiness may or may not require a direct targeting of children's self-regulation skills. As pointed out by Lonigan and Phillips (2012), more work is needed comparing curricula that target social–emotional and self-regulation skills, with more academic skills-based curricula. Most importantly, of the currently available early intervention programs that target self-regulation (e.g., REDI, TOM, KITS, CSRP) or academic readiness (i.e., Literacy Express; Lonigan, Clancy-Menchetti, Phillips, McDowell, & Farver, 2005), none have specifically targeted children with EBP. Only IY directly targets preschool children with EBP; however, no treatment effects on academic outcomes have been reported (Webster-Stratton & Herman, 2010). Furthermore, neither IY nor most of the reviewed programs, are designed to provide services during the summer transition to kindergarten. Intervening during the summer may be critical given well documented summer learning losses in academic skills (e.g., Cooper, 2004). Finally, when considering more cost effective and less intensive PT models for children with EBP, it remains unclear (a) what the optimal intervention package for helping children with EBP transition successfully to kindergarten is comprised of, and (b) whether an intervention has to specifically target children's social–emotional and self-regulation functioning to result in positive school readiness outcomes.

Designed as a small randomized trial, the current study sought to examine the promise of three newly developed intervention packages (see Method for details) aimed at facilitating the transition to kindergarten for preschoolers identified as having EBP. The first and most cost effective intervention package was an 8-week PT group (School Readiness Parenting Program; SRPP). Families randomized into the second and third intervention packages received not only the SRPP, but children also attended two different versions of an intensive kindergarten summer readiness class (KSRC) that was part of the summer treatment program for pre-kindergarteners (STP-PreK; Graziano, Slavec, Hart, Garcia, & Pelham, 2014). One version included the standard behavioral and academic curriculum (STP-PreK) while the other additionally contained social–emotional and self-regulation training (STP-PreK Enhanced).

We hypothesized that (a) all three programs would be feasible to implement, be highly attended, and receive high consumer/treatment satisfaction scores; (b) children across all interventions would experience a decrease in their EBP trajectory across time; (c) children participating in the STP-PreK and STP-PreK Enhanced would experience a steeper decline in their EBP trajectory across time as well as a steeper growth in academic functioning compared to children who received only PT; and (d) children in the STP-PreK Enhanced would experience a steeper growth in their socio-emotional and self-regulation functioning compared to children in the other interventions.

2. Method

2.1. Participants and recruitment

The study took place in a large urban southeastern city in the U.S. with a large Hispanic/Latino population. Children and their caregivers were recruited from local preschool and mental health agencies via brochures, radio and newspaper ads, open houses, and parent workshops. Sixty-four families scheduled a screening appointment. The primary caregiver provided written consent prior to the start of the initial screening assessment. To qualify for the study participants were required to (a) have an EBP composite *t*-score of 60 or above on the Behavior Assessment System for Children, 2nd Edition (BASC-2; Reynolds & Kamphaus, 2004) as reported by their preschool teacher ($M = 67.93$, $SD = 11.25$), (b) be enrolled in preschool during the previous year, (c) have an IQ of 70 or higher ($M = 93.20$, $SD = 14.21$) based on the Wechsler Preschool and Primary Scale of Intelligence–Fourth edition (WPPSI-IV; Wechsler, 2012), (d) have no confirmed history of Autism Spectrum Disorder based on parental report as well as completion of the Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003), and (e) be able to attend the daily 8-week summer program or SRPP prior to the start of kindergarten.

The final participating sample consisted of 45 preschool children (76% boys) with at-risk or clinically elevated levels of EBP. Questionnaires, offered in the parents' preferred language, were completed primarily by mothers (96%) across all study assessments. See Table 1 for sample demographics including rates of diagnoses derived from administration of the disruptive disorders module of the Diagnostic Interview Schedule for Children, computerized version IV (C-DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). No significant differences were found between English and Spanish speaking parents. According to parent report at intake, no children were on any psychotropic medication. All children were required to be fluent in English as administration of standardized IQ and academic measures could only be conducted in English.

2.2. Measures of feasibility and acceptability

2.2.1. Treatment fidelity

A licensed psychologist completed a treatment fidelity checklist on a weekly basis for each classroom to provide supervision to staff implementing the STP-PreK and STP-PreK Enhanced (as fully described in the program components section). Additionally, the KSRC portion of the STP-PreK and STP-PreK Enhanced were videotaped every two weeks with research assistants trained to code sessions using a treatment fidelity checklist. Treatment fidelity measures were completed on 31% of camp sessions for

Table 1
Participant baseline demographic variables by initial intervention assignment.

	Total sample ($n = 45$)	STP-PreK ($n = 15$)	STP-PreK enhanced ($n = 15$)	PT only ($n = 15$)
Demographic variables				
Child sex (% male)	76	73	60	93
Child age (Mean)	5.16 (.33)	5.21 (.35)	5.08 (.32)	5.19 (.33)
Hollingshead SES (Mean)	42.38 (13.65)	36.93 (15.53)	49.57 (8.19)	40.63 (13.68)
Child race (%)				
Hispanic/Latino	84	87	80	87
Non-Hispanic/Latino White	9	0	13	13
African-American	4	7	7	0
Biracial	3	7	0	0
Caregiver age (Mean)	36.03 (6.77)	36.27 (8.31)	37.89 (5.28)	34.27 (6.29)
Household structure (%)				
Both biological parents present	62	67	53	67
Single biological parent	38	33	47	33
Home language (%)				
Bilingual (Spanish/English)	45	27	60	47
Monolingual (English only)	29	27	27	33
Monolingual (Spanish only)	22	40	13	13
Other language spoken	4	6	0	7
Referral source (%)				
Self-referred	49	47	40	60
Mental health professional/physician	27	13	47	20
Preschool	24	40	13	20
Screening measures				
Child IQ	93.20 (14.21)	93.07 (12.16)	93.73 (13.70)	92.80 (17.28)
BASC-2 externalizing *t*-score (P)	66.09 (12.43)	66.67 (13.23)	64.00 (13.98)	67.60 (10.37)
BASC-2 externalizing *t*-score (T)	67.87 (11.64)	69.80 (8.42)	66.13 (13.57)	67.87 (11.64)
ADHD only diagnosis (%)	28.9	20.0	40.0	26.7
ADHD + ODD diagnosis (%)	64.4	73.3	60.0	60.0

Note. Values enclosed in parentheses represent standard deviations. Multivariate and chi-square analyses indicated no significant differences among the intervention groups on any demographic or screening variable. SES = socioeconomic status, BASC-2 = Behavior Assessment System for Children, 2nd Edition, ADHD = Attention-Deficit Hyperactivity Disorder, ODD = Oppositional Defiant Disorder, P = parent report, T = teacher report, STP = summer treatment program, PT = parent training.

each separate condition with both classrooms attaining excellent fidelity ($M = 98\%$; range 93%–100%). SRPP fidelity was completed by a licensed psychologist or master's level graduate student for 6 of 8 sessions, with weekly group supervision provided by a licensed psychologist. The two graduate-level therapists conducting the SRPP attained excellent fidelity ($M = 98\%$; range 90%–100%).

2.2.2. Attendance

Attendance for each camp day and parenting session was measured from counselors' contact notes and sign-in sheets completed by parents during drop-off and pick up.

2.2.3. Consumer/treatment satisfaction

Parents provided ratings of treatment satisfaction for the summer camp portion at post-treatment via a standard satisfaction questionnaire adapted for the STP-PreK. Parents indicated their degree of satisfaction across a five-point Likert scale on how much they and their child benefited, whether they would recommend the program to other parents, as well as how effective the program was compared to other treatment services they had received. The mean level of satisfaction was calculated across the items. Parents also provided ratings of treatment satisfaction for the PT portion by completing the Therapy Attitude Inventory (Brestan, Jacobs, Rayfield, & Eyberg, 1999).

2.3. Measures of school readiness

2.3.1. Behavioral functioning

To assess children's EBP, parents and teachers completed the BASC-2 (Reynolds & Kamphaus, 2004), a widely-used and psychometrically sound checklist that taps into emotional and behavioral domains of children's functioning. Items are rated on a four-point scale with respect to the frequency of occurrence (never, sometimes, often, and almost always). The measure yields scores on broad internalizing, externalizing, and behavior symptom domains as well as specific adaptive and social functioning skills scales. For this study, the externalizing functioning composite *t*-scores were used (α's = .65–.80 across raters). To assess children's behavioral impairment, parents and teachers completed the Impairment Rating Scale (IRS; Fabiano et al., 2006). The IRS measures the severity of children's impairment in multiple areas rated on a 7-point Likert scale ranging from 0 (no impairment) to 6 (extreme impairment). Areas of impairment included academic functioning, classroom functioning, self-esteem, relationships with peers and teachers, and overall functioning. Scores on the IRS show excellent internal consistency and convergent/divergent validity with other measures of impairment (Fabiano et al., 2006). The overall functioning item was used to examine children's behavioral impairment across settings.

2.3.2. Academic functioning

Children were individually administered the Bracken School Readiness Assessment (BSRA; Bracken, 2002), a widely-used and psychometrically sound test consisting of five subtests assessing children's receptive knowledge of colors, letters, numbers/counting, sizes/comparisons, and shapes. For this study, the overall school readiness composite raw score was used. Children were also administered six subtests (i.e., applied problems, calculation, writing samples, letter-word identification, passage comprehension, and spelling) of the Woodcock–Johnson Test of Achievement, 3rd Edition (WJ-III, Woodcock, McGrew, & Mather, 2001), a widely-used, norm-referenced measure of academic ability with excellent psychometric properties. The current study examined the mean raw scores of the derived composite scores: Brief Reading (letter-word identification, passage comprehension), Brief Math (applied problems, calculation), and Brief Writing (spelling, writing samples). However, given the high correlations among these composites (*r*'s = .62–.82), an overall achievement composite was used by averaging the composite scores at each assessment point.

Parents and teachers were also asked to complete the Kindergarten Behavior and Academic Competency Scale (KBACS; Hart & Graziano, 2013). The KBACS is a 23-item questionnaire measuring children's kindergarten readiness across domains (e.g., following classroom rules, completing academic work) along a 5-point scale (poor, fair, average, above average, and excellent). Preliminary work indicates that scores from the KBACS show excellent test–retest reliability (ICC = .82) and sensitivity to treatment (Graziano et al., 2014). An overall score was derived by averaging across all items (α's = .94–.99 across raters) with higher scores indicating greater kindergarten readiness.

