The Impact of a Primary Prevention Program on Preschool Children's Social–Emotional Competence

Kristen M. Kemple[1] · Ilrang Lee[2,3] · Stacy M. Ellis[1]

Abstract

This quasi-experimental study compared children who were (or were not) exposed to a 28-week program designed to prevent aggressive behavior by teaching pro-social skills and social knowledge. Children in the experimental group increased significantly in teacher-ratings of cooperation, assertion, self-control, and total social skills, as well as in social knowledge as measured through an interview procedure. Children in the comparison group showed no significant improvements. Neither group showed changes in teacher ratings of externalizing or internalizing problem behaviors. Preliminary analyses suggest that the experimental group also showed reduction in observed aggressive behavior, while the comparison group did not. Changes within the experimental group differed according to whether the teacher had initially identified a child as high or as low in social competence. High competence children showed significant increase in cooperation and in total social skills, while low competence children showed significant increase in cooperation, assertion, total social skills, and social knowledge. The sample size for this study was small (37 subjects), and should be replicated with a larger sample. Results do, however add quasi-experimental support for the effectiveness of the program, and suggest that changes are due to the program, rather than to maturation.

Keywords Aggressive behavior · Preschool · Primary prevention · Second step · Social competence

Introduction

Social–Emotional Competence in Early Childhood

The growth of young children's social–emotional competence has historically been a central goal of preschool education. In addition to being an important aspect of child development in its own right, social–emotional competencies such as getting along with peers, following directions, and paying attention support children's general well-being and enable children to benefit from what their early childhood program has to offer (Boyd et al. 2005). At the same time, social competence in the early childhood years has important implications for children's later adjustment and success (Shonkoff and Phillips 2000). Early childhood is a critical period for the onset of behavioral and emotional problems. Behavioral problems in the preschool years are not rare; Qi and Kaiser (2003) report that behavior problems among 3 to 5-year olds, according to teacher-report, ranged from 14 to 52%. The early years constitute a prime time to prevent behavior problems by supporting the growth of social–emotional competence.

Early Social–Emotional Competence Predicts Later Outcomes

Behavior problems in early childhood have significant stability and predictive power over time (e.g., Egeland et al. 1990; Jones et al. 2015). Challenging behaviors that disrupt classroom learning constitute one of the strongest predictors of a child's later aggression, delinquency, antisocial behavior, and substance abuse (McCabe and Frede 2007). The effort required for teachers to teach a child at age 10 is predicted by the same child's challenging behaviors at age 5 (Houts et al. 2010). A study of hard-to-manage preschoolers found

✉ Ilrang Lee
leei@bgsu.edu

1 University of Florida, Gainesville, USA

2 Bowling Green State University, Bowling Green, USA

3 Inclusive Early Childhood Education, School of Teaching and Learning, 539 Education Building, Bowling Green, OH 43403-0247, USA

that half of those children had adjustment problems in kindergarten, and 67% met clinical criteria for externalizing behavior problems at age 9. Furthermore, of those children with problems at both 6 and 9 years, 94% continued to meet clinical criteria in early adolescence (Pierce et al. 1999). In a longitudinal study of preschoolers' aggression and social competence, Denham et al. (2002) found that children with the least emotion knowledge at ages 3 and 4 exhibited poorer social competence and higher aggression at ages 4 and 5. In particular, a strong positive correlation exists between early and later aggressive behavior (Rutter et al. 1998). In a study of the long-term trajectory of externalizing behavior problems, children with moderate to high levels of externalizing behaviors from early childhood were significantly more likely to be engaged later in violent or delinquent behavior than children with low frequency, even after controlling for demographic characteristics and child maltreatment (Thompson et al. 2011).

Children's emotion regulation, as well as their understanding of social cues and social rules are important areas of growth in early childhood, and set the foundation for later life outcomes such as health and well-being (Boyd et al. 2005; Braveman et al. 2008). Young children's knowledge of emotion vocabulary is predictive of both social and academic competence (Arsenio et al. 2000; Denham et al. 2012; Rhoades et al. 2011). Social–emotional learning has also been identified as an important component in the prevention of bullying (Smith and Low 2013). Poor social problem-solving skills have been identified as a predictor of involvement in bullying. Evidence suggests that this holds true not only for students who bully others, but also for students who are bullied, as well as for those who are involved in both enacting bullying and being victims of bullying (Cook et al. 2010).

Early social–emotional competence has long-term