2.3.3. Adaptive functioning and social–emotional skills

The adaptive skills *t*-score of the BASC-2 was used as a measure of children's adaptive functioning (α's = .65–.80 across parent and teacher reports). To assess social–emotional functioning, children completed a standardized emotion knowledge task, which required children to both expressively and receptively identify eight different emotions (sad, happy, angry, afraid, surprised, disgusted, embarrassed, guilty) as presented visually via cartoon faces (Denham, 1986). Children scored 1 point for each correct expressive and subsequent receptive answer. A total of 16 points was possible with higher scores indicative of better emotional awareness and knowledge (α's = .61–.69). Scores on the emotion knowledge test show good test–retest reliability ($r = .68$ within a 1–3 week period) among preschoolers (S. Denham, personal communication, January 8, 2016). Children also completed the challenging situation task (CST; Denham, Bouril, & Belouad, 1994) to assess their social problem-solving skills. In the CST, children are presented with six hypothetical peer provocation situations (e.g., peer knocking down the target child's block tower) and are asked to provide an affective response (i.e., happy, sad, angry, and neutral/just okay) and how they would response to that

situation (i.e., prosocial, aggressive, crying, avoidant). A prosocial composite was created by subtracting the number of aggressive responses from the prosocial responses with higher scores indicative of better social-problem solving.

2.4. Self-regulation: EF

2.4.1. Automated working memory assessment

Children were administered four subtests from the automated working memory assessment (AWMA; Alloway, 2007), a computer-based assessment of working memory skills for children and adults ages 4 to 22, including: (a) Word Recall (auditory short-term memory); (b) Listening Recall (auditory working memory); (c) Dot Matrix (visuo-spatial short-term memory); and (d) Mister X (visuo-spatial working memory). Raw scores are converted to standard scores using gender and age norms. Scores from the AWMA show adequate test–retest reliability and has established convergent validity (Alloway, Gathercole, Kirkwood, & Elliott, 2008). Given the high correlations among the subtests (r's .66–.80, $p < .001$), an average standardized score was calculated and used in subsequent analyses.

2.4.2. Head–toes–knees–shoulders task

Children were administered the head–toes–knees–shoulders task (HTKS; Ponitz et al., 2008). The HTKS is a widely-used task used with preschoolers to assess EF. The HTKS has well-established internal consistency, reliability and concurrent/predictive validity (McClelland et al., 2007; Ponitz, McClelland, Matthews, & Morrison, 2009). In this task, children are initially given two paired behavioral rules (e.g., touch your head and touch your toes) in which they naturally respond to and habituate. Next, children are instructed to switch and respond in a different or opposite way (e.g., touching their head when told to "touch toes") across 10 test trials. The task then switches again back to a habituation of two other verbal commands (e.g., touch your knees and touch your shoulders) followed by 10 more test trials in which the children are required to combine both set of rules with a possibility of four different responses. Two points are awarded for a correct opposite response, zero points for an incorrect response, and one point if any motion to the incorrect response is made but then self-corrected. Scores range from 0 to 40, with higher scores indicative of better EF.

2.4.3. Behavior rating inventory of EF

Parents and teachers completed the Behavior Rating Inventory of Executive Function (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000 or BRIEF-P; Gioia, Espy, & Isquith, 2003). Items are rated on a three-point Likert scale (never, sometimes, and often). Both the BRIEF-P and BRIEF are well-established, psychometrically sound measures (Mahone & Hoffman, 2007) that yield five non-overlapping but correlated clinical scales (inhibit, shift, emotional control, working memory, and plan-organize) and two validity scales. Scores in these clinical scales are summed to create composite indices of inhibitory self-control (inhibit + emotional control), flexibility (shift + emotional control), emergent metacognition (working memory + plan-organize), and an overall global executive composite. Higher scores indicate poorer EF skills. For this study, the t-score of the emergent metacognition index was used (α's across raters = .77–.79).

2.5. Self-regulation: ER

2.5.1. Laboratory temperament assessment battery

Children were videotaped participating in two frustration tasks (not sharing 4 min and impossibly perfect green circles 3.5 min) from the laboratory temperament assessment battery (LAB-TAB; Goldsmith & Rothbart, 1996) designed to elicit emotional distress and regulation. Regulation was defined as the overall effectiveness of using various strategies (e.g., distraction). A global measure of regulation was coded on a scale from 0 (dysregulated/no control of distress) to 4 (child seemed to completely regulate distress during most of the task). The reliability Kappas for global codes in this study were all above .80. The global regulation codes were averaged across tasks (r's = .36, $p < .05$ to .73, $p < .001$) to produce a single score with higher numbers indicating better ER.

2.5.2. ER checklist

Parents and teachers completed the ER Checklist (Shields & Cicchetti, 1997). The ER checklist is a 23-item questionnaire that uses a 4-point Likert scale (1 = almost always to 4 = never) and yields two subscales: the Negativity/Lability scale (15 items), which represents negative affect and mood lability, and the ER scale (8 items), which assesses processes key to adaptive regulation. The current study examined the ER scale (α's across raters = .77–.79) with higher scores indicative of better ER skills.

2.6. Procedure

This study was approved by the university's Institutional Review Board. A randomized trial design was used to obtain preliminary evidence for the promise of three different intervention programs in improving preschoolers with EBP school readiness outcomes. See Fig. 1 for CONSORT flow chart.

The 45 children were randomized to: (1) STP-Prek ($n = 15$), (2) STP-Prek Enhanced ($n = 15$), or (3) PT only ($n = 15$). Families participated in a pre-treatment assessment prior to the start of the interventions and completed a post-treatment assessment two to three weeks after the interventions ended (mean time to complete post-treatment assessment = 2.8 weeks, SD =

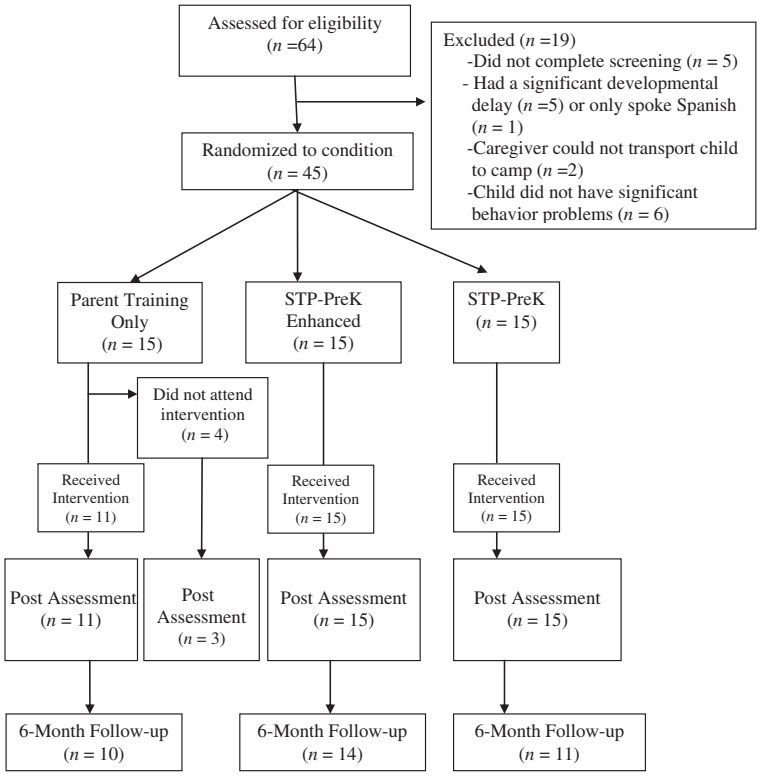

Fig. 1. Consort flow diagram.

2.6 weeks). Of note, four families who were randomized to the PT group, failed to come to a single parenting session. These families were excluded from subsequent analyses given that they did not participate in any treatment. Families completed a follow-up assessment approximately 6 months after the intervention ended (mean time to complete follow-up assessment = 6.9 months, *SD* = 1.21 months). Eight of the families could not be contacted despite multiple efforts, one family declined to participate due to transportation difficulties, and one family moved out of the state. The three intervention groups were compared on all demographic (e.g., child age, child sex, SES, ethnicity) and screening variables (e.g., initial EBP symptom severity, ADHD diagnosis). As seen in Table 1, there were no significant differences between the groups on any demographic or screening measures. All interventions were provided at no cost to the families. Gift cards ($50) were provided to families at each time point following completion of the intervention. Teachers (preschool teachers at pre-treatment and kindergarten teachers at post-treatment and 6-month follow-up assessments) were also given gift cards ($25) for completing questionnaires.

Table 2
Breakdown of program components across intervention groups.

Program components	Targeted child and parent outcome	Intensity/duration	STP-PreK enhanced	STP-PreK	PT only
KSRC: behavioral modification	Non-compliance, aggression, attention problems, hyperactivity/impulsivity	Daily for 8 weeks/ 8 h/day	Yes	Yes	No
KSRC: academic curriculum	Pre-literacy skills, pre-numeracy skills, basic writing skills	Daily for 8 weeks/ 3 h/day	Yes	Yes	No
KSRC: social–emotional	Emotional awareness social skills	Daily for 8 weeks/ 30 min/day	Yes	No[a]	No
KSRC: self-regulation	Executive functioning, emotion regulation	Daily for 8 weeks/ 45 min/day	Yes	No[a]	No
Parenting training (SRPP)	Parenting practices, behavior management, school involvement	Once a week for 8 weeks/ 90–120 min sessions	Yes	Yes	Yes

Note. STP-PreK = summer treatment program for pre-kindergarteners (STP-PreK), PT = parent training, KSRC = kindergarten summer readiness class. SRPP = School Readiness Parenting Program.

[a] Although children randomized to the STP-PreK did not receive the social–emotional and self-regulation curriculum, they were in camp for the same amount of time and engaged in other activities during those 75 min. For example, they engaged in the non-adaptive version of Cogmed and played learning games versus the self-regulation games.

For pre-treatment assessment, caregivers brought their children to the laboratory on two occasions in the spring prior to kindergarten. During the first visit, which lasted approximately 3 h, clinicians administered a standard battery that included the WPPSI-IV, the BSRA, and the WJ-III. While in the laboratory, the caregiver completed questionnaires and a diagnostic interview (C-DISC-IV). At the time of the phone screening or during the first initial visit, caregivers provided consent for their child's preschool teacher to fill out rating scales via a secure online survey portal (REDCap) or send back hard copies of the rating scales in a sealed envelope. Eligible participants were invited to attend the second visit lasting 2–3 h. The order of the tasks was random with no order effects present or any evidence of performance fatigue as children's scores across tasks varied tremendously with no indication of a decline in scores across time. The EF tasks included the AWMA and the HTKS. The social–emotional battery included an emotion knowledge test, the challenging situation task, and two frustration tasks. All subsequent post-treatment and 6-month follow-up assessment sessions followed the same structure lasting three to 4 h given the inclusion of the academic testing. Several strategies were implemented to guard against test fatigue given the long battery administered. First, children were given frequent breaks throughout the assessment as all clinicians were trained to observe any signs of initial fatigue (e.g., not responding to questions, reflexively saying don't know). Second, children were provided with stickers upon completion of every subtest to promote optimal motivation during testing. Finally, children were also given small incentives (e.g., trips to the prize box) upon completion of the entire visit and were reminded of this incentive throughout the visit.

2.7. Program components

Table 2 summarizes each intervention condition in terms of which program components were implemented and the intensity and duration of each component.

2.7.1. Kindergarten summer readiness class (KSRC): overview

The KSRC operated daily, Monday–Friday, from 8 a.m. to 5 p.m. for 8 weeks during the summer prior to kindergarten entry. Throughout the KSRC children participated in activities designed to promote (a) behavioral and social–emotional skills consistent with the expectations of kindergarten; (b) academic skills; (c) physical activity; good sportsmanship, basic sports skills, and (d) a positive attitude towards learning and school. Fifteen children were assigned to a classroom, staffed by one lead teacher, one lead counselor, and four paraprofessional developmental aides, yielding a 2:5 staff to student ratio. Lead teachers were certified early childhood or elementary teachers; lead counselors were clinical and counseling psychology graduate students; and developmental aides were undergraduate and post-baccalaureate paraprofessionals. All staff completed a 10-day training in program procedures and were supervised daily by either the first or second author, licensed clinical psychologists with over 10 years of experience implementing interventions with children with EBP. Below, we briefly describe the behavioral modification program, academic enrichment curriculum, and social–emotional and self-regulation curriculum of the KSRC. The specifics for each component of the KSRC are detailed in a manual available from the authors.

2.7.2. KSRC: behavioral modification program

The behavior modification program used across activities was modeled after the evidence-based system used in the STP-Elementary Academic Learning Centers (Pelham et al., 2010). The combination point and response-cost system allows for development of children's abilities to follow instructions, complete tasks accurately, comply with teacher requests, and interact positively with peers. Staff members used a public flip-card color chart in combination with the point system, where students began each activity on green and flipped their color to yellow after 5 points lost and red after 10 points lost. At the end of the activity, there was a public point check to provide feedback to the children on points earned and to receive tangible chips representing points earned for ending on green or yellow, but not red. At the start of the next activity, the flip color chart was reset to green with the opportunity to earn green the next period. Serious violations (e.g., aggression, destruction of property, repeated non-compliance) resulted in a time out from positive reinforcement using procedures from PCIT. Children exchanged points earned for daily classroom rewards and privileges (e.g., recess). At the end of each day, parents were provided verbal and written feedback about children's behavioral and academic progress via a daily report card (DRC). Parents were instructed on how to provide daily, home, DRC-contingent rewards during the first session of PT. The DRC procedures used in the program were directly adapted from the STP including the offering of school consultation services during the kindergarten year to establish the DRC (see Fabiano, Schatz, & Pelham, 2014 for a detailed description).

2.7.3. KSRC: academic enrichment curriculum

Literacy Express, an evidence-based preschool curriculum (Lonigan et al., 2005), was modified for the program by the curriculum developers so that all core literacy and numeracy skills were covered sequentially. Each week followed a Literacy Express theme. For example, during the week of Under the Sea, all of the academic activities, centers, vocabulary of the week, seatwork, and homework, were related to the theme and followed suggested curriculum activities. The mode of instruction varied from whole to small-group and independent activities.

2.7.4. KSRC: social–emotional and self-regulation curriculum

The social–emotional curriculum consisted of social skills (i.e., participation, communication, cooperation, and encouragement) and emotional awareness (i.e., happy, sad, mad, scared, surprised, disgusted, embarrassed, and guilty) training (30 min daily) via

the use of puppets, videos, and in-vivo reinforcement of skills throughout the day. Children learned how to cope with negative emotions via the Turtle Shell Technique (Schneider, 1974). The self-regulation curriculum consisted of children participating in a game period (30 min daily) in which they engaged in various EF games (e.g., red light/green light) adapted from a series of circle time games shown to improve preschoolers' EF (Tominey & McClelland, 2011). Lastly, children also participated in a daily 15 min computerized working memory training (Cogmed JM; http://www.cogmed.com).

2.7.5. Parent training (PT)

The School Readiness Parenting Program (SRPP) was conducted weekly lasting between 1.5 to 2 h. The first half of each SRPP session involved traditional aspects of behavioral parent training (e.g., improving parent–child relationship, discipline strategies such as time out) delivered in a group format via COPE (Cunningham et al., 1998) style modeling approach. The behavior management content was based on PCIT (Eyberg et al., 2001) with four core sessions focused on child-directed skills (e.g., labeled praise, description, reflection, enthusiasm) during "special time" while another four core sessions focused on parent-direct skills (e.g., effective commands, time out). Four optional monthly sessions were offered in the fall of the kindergarten year. Subgroup activities of the core sessions entailed parents practicing the newly acquired skills with their own children while the other parents in the subgroup observed and provided positive feedback. During the second half of each SRPP session, parents participated in group discussions on several school readiness topics including: how to manage behavior problems during homework time and in public settings, how to promote early literacy (parents practiced and received feedback on using dialogic reading) and math skills, how to implement a home-school communication plan with kindergarten teachers (i.e., DRC), and how to prepare for kindergarten.

2.8. Data analysis plan

All analyses were conducted using SPSS 19.0. There were no missing data for any pre-treatment measures and only one child did not complete the post-treatment assessment. In terms of the 6-month follow-up assessment, complete data were available on 80% of our sample. To assess the effects of the interventions, separate linear mixed models with random effects were conducted for each outcome. Fixed effects of linear time, quadratic time, intervention group (STP-PreK Enhanced, STP-PreK, and PT only), and the interactions of intervention group with the time factors were included. Child sex, parent training attendance, and child IQ were included as covariates in selected models (e.g., child IQ was only covaried for academic outcomes while sex was not covaried in outcome measures that provided sex based *t*-scores such as the BASC or BRIEF). Random intercepts were also included in each model. Consistent with intervention studies, the examination of quadratic effects, although limited given only the three time points assessed, still provides useful information in terms of determining if outcomes that improve from baseline to post-treatment (a) continue to improve in a linear fashion, (b) flatten out, or (c) become a more pronounced v-shaped effect in which the original gains of the intervention regress back to baseline levels.

Robust Maximum Likelihood estimation was employed in all models. An advantage of LMM is that all participants with at least one observation are included in analyses (West, Welch, & Galecki, 2014), minimizing the impact of missing data. For each outcome, the following level 1 and level 2 specifications of a mixed model were evaluated.

Level 1: $Yij = \pi 0i + \pi 1\ (\text{time}) + \pi 2\ (\text{time} * \text{time}) + eij$

Level 2: $\pi 0i = \beta 00 + \beta 01\ (\text{PT attendance}) + \beta 02\ (\text{sex / IQ when appropriate}) + \beta 03\ (\text{intervention group}) + r0i$

$\pi 1 = \beta 10 + \beta 13\ (\text{intervention group})$

$\pi 2 = \beta 20 + \beta 23\ (\text{intervention group})$

Combined: $Yij = \beta 00 + \beta 01\ (\text{PT attendance}) + \beta 02\ (\text{sex / IQ when appropriate}) + \beta 03\ (\text{intervention group}) + \beta 10\ (\text{time}) + \beta 13\ (\text{intervention group} * \text{time}) + \beta 20\ (\text{time} * \text{time}) + \beta 23\ (\text{intervention group} * \text{time} * \text{time}) + r0i + eij$

Comparisons between intervention groups were conducted via the use of dummy codes. Hence, the above mixed model was applied twice: the first set of dummy-coded variables represented the comparison between (a) STP-PreK and PT only groups and (b) STP-PreK Enhanced and PT only groups while the second alternative dummy-coding scheme was used to get the final comparison between the STP-PreK and STP-PreK Enhanced groups. Of particular interest are the group × linear trend effect (given by the β13 fixed effect) and the group × quadratic trend effect (given by the β23 fixed effect). These values and their significance reflect average differences between the intervention groups in instantaneous linear trend at the beginning of the study and in their quadratic trends, respectively. The group difference in intercepts (β03 fixed effect) reflects group differences prior to randomization, so we did not expect differences. Due to space constraints and the fact that the current study examined 19 outcomes, we only reported the fixed time and group * time effects.

To further probe model results, estimated marginal means from LMMs were used to calculate Cohen's *d* effect size (ES) estimates for within-subjects. Given our interest in examining the initial promise of all intervention groups, ES were calculated separately for each intervention by comparing baseline to post-treatment, baseline to follow-up, and post-treatment to follow-up. The correlation between time points was taken into account (Morris & DeShon, 2002) while confidence intervals for all ES were included (Thompson, 2002). To evaluate any significant differences in ES between the groups, all LMMs were conducted a second and third time with the time variable re-centered at post-treatment, and at the 6-month follow-up. Significance of group effect (assessed via the dummy codes) in these models indicate a significant difference in intervention groups at post-treatment and/or 6-month follow-up (denoted via different subscripts).

Table 3
Behavioral outcomes.

	BL *M* (*SE*)	PT *M* (*SE*)	FU *M* (*SE*)	Time effect *F*	Time × group *F*	Time × group *F*	BL-PT *d* [95% CI]	BL-FU *d* [95% CI]	PT-FU *d* [95% CI]
EBP composite: BASC-2 (P)		—	—	Q-24.09***	—	—	—	—	—
Parent training only	68.51 (3.48)	53.88 (3.48)	63.27 (4.05)	—	Ref	—	−1.27[a] [−2.06, −.45]	−.42[a] [−1.03, .21]	.75[a] [.06, 1.41]
STP-PreK	66.50 (2.97)	53.43 (2.97)	58.43 (3.66)	—	.47	Ref	−.1.14[a] [−1.78, −.47]	−.59[a] [−1.14, −.04]	.37[ab] [−.16, .89]
STP-PreK enhanced	64.30 (3.03)	52.63 (3.03)	53.79 (3.35)	—	1.71	.44	−.99[a] [−1.61, −.36]	−.85[a] [−1.43, −.24]	.09[ab+] [−.42, .60]
EBP composite: BASC-2 (T)		—	—	Q-25.43***	—	—	—	—	—
Parent training only	67.39 (3.32)	55.53 (3.44)	56.61 (3.71)	—	Ref	—	−1.06[a] [−1.79, −.29]	−.92[a] [−1.61, −.19]	.09[a] [−.50, .68]
STP-PreK	69.82 (2.84)	58.77 (2.90)	63.73 (3.05)	—	.07	Ref	−.99[a] [−1.61, −.36]	−.53[a] [−1.07, .02]	.43[a] [−.11, .95]
STP-PreK enhanced	66.09 (2.89)	52.82 (2.89)	55.31 (3.12)	—	.13	.01	−1.19[a] [−1.84, −.51]	−.92[a] [−1.52, −.30]	.21[a] [−.30, .72]
Overall impairment-IRS (P)		—	—	Q-9.81***	—	—	—	—	—
Parent training only	4.52 (.45)	2.97 (.45)	2.97 (.58)	—	Ref	—	−1.04[a] [−1.77, −.28]	−.90[a] [−1.60, −.18]	.00[a] [−.59, .59]
STP-PreK	4.38 (.38)	2.52 (.38)	2.55 (.50)	—	.12	Ref	−1.27[a] [−1.94, −.57]	−1.03[a] [−1.65, −.39]	.02[a] [−.49, .52]
STP-PreK enhanced	4.58 (.39)	3.51 (.39)	3.29 (.46)	—	.40	1.16	−.71[a] [−1.27, −.13]	−.78[a] [−1.35, −.19]	−.13[a] [−.64, .38]
Overall impairment-IRS (T)		—	—	Q-8.60**	—	—	—	—	—
Parent training only	4.52 (.55)	2.45 (.60)	3.48 (.63)	—	Ref	—	−1.08[ab] [−1.82, −.31]	−.52[a] [−1.14, .12]	.50[ab] [−.14, 1.12]
STP-PreK	4.25 (.46)	3.21 (.51)	2.50 (.51)	—	2.66	Ref	−.55[a] [−1.09, .00]	−.93[b+] [−1.53, −.31]	−.36[a] [−.88, .17]
STP-PreK enhanced	4.52 (.48)	1.76 (.49)	1.93 (.52)	—	.01	3.77+	−1.47[b] [−2.19, −.72]	−1.34[b+] [−2.03, −.62]	.09[a] [−.42, .59]

Note. Means and SEs are marginal estimates after controlling for sex and PT attendance. Q = quadratic ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .10$. P = parent report, T = teacher report, BL = baseline assessment, PT = post-treatment assessment, FU = 6-month follow-up assessment, STP = summer treatment program, BASC = Behavior Assessment System for Children, 2nd Edition, IRS = Impairment Rating Scale. Ref = reference group for time × group comparisons. Cohen's standardized *d* for group × time effect is for each intervention group. Same letter subscripts indicate effect sizes were not significantly different between intervention groups; different lettered subscripts indicate a significant difference ($p < .05$) in the effect size between groups.

3. Results

3.1. Attendance and satisfaction

ANOVAs were conducted to examine differences among intervention groups in terms of attendance and/or satisfaction. Whereas there were no overall differences in attendance of the core PT sessions among the groups ($p = .11$), follow-up contrast tests using a Bonferroni correction indicated a trend for parents of children who were in the STP-PreK Enhanced attending a marginally greater number of core PT sessions ($M = 7.33$, $SD = 1.05$) compared to parents of children who were in the regular STP-PreK ($M = 6.20$, $SD = 1.61$), $p < .08$, and parents who were assigned to the PT only group ($M = 6.09$, $SD = 1.73$), $p < .07$. Additionally, there was a marginal difference in the overall satisfaction level with PT among the groups, $F(2, 38) = 2.51$, $p < .10$. Specifically, parents of children who were in the STP-PreK Enhanced reported marginally higher levels of satisfaction with PT ($M = 4.68$, $SD = .26$) compared to parents of children who were in the regular STP-PreK ($M = 4.38$, $SD = .44$), $p < .06$, or parents who were assigned to the PT only group ($M = 4.38$, $SD = .51$), $p < .08$. No significant differences were found among any other contrast tests.

3.2. Intervention school readiness outcomes

3.2.1. Behavioral functioning

No covariates (i.e., sex, PT attendance) were significantly associated with the initial status of any behavioral functioning outcomes as measured via the BASC-2. As seen in Table 3, a significant quadratic effect for time, but no time by group interaction, was noted for both parent and teacher rated EBP. These results indicated no significant differences in the slope of EBP improvement (per parent or teacher report) between (a) children in the STP-PreK Enhanced group and children in the PT only group ($b = -15.85$, $SE = 16.79$, $p = .35$ for parent report and $b = -5.91$, $SE = 16.21$, $p = .72$ for teacher report), (b) children in the STP-PreK group and children in the PT only group ($b = -8.40$, $SE = 16.82$, $p = .62$ for parent report and $b = -4.27$, $SE = 16.43$, $p = .78$ for teacher report), or (c) children in the STP-PreK Enhanced group and children in the STP-PreK group ($b = -7.45$, $SE = 15.47$, $p = .63$ and $b = -1.64$, $SE = 14.79$, $p = .91$ for teacher report). Large ES were observed from baseline to post-treatment across all three intervention groups that were maintained at the 6-month follow-up assessment (see Table 3).

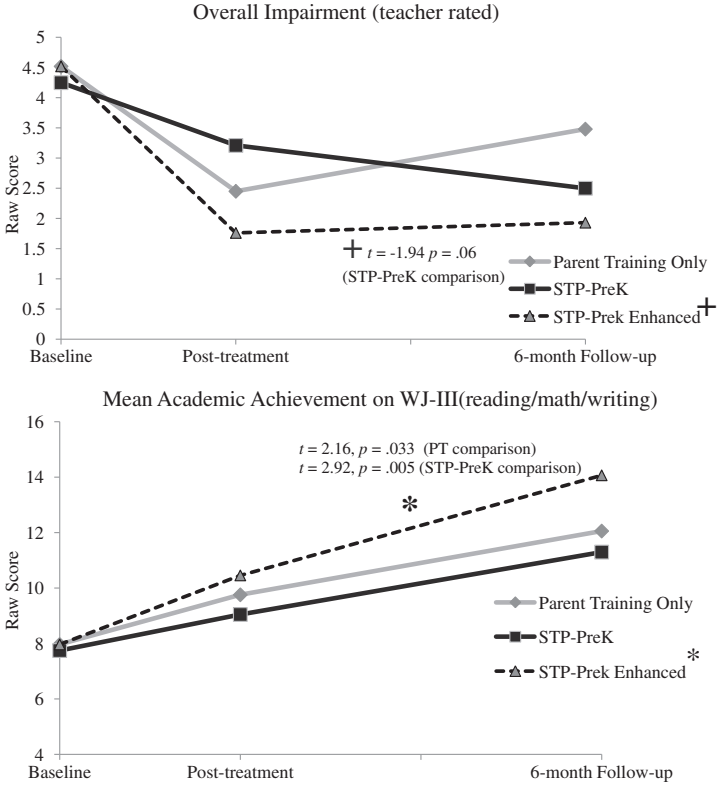

Fig. 2. Overall impairment and academic achievement for children across intervention groups. Note. Analyses controlled for sex, parent training attendance, and IQ (only for WJ-III). * or + indicates significant ($p < .05$) or marginal ($p < .10$) difference in slope/growth from baseline to the 6-month follow-up period between intervention groups. WJ-III = Woodcock Johnson Test of Achievement III.

Table 4
Academic outcomes.

	BL *M* (*SE*)	PT *M* (*SE*)	FU *M* (*SE*)	Time effect *F*	Time × group *F*	Time × group *F*	BL-PT *d* [95% CI]	BL-FU *d* [95% CI]	PT-FU *d* [95% CI]
School Readiness Composite-Bracken (O)		–	–	L-37.73***	–	–	–	–	–
Parent training only	57.72 (2.84)	64.72 (2.84)	70.98 (3.21)	–	Ref	–	.74[a] [.06, 1.40]	1.30[a] [.47, 2.10]	.62[a] [−.04, 1.25]
STP-PreK	60.90 (2.39)	66.97 (2.39)	72.22 (2.68)	–	.225	Ref	.66[a] [.09, 1.21]	1.15[a] [.48, 1.79]	.53[a] [−.02, 1.07]
STP-PreK enhanced	60.67 (2.48)	68.93 (2.48)	73.34 (2.53)	–	.066	.066	.86[a] [.25, 1.45]	1.31[a] [.60, 1.99]	.45[a] [−.09, .98]
Mean academic achievement-WJ-III (O)		–	–	L-122.29***	–	–	–	–	–
Parent training only	7.97 (.82)	9.76 (.82)	12.06 (.82)	–	Ref	–	.66[ab] [−.01, 1.30]	1.50[a] [.61, 2.37]	.85[a] [.14, 1.53]
STP-PreK	7.75 (.68)	9.05 (.68)	11.30 (.68)	–	.27	Ref	.49[a] [−.01, 1.02]	1.35[a] [.63, 2.05]	.86[a] [.25, 1.44]
STP-PreK enhanced	7.97 (.71)	10.46 (.71)	14.07 (.71)	–	4.68*	8.51**	.91[b] [.29, 1.50]	2.22[b] [1.25, 3.17]	1.31[a] [.39, 1.65]
Kindergarten overall readiness-KBACS (P)		–	–	L-7.54**	–	–	–	–	–
Parent training only	1.50 (.20)	2.04 (.20)	2.13 (.24)	–	Ref	–	.82[a] [.12, 1.49]	.86[a] [.15, 1.54]	.12[a] [−.48, .71]
STP-PreK	2.21 (.17)	2.46 (.17)	2.58 (.24)	–	1.04	Ref	.38[a] [−.15, .90]	.38[a] [−.15, .90]	.14[a] [−.37, .65]
STP-PreK enhanced	2.03 (.17)	2.35 (.17)	2.61 (.20)	–	.69	.04	.48[a] [−.06, 1.01]	.81[a] [.21, 1.38]	.36[a] [−.17, .88]
Kindergarten overall readiness-KBACS (T)		–	–	L-5.05*	–	–	–	–	–
Parent training only	1.87 (.24)	2.26 (.26)	2.22 (.27)	–	Ref	–	.47[a] [−.17, 1.08]	.40[a] [−.22, 1.01]	−.04[a] [−.63, .55]
STP-PreK	1.89 (.20)	1.89 (.20)	1.94 (.22)	–	1.40	Ref	.00[a] [−.51, .51]	.06[a] [−.45, .57]	.06[a] [−.45, .57]
STP-PreK enhanced	1.73 (.21)	2.12 (.22)	2.19 (.22)	–	.01	1.60	.47[a] [−.07, 1.00]	.55[a] [.00, 1.09]	.08[a] [−.43, .59]

Note. Means and SEs are marginal estimates after controlling for sex, PT attendance, and IQ (for achievement tests). L = linear ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .10$. P = parent report, T = teacher report, O = observed/standardized test, BL = baseline assessment, PT = post-treatment assessment, FU = 6-month follow-up assessment, STP = summer treatment program, WJ-III = Woodcock–Johnson Test of Achievement, 3rd Edition, KBACS = Kindergarten Behavior and Academic Competency Scale. Ref = reference group for time × group comparisons. Cohen's standardized d_{rm} for group × time effect is for each intervention group. Same letter subscripts indicate effect sizes were not significantly different between intervention groups; different lettered subscripts indicate a significant difference ($p < .05$) in the effect size between groups.

Table 5
Social outcomes.

	BL *M* (*SE*)	PT *M* (*SE*)	FU *M* (*SE*)	Time effect *F*	Time × group *F*	Time × group *F*	BL-PT *d* [95% CI]	BL-FU *d* [95% CI]	PT-FU *d* [95% CI]
Adaptive skills-BASC-2 (P)		–	–	Q-41.92***	–	1.52	–	–	–
Parent training only	40.25 (2.58)	49.88 (2.58)	42.88 (2.86)	–	Ref	–	1.13^{a} [.34, 1.87]	$.29^{a}$ [−.32, .88]	$-.77^{a}$ [−1.43, −.08]
STP-PreK	45.85 (2.21)	52.71 (2.21)	44.15 (2.55)	–	.23	Ref	$.80^{a}$ [.21, 1.38]	$-.17^{b}$ [−.68, .34]	$-.88^{a}$ [−1.47, −.27]
STP-PreK enhanced	44.06 (2.25)	53.46 (2.25)	53.14 (2.41)	–	1.52	.65	1.08^{a} [.43, 1.71]	1.00^{a} [.37, 1.62]	$-.04^{b}$ [−.54, .47]
Adaptive skills-BASC-2 (T)		–	–	1.58	–	–	–	–	–
Parent training only	45.81 (2.53)	47.28 (2.65)	47.05 (2.95)	–	Ref	–	$.17^{a}$ [−.43, .76]	$.14^{a}$ [−.46, .73]	$-.02^{a}$ [−.62, .57]
STP-PreK	47.16 (2.16)	47.91 (2.24)	46.54 (2.41)	–	.01	Ref	$.09^{a}$ [−.42, .59]	$-.07^{a}$ [−.58, .44]	$-.15^{a}$ [−.66, .36]
STP-PreK enhanced	44.93 (2.19)	48.93 (2.19)	46.26 (2.44)	–	.39	.64	$.47^{a}$ [−.07, 1.00]	$.15^{a}$ [−.36, .66]	$-.30^{a}$ [−.81, .23]
Social problem solving (O)		–	–	Q-7.75**	–	–	–	–	–
Parent training only	.68 (.88)	−.87 (.88)	−.90 (.1.02)	–	Ref	–	$-.53^{a}$ [−1.15, .12]	$-.50^{a}$ [−1.11, .14]	$-.01^{a}$ [−.60, .58]
STP-PreK	.81 (.74)	.61 (.74)	2.92 (.88)	–	.01	Ref	$-.07^{a}$ [−.58, .44]	$.67^{b}$ [.01, 1.22]	$.72^{b+}$ [.14, 1.28]
STP-PreK enhanced	1.69 (.77)	.36 (.77)	2.05 (.78)	–	.31	.25	$-.45^{a}$ [−.97, .09]	$.12^{ab}$ [−.39, .63]	$.56^{ab}$ [.01, 1.10]
Emotion knowledge (O)		—	–	L-13.05**	–	–	–	–	–
Parent training only	8.30 (.62)	9.20 (.62)	9.49 (.73)	–	Ref	–	$.44^{a}$ [−.19, 1.05]	$.52^{a}$ [−.12, 1.15]	$.13^{a}$ [−.47, .72]
STP-PreK	9.32 (.53)	9.79 (.53)	9.98 (.61)	–	.15	Ref	$.23^{a}$ [−.29, .74]	$.30^{a}$ [−.22, .81]	$.09^{a}$ [−.42, .59]
STP-PreK enhanced	8.64 (.54)	11.84 (.54)	11.84 (.56)	–	4.59*	7.58**	1.53^{b} [.76, 2.28]	1.50^{b} [.74, 2.24]	$.00^{a}$ [−.51, .51]

Note. Means and SEs are marginal estimates after controlling for sex and PT attendance. Q = quadratic, L = linear, ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .10$. P = parent report, T = teacher report, O = observed/standardized test, BL = baseline assessment, PT = post-treatment assessment, FU = 6-month follow-up assessment, STP = summer treatment program, BASC = Behavior Assessment System for Children, 2nd Edition. Ref = reference group for time × group comparisons. Cohen's standardized *d* for group × time effect is for each intervention group. Same letter subscripts indicate effect sizes were not significantly different between intervention groups; different lettered subscripts indicate a significant difference ($p < .05$) in the effect size between groups.

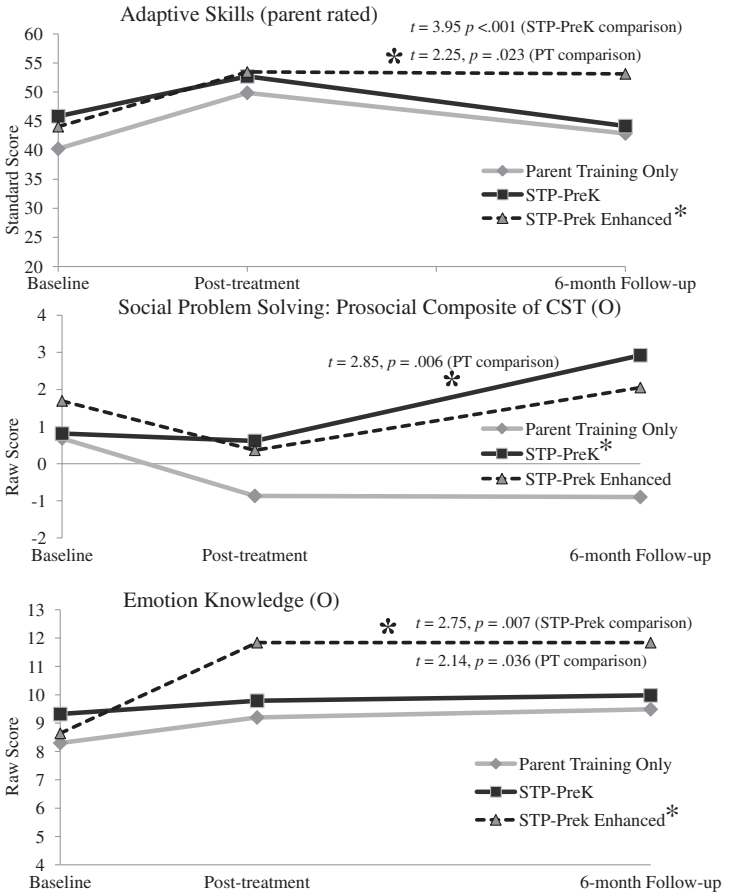

Fig. 3. Social–emotional outcomes for children across intervention groups. Note. Analyses controlled for sex and parent training attendance. O = observation/standardized assessment, CST = challenging situation task. * indicates significant difference ($p < .05$) in slope/growth from baseline to the 6-month follow-up period between intervention groups.

When examining severity of children's behavioral impairment, sex was the only significant covariate in terms of predicting children's initial status with girls being reported by parents and teachers as having less impairment compared to boys ($b = -.99$, $SE = .43$, $p = .03$ and $b = -.1.50$, $SE = .51$, $p = .01$, respectively). As seen in Table 3, significant quadratic effects for time were noted while a marginally significant time by group interaction was noted for behavioral impairment as reported by teachers. For parent report, results indicated no significant differences in the slope of behavioral impairment between (a) children in the STP-PreK Enhanced group and children in the PT only group ($b = 1.59$, $SE = 2.51$, $p = .53$), (b) children in the STP-PreK group and children in the PT only group ($b = -.89$, $SE = 2.53$, $p = .73$), or (c) children in the STP-PreK Enhanced group and children in the STP-PreK group ($b = 2.48$, $SE = 2.30$, $p = .29$). These improvements were maintained during the 6-month follow-up assessment as evident by large ES (see Table 3). For teacher report, and as seen in Fig. 2, children in the STP-PreK Enhanced group experienced a marginally steeper decline in behavioral impairment across time compared to children in the STP-PreK group ($b = -.5.85$, $SE = 3.01$, $p = .06$). ES comparisons (see Table 3) indicated that children in the STP-PreK Enhanced group were marginally more likely to maintain such reduction in impairment at the 6-month follow-up compared to children in the PT only group ($t = -1.71$, $p = .09$). Children in the STP-PreK group were also marginally more likely to maintain their reduction in impairment at the 6-month follow-up compared to children in the PT only group ($t = 1.82$, $p = .07$).

3.2.2. Academic functioning

No covariates (i.e., sex, PT attendance) were significantly associated with initial status of parent rated school readiness on the KBACS. On the other hand, girls were rated by preschool teachers as being better prepared for kindergarten compared to boys ($b = .53$, $SE = .25$, $p < .05$). Additionally, child IQ and PT attendance (but not sex) were significant predictors of children's initial levels of school readiness as measured by the BSRA. As expected, child IQ was positively associated with the BSRA ($b = .53$, $SE = .09$, $p < .001$). On the other hand, parents that had greater levels of PT attendance were more likely to have children with lower BSRA scores ($b = -2.06$ SE $= .72$, $p = .01$).

After accounting for covariates, and as seen in Table 4, significant linear effects for time, but no time by group interaction, were noted for both parent and teacher rated school readiness on the KBACS as well as on the BSRA. These results indicated no

Table 6
Executive functioning and emotion regulation outcomes.

	BL *M* (*SE*)	PT *M* (*SE*)	FU *M* (*SE*)	Time effect *F*	Time × group *F*	Time × group *F*	BL-PT *d* [95% CI]	BL-FU *d* [95% CI]	PT-FU *d* [95% CI]
BRIEF-metacognitive EF difficulties (P)		–	–	Q-15.49***	–	–	–	–	–
Parent training only	77.40 (4.62)	67.67 (4.62)	60.40 (5.16)	–	Ref	–	−.64[a] [−1.27, .03]	−1.04[a] [−1.77, −.28]	−.44[a] [−1.06, .19]
STP-PreK	69.49 (3.95)	53.97 (4.00)	57.76 (4.62)	–	3.26+	Ref	−1.01[a] [−1.62, −.37]	−.65[a] [−1.20, −.08]	.22[b+] [−.29, .73]
STP-PreK enhanced	73.35 (4.01)	61.35 (4.01)	54.80 (4.32)	–	.16	2.40	−.77[a] [−1.34, −.18]	−1.15[a] [−1.79, −.48]	−.40[a] [−.93, .13]
BRIEF-metacognitive EF difficulties (T)		–	–	Q-4.10*	–	–	–	–	–
Parent training only	68.47 (4.72)	62.03 (4.94)	67.69 (8.63)	–	Ref	–	−.40[ab] [−1.01, .22]	−.04[a] [−.63, .56]	.11[a] [−.49, .70]
STP-PreK	64.35 (4.04)	64.90 (4.49)	73.13 (7.48)	–	.17	Ref	.03[b] [−.47, .54]	.39[a] [−.14, .91]	.35[a] [−.18, .87]
STP-PreK enhanced	68.56 (4.08)	56.03 (4.08)	65.84 (6.74)	–	.50	1.47	−.79[a+] [−1.37, −.20]	−.12[a] [−.63, .39]	.28[a] [−.24, .80]
AWMA average standardized performance (O)		–	–	Q-16.97***	–	–	–	–	–
Parent training only	92.88 (3.50)	95.61 (3.50)	96.33 (3.85)	–	Ref	–	.24[a] [−.37, .83]	.28[a] [−.33, .88]	.06[a] [−.53, .65]
STP-PreK	94.67 (2.94)	99.12 (2.94)	99.47 (3.42)	–	.11	Ref	.39[a] [−.23, 1.00]	.39[a] [−.24, .99]	.03[a] [−.56, .62]
STP-PreK enhanced	93.72 (3.06)	108.44 (3.12)	103.25 (3.18)	–	7.36**	6.53*	1.23[b] [.42, 2.01]	.79[a] [.09, 1.46]	−.43[a] [−1.04, .20]
HTKS total score (O)		–	–	Q-26.64***	–	–	–	–	–
Parent training only	14.55 (3.18)	16.64 (3.18)	22.95 (3.60)	–	Ref	–	.20[a] [−.40, .79]	.74[a] [.05, 1.40]	.56[a] [−.09, 1.18]
STP-PreK	21.45 (2.68)	31.65 (2.68)	27.22 (3.01)	–	5.89*	Ref	.98[b] [.35, 1.59]	.52[a] [−.03, 1.06]	−.40[a] [−.92, .13]
STP-PreK enhanced	13.68 (2.78)	28.01 (2.78)	25.29 (2.93)	–	8.61**	.29	1.33[b] [.62, 2.02]	1.05[a] [.40, 1.67]	−.25[a] [−.76, .27]
ER checklist: total regulation (P)		–	–	Q-7.79*	–	–	–	–	–
Parent training only	.66 (.19)	1.42 (.19)	.76 (.24)	–	Ref	–	1.21[a] [.40, 1.98]	.14[a] [−.46, .73]	−.91[a] [−1.60, −.18]
STP-PreK	1.05 (.16)	1.14 (.16)	1.47 (.20)	–	10.65**	Ref	.15[b] [−.37, .65]	.60[ab] [.04, 1.14]	.47[b] [−.08, .99]
STP-PreK enhanced	1.20 (.17)	1.41 (.17)	1.87 (.19)	–	11.00**	.01	.32[b] [−.21, .83]	.95[b+] [.32, 1.55]	.65[b] [.08, 1.20]
ER checklist: total regulation (T)		–	–	2.51	–	–	–	–	–
Parent training only	.92 (.32)	1.13 (.36)	1.00 (.38)	–	Ref	–	.19[a] [−.42, .78]	.07[a] [−.53, .66]	−.11[a] [−.70, .49]
STP-PreK	.62 (.27)	1.26 (.27)	.62 (.35)	–	.68	Ref	.61[a] [.05, 1.15]	.00[a] [−.51, .51]	−.52[a] [−1.05, .03]
STP-PreK enhanced	.95 (.28)	1.10 (.28)	1.22 (.34)	–	.03	1.25	.14[a] [−.37, .65]	.22[a] [−.30, .73]	.10[a] [−.41, .60]
Global regulation (O)	–	–	–	L-7.69**	–	–	–	–	–
Parent training only	2.77 (.30)	2.90 (.30)	3.09 (.36)	–	Ref	–	.13[a] [−.47, .72]	.28[a] [−.33, .88]	.17[a] [−.43, .76]
STP-PreK	2.48 (.24)	2.87 (.24)	3.16 (.37)	–	.37	Ref	.42[a] [−.12, .94]	.57[a] [.01, 1.10]	.22[a] [−.29, .73]
STP-PreK enhanced	2.59 (.24)	3.09 (.24)	2.69 (.28)	–	1.52	.52	.54[a] [−.01, 1.07]	.10[a] [−.41, .60]	−.39[a] [−.91, .14]

Note. Means and SEs are marginal estimates after controlling for sex and PT attendance. Q = quadratic, L = linear, ***$p < .001$, **$p < .01$, *$p < .05$, +$p < .10$. P = parent report, T = teacher report, BL = baseline assessment, PT = post-treatment assessment, FU = 6 month follow-up assessment, STP = summer treatment program. BRIEF = Behavior Rating Inventory of Executive Function, AWMA = automated working memory assessment, HTKS = head–toes–knees–shoulders task, ER = emotion regulation. Ref = reference group for time × group comparisons. Cohen's standardized *d* for group × time effect is for each intervention group. Same letter subscripts indicate effect sizes were not significantly different between intervention groups; different lettered subscripts indicate a significant difference ($p < .05$) in the effect size between groups.

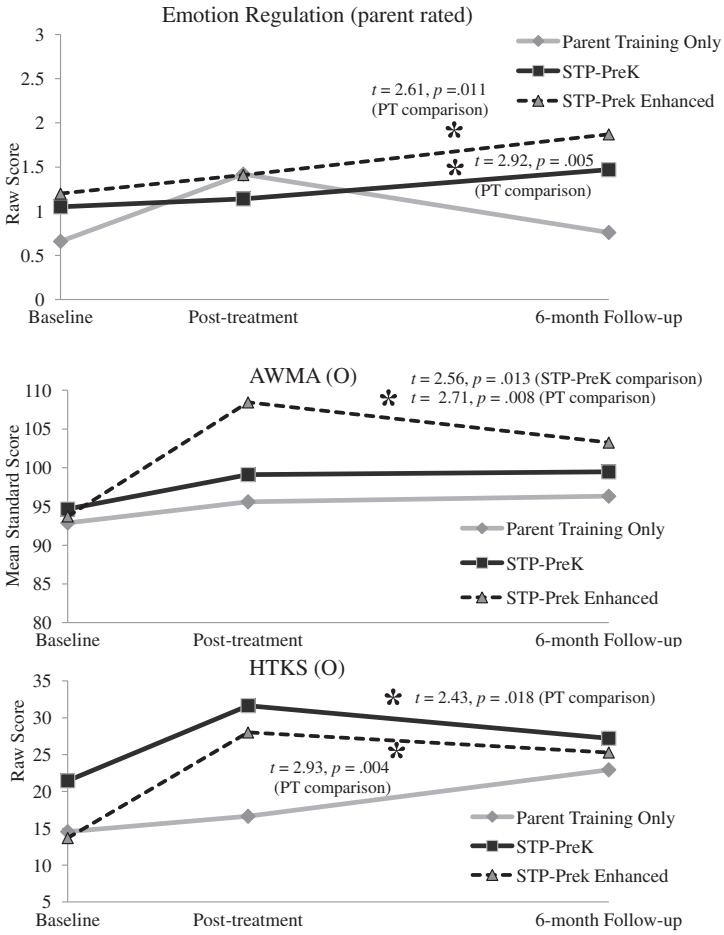

Fig. 4. Executive functioning and emotion regulation outcomes for children across intervention groups. Note. O = observation/standardized assessment, AWMA = automated working memory assessment, HTSK = head–toes–shoulders–knees Task. * indicates significant difference ($p < .05$) in slope/growth from baseline to the 6-month follow-up period between intervention groups.

significant differences in the slope of school readiness improvement (per parent report, teacher report, or BSRA) between (a) children in the STP-PreK Enhanced group and children in the PT only group ($b = -.05$, $SE = .32$, $p = .86$ for parent report, $b = -.11$, $SE = .33$, $p = .74$ for teacher report, and $b = 1.08$, $SE = 4.20$, $p = .80$ for BSRA), (b) children in the STP-PreK group and children in the PT only group ($b = .24$, $SE = .35$, $p = .49$ for parent report, $b = .29$, $SE = .33$, $p = .39$ for teacher report, and $b = 2.07$, $SE = 4.35$, $p = .64$ for BSRA), or (c) children in the STP-PreK Enhanced group and children in the STP-PreK group ($b = -.19$, $SE = .32$, $p = .56$ for parent report, $b = -.40$, $SE = .29$, $p = .18$ for teacher report, and $b = -.99$, $SE = 3.83$, $p = .80$ for BSRA). In other words, children across all three intervention groups experienced growth/improvements in their school readiness scores (as rated by both parents and teachers as well as an objective school readiness test: BSRA) across time points in a similar manner. Of note, while improvements on the BSRA and parent report of school readiness on the KBACS were maintained during the 6-month follow-up assessment as evident by medium to large ES across intervention groups (see Table 4), only small to medium ES were noted for teacher report of school readiness across intervention groups with all confidence intervals containing zero.

When examining overall academic achievement in reading, math, and written expression as measured by the WJ-III, both child IQ and PT attendance (but not sex) were significant predictors of children's initial levels of academic achievement. As expected, child IQ was positively associated with academic achievement ($b = .18$, $SE = .03$, $p < .001$). On the other hand, parents who had greater levels of PT attendance were more likely to have children with lower initial levels of academic achievement ($b = -.52$, SE = .22, $p < .05$). After accounting for covariates, significant linear effects for time and time by group interactions emerged. Specifically, and illustrated in Fig. 2, children in the STP-PreK Enhanced group experienced a significantly steeper growth in academic achievement as measured via the WJ-III across time compared to children in both STP-PreK group ($b = 2.56$, $SE = .88$, $p = .01$) and the PT only group ($b = 2.06$, $SE = .95$, $p < .05$). No significant difference was found in the slope of academic achievement between children in the STP-PreK group and those in the PT only group ($b = .50$, $SE = .95$, $p = .61$). Of note, children across all three intervention groups experienced significant growth in academic achievement with large ES noted at the 6-month follow-up assessment (see Table 4).

3.2.3. Adaptive and social–emotional

In terms of covariates, PT attendance was significantly associated with initial levels of adaptive skills as reported by parents and teachers. Specifically, parents who had greater levels of PT attendance were more likely to report their children as having higher initial levels of adaptive skills ($b = 2.22$, $SE = .75$, $p = .01$) while teachers reported their children as having lower initial levels of adaptive skills ($b = -1.33$ $SE = .55$, $p = .02$). After accounting for covariates and as seen in Table 5, no time or time by group effects were found for teacher rated adaptive skills. On the other hand, a significant quadratic effect for time, but no time by group effect, was found for parent rated adaptive skills. These results indicated no significant differences in the slope of adaptive skills improvement (per parent report) between (a) children in the STP-PreK Enhanced group and children in the PT only group ($b = -5.11$, $SE = 9.73$, $p = .60$), (b) children in the STP-PreK group and children in the PT only group ($b = 8.87$, $SE = 9.75$, $p = .37$), or (c) children in the STP-PreK Enhanced group and children in the STP-PreK group ($b = -3.76$ $SE = 8.96$, $p = .68$). Large ES were observed from baseline to post-treatment across all three intervention groups. However, the quadratic nature of the effect indicated that such improvements decreased from the post to the 6-month follow-up assessment for children in the STP-PreK and PT only groups (see Table 5). On the other hand, children in the STP-PreK Enhanced group were able to maintain such large improvements at the 6-month follow-up assessment compared to children in both the STP-PreK group ($t = 3.95$ $p < .001$) and PT only group ($t = 2.25$, $p = .023$).

In terms of the objective measures, sex was the only covariate significantly associated with initial status of children's emotion knowledge such that girls scored lower compared to boys ($b = -1.30$ $SE = .54$, $p = .02$). After accounting for covariates and as seen in Table 5, a significant linear effect for time as well as a time by group effect was found for emotion knowledge. As illustrated in Fig. 3, children in the STP-PreK Enhanced group experienced significantly steeper growth in their emotion knowledge across time compared to children in both STP-PreK group ($b = 9.86$, $SE = 3.58$, $p < .01$) and the PT only group ($b = 8.35$, $SE = 3.90$, $p < .05$). No significant difference was found in the slope of emotion knowledge between children in the STP-PreK group and those in the PT only group ($b = 1.51$, $SE = 3.90$, $p = .70$). As seen by the ES and confidence intervals (Table 5), only children in the STP-PreK Enhanced group experienced a large improvement in emotion knowledge that was maintained at the 6-month follow-up.

No covariates (i.e., sex, PT attendance) were significantly associated with initial status of children's performance on a social-problem solving task. As seen in Table 5, a significant quadratic effect for time, but no time by group interaction, was found. These results indicated no significant differences in the overall slope of social problem solving abilities between (a) children in the STP-PreK Enhanced group and children in the PT only group ($b = -2.29$, $SE = 4.10$, $p = .58$), (b) children in the STP-PreK group and children in the PT only group ($b = -.40$, $SE = 4.17$, $p = .92$), or (c) children in the STP-PreK Enhanced group and children in the STP-PreK group ($b = -31.89$, $SE = 3.77$, $p = .62$). In fact, as seen in Fig. 3 and depicted by ES in Table 5, all three intervention groups experienced no improvement (or even a small decline) in prosocial scores from baseline to post-treatment. On the other hand, children in the STP-PreK experienced a marginally steeper increase in prosocial scores from post-treatment to the 6-month follow-up assessment compared to children in the PT only group ($b = 2.35$, $SE = 1.30$, $p = .074$). As seen by the ES and confidence intervals presented in Table 5, only children in the STP-PreK group experienced a medium improvement in social-problem solving at the 6-month follow-up assessment.

3.2.4. Self-regulation (ER and EF)

No covariates (i.e., sex, PT attendance) were significantly associated with the initial status of parent or teacher rated ER. As seen in Table 6, no time or time by group effects were found for teacher rated ER. On the other hand, a significant quadratic effect for time and a time by group effect, was found for parent rated ER. Specifically, and as depicted in Fig. 4, children in the STP-PreK Enhanced group and the STP-PreK group experienced significantly steeper growths in ER across time compared to children in the PT only group ($b = 2.70$, $SE = 1.03$, $p < .01$ and $b = 3.02$, $SE = 1.03$, $p < .01$, respectively). No significant difference was found in the slope of ER between children in the STP-PreK Enhanced group and those in the STP-PreK group ($b = -.32$, $SE = .95$, $p = .73$). It is important to acknowledge that children in the PT Only group were reported by parents as having greater improvements in ER from baseline to post-treatment compared to children in the STP-PreK Enhanced ($t = 2.11$, $p = .041$) and STP-PreK ($t = 2.55$, $p = .015$) groups. However, as seen by the ES reported in Table 6, this initial large ES from baseline to post-treatment among children in the PT only group was not maintained at the 6-month follow-up assessment (a large decline occurred) whereas children in the STP-PreK Enhanced and STP-PreK groups continued to positively improve their ER.

In terms of an objective measure of ER, a significant linear effect for time, but no time by group effect nor any covariate effects, was found for overall regulation across the frustration tasks. These results indicated no significant differences in the overall slope of observed ER between (a) children in the STP-PreK Enhanced group and children in the PT only group ($b = -1.69$, $SE = 1.37$, $p = .22$), (b) children in the STP-PreK group and children in the PT only group ($b = -.85$ $SE = 1.39$, $p = .54$), or (c) children in the STP-PreK Enhanced group and children in the STP-PreK group ($b = -.84$, $SE = 1.17$, $p = .48$). As seen by the ES and confidence intervals presented in Table 6, only children in the STP-PreK group experienced a medium improvement in observed ER that maintained at the 6-month follow-up.

Within the EF domain, a significant quadratic effect for time, but no time by group effect nor any covariate effects, was found for both parent and teacher report of EF difficulties (BRIEF). These results indicated no significant differences in the slope of EF difficulties across time (per parent or teacher report) between (a) children in the STP-PreK Enhanced group and children in the PT only group ($b = 8.56$, $SE = 18.42$, $p = .64$ for parent report and $b = 24.41$, $SE = 30.70$, $p = .43$ for teacher report), (b) children in the STP-PreK group and children in the PT only group ($b = 27.70$, $SE = 18.70$, $p = .14$ for parent report and $b = -23.22$, $SE = 31.75$, $p = .47$ for teacher report), or (c) children in the STP-PreK Enhanced group and children in the STP-

PreK group ($b = -19.15$ $SE = 17.23$, $p = .27$ for parent report and $b = 47.63$, $SE = 28.81$, $p = .10$ for teacher report). As seen in Table 6, significant decreases in children's EF difficulties as reported by parents are noted by the large ES observed from baseline to post-treatment across all three intervention groups that were significantly maintained during the 6-month follow-up assessment. On the other hand, for teacher reports of children's EF difficulties, while children in the STP-PreK Enhanced group experienced a large decrease in EF difficulties at the post-treatment assessment, none of the three intervention groups maintained any significant improvement at the 6-month follow-up assessment.

No covariates (i.e., sex, PT attendance) were significantly associated with initial status of any objective measures of EF. As seen in Table 6, a significant quadratic effect for time and time by group effect was found for the HTKS task as well as the AWMA average score. Specifically, on the AWMA, children in the STP-PreK Enhanced group experienced a significantly steeper growth in EF across time compared to children in both STP-PreK group ($b = 35.41$, $SE = 13.86$, $p < .05$) and the PT only group ($b = 40.45$, $SE = 14.91$, $p = .008$). No significant difference was found in the slope of EF between children in the STP-PreK group and those in the PT only group ($b = .5.04$, $SE = 14.91$, $p = .74$). Of note, the significantly steeper growth in EF across time for children in the STP-PreK Enhanced group compared to the other two groups was most evident in the post-treatment assessment (see Table 6). Although no significant differences in ES among the groups were found at the 6-month follow-up assessment, it is important to note that the STP-PreK Enhanced group was the only one that continued to have a large ES with a confidence interval that did not contain zero.

Last, children in the STP-PreK Enhanced and the regular STP-PreK groups experienced significantly steeper growths in EF as measured via the HTKS task compared to children in the PT only group ($b = 46.20$ $SE = 15.75$, $p < .01$ and $b = 38.40$, $SE = 15.83$, $p < .05$, respectively). No significant difference was found in the slope of EF between children in the STP-PreK Enhanced group and those in the STP-PreK group ($b = 7.80$, $SE = 14.46$, $p = .59$). Similar to the AWMA, the significantly steeper growth in EF as measured via the HTKS task across time for children in the STP-PreK Enhanced and STP-PreK groups compared to the PT only group was most evident in the post-treatment assessment (see ES in Table 6). Although no significant differences in ES among the groups were found at the 6-month follow-up, it is important to note that the STP-PreK Enhanced group was the only one that continued to have a large ES ($d = 1.05$) with a confidence interval that did not contain zero.

4. Discussion

All three interventions were well received by families as evident by high attendance rates as well as high consumer/treatment satisfaction scores. In terms of behavioral outcomes, teacher and parent ratings indicated that children across all three intervention groups (STP-PreK, STP-PreK Enhanced, and PT only) experienced significant improvements in not only their EBP, but also the impairment such symptoms were causing at school and at home. Whereas, generally speaking, there were no significant differences in the slope of such behavioral improvements across time among intervention groups, there are two noteworthy findings favoring the STP-PreK-Enhanced condition. First, PT attendance and satisfaction were marginally better among families assigned to the STP-PreK Enhanced group versus those in the PT only group. Families of the STP-PreK Enhanced attended 92% of PT sessions with zero families dropping out of treatment while only 56% of PT sessions were attended by families randomized to PT due to four families dropping out prior to the first session. This indicates families' preference for intervention programs that concurrently target the child directly, as the families that dropped out indicated, anecdotally, disappointment in not being randomized to the condition that also received the STP-PreK.

Within the academic domain, children across all three intervention groups experienced significant growth in academic achievement (as measured via standardized measures: Bracken and WJ-III) with large ES noted at the 6-month follow-up. Parents' perception of children's kindergarten readiness (but not teachers as evident by the presence of zero in the confidence interval of the ES at post-treatment and at the 6-month follow-up) also improved across treatment and maintained during the 6-month follow-up. Given that previous behavioral PT programs have typically either failed to show gains in academic functioning (Chronis et al., 2004; Kaminski et al., 2008) or do not assess or report on academic outcomes (Webster-Stratton & Herman, 2010), the present study provides preliminary support for the SRPP and the benefits of implementing academically oriented topics along with traditional behavior modification strategies.

Whereas children in all three intervention groups experienced academic growth, those in the STP-PreK-Enhanced experienced a significantly steeper growth in academic achievement (as measured via the WJ-III) across time compared to children in both STP-PreK group and the PT only group. In fact, the ES at the 6-month follow-up period for children in the STP-PreK Enhanced group ($d = 2.22$) was significantly larger than children in the STP-PreK group ($d = 1.35$) or those in the PT only group ($d = 1.50$). Although the intervention groups did not differ in their slopes/growth as measured by the Bracken or parent/teacher rated school readiness outcomes, this may have been due to the fact that the WJ-III is a more comprehensive achievement test. Additionally, parents/teachers' perception of school readiness as measured by the KBACS may be influenced by children's behavioral and social–emotional functioning. Although preliminary in nature given the lack of a control group, children in the STP-PreK Enhanced experienced larger improvements within the academic domain compared to children in previous early intervention programs that specifically target social–emotional and self-regulation such as REDI ($d = -.04$ to .39 for language and emergent literacy skills gains; Bierman et al., 2008), TOM ($d = -.11$ to .34 for academic achievement and oral language gains; Barnett et al., 2008; $d = .13$ to .43 for academic achievement; Blair & Raver, 2014), and KITS ($d = .26$ for early literacy skills; Pears et al., 2013), as well as a more academically oriented intervention programs such as the Literacy Express ($d = -.02$ to .36 on vocabulary, print knowledge, phonological awareness, and basic school readiness; Lonigan & Phillips, 2012; Lonigan, Farver, Phillips, & Clancy-Menchetti, 2011).

Given that children in the standard STP-PreK and STP-PreK Enhanced received the identical behavioral and academic curriculum (Literacy Express; Lonigan et al., 2005), it would appear that the additional social–emotional and self-regulation training embedded within the STP-PreK Enhanced condition provided incremental benefits for children's academic achievement growth, at least as measured by the WJ-III. The targeted nature of our current sample may explain our larger ES as children with EBP are more likely to have lower social–emotional competency and deficits in self-regulation which when addressed may allow them to benefit more from an academic curriculum (e.g., Literacy Express). Specifically, as they improve their attention in class and learn to manage their arousal levels more effectively, their learning is maximized (Blair, 2002). Additionally, the current study is the first, to our knowledge, to establish the incremental benefits of such social–emotional and self-regulation training after accounting for a rigorous and established behavioral and academic curriculum. Taken together, it appears that there are several potential direct and indirect mechanisms that early intervention programs can target to promote children's academic growth. The lack of differences among children in the PT only group and regular STP-PreK shows that targeting parenting skills and/or involvement as it relates to school readiness can be as effective as providing direct instruction to children in an intensive summer camp format. Most importantly, the findings from the STP-PreK Enhanced suggest that a multi-targeted approach that addresses parenting, child academic skills, and child social–emotional and self-regulation skills yields the best academic outcomes (at least as measured by a standardized achievement test such as the WJ-III).

Last, children in the STP-PreK Enhanced group experienced greater growth across time in emotion knowledge, ER (parent report), and EF (HTKS, AWMA) compared to children in the other groups. It is important to note, however, that there were no significant differences in the slope of EF improvement as reported by parents or teachers on the BRIEF. Additionally, the specific EF benefits (as measured by the HTKS and AWMA) gained for children in the STP-PreK Enhanced group were most evident in the post-treatment assessment. While no significant differences in ES among the interventions were found at the 6-month follow-up assessment, it is important to note that the STP-PreK Enhanced group was the only one that continued to have a large ES with a confidence interval that did not contain zero ($d = 1.05$, 95% CI [.40, 1.67] for HTKS and $d = .79$, 95% CI [.09, 1.46] for AWMA). Given the clinical nature of our sample, it is likely that children in our sample have chronic EF deficits that require ongoing support and that cannot be permanently resolved. It will be important for future work to determine whether ongoing booster sessions of self-regulation training provided by either teachers at school or parents at home can facilitate long-term maintenance. Finally and in contrast to EF, children in the STP-PreK Enhanced group continued to show better emotional knowledge and parent reported ER at the 6-month follow-up assessment compared to children in the other two interventions. No reliable ES were found for teacher reported ER or observed ER (confidence intervals for all ES at the 6-month follow-up contained zero). Taken together, these findings generally speak to the incremental benefits, beyond standard behavior modification, of directly teaching children social–emotional skills (e.g., improving emotional awareness, ER) as well as daily reinforcement of self-regulation skills that require the use of EF to control behavior in an adaptive manner in the classroom.

4.1. Limitations and future directions for research

There were some limitations to the current study that need to be addressed. First, although findings were statistically significant with medium to large ES, the small sample size of the current randomized trial is a significant limitation. For example, post-hoc power analyses using Gpower indicated that we only had adequate power to find large ES ($d > 1.0$; power = .82) when comparing the groups. The variability in ranges of confidence intervals for ES presented further highlight the preliminary nature of the current findings. Out of the 38 possible ES (19 for post-treatment and 19 for the 6-month follow-up), the PT only group had only 15 that did not include zero in the confidence interval while the STP-PreK group had 17. In contrast, the STP-PreK Enhanced group had 25 ES that did not include zero in the confidence interval. Hence, despite the preliminary nature of our findings, when viewed across all 19 outcomes, it does appear that children in the STP-PreK Enhanced group experienced greater and more reliable growth across domains compared to children in the other two interventions. Future studies comparing intervention conditions should consider a larger number children per intervention condition (at least 60) to maximize power to find smaller ES. Second, the current study compared three different intervention packages with no control group. Hence, it is possible that threats to validity, such as regression to the mean, cannot be completely ruled out. Additionally, given the rapid growth of children's self-regulation skills, including EF, that occur within the preschool period (Carlson, 2005), it is possible that some of the improvements we documented across children's functioning reflects a maturational process (Denham, 2006). The next logical step would be to have a larger randomized trial that would include a control group.

At a programmatic level, it is impossible to determine which aspects of the social–emotional and self-regulation training curriculum of the STP-PreK Enhanced were most crucial. For example, the EF games embedded in the curriculum have on their own shown promise in improving children's academic functioning (Tominey & McClelland, 2011), whereas Cogmed on its own has had mixed findings (Shipstead, Redick, & Engle, 2012). Given the cost associated with computerized working memory training paradigms, future work should evaluate the extent to which classroom activities that promote social–emotional and self-regulation are effective in improving children with EBP's educational outcomes, after accounting for more skill based academic tutoring and traditional behavioral management techniques.

In sum, our findings indicate that a behavioral PT program (i.e., SRPP) that also includes academically oriented topics appears sufficient to address children's behavioral functioning, and provides mild to moderate benefits for children's academic functioning. The SRPP's medium to large ES within the behavioral domain is also comparable to the ES found in other behavioral PT programs (e.g., PCIT, Triple P), yet accomplished in only 8 core sessions. Most importantly, however, the findings from the STP-PreK Enhanced suggest that a multi-targeted approach that addresses parenting, child academic skills, and child social–emotional and

self-regulation yields the best school readiness outcomes (academic functioning, EF, ER, and emotional awareness) compared to not only the PT only group, but also a standard STP-PreK that contained a more traditional behavioral and academic curriculum. Finally, although more work is needed to disentangle the mechanisms responsible for children's long term school readiness improvement, it does appear that while directly targeting children's social–emotional and self-regulation skills within an authentic classroom environment may prove to be beneficial, the maintenance of such success is not tied to a maintenance in observed EF.

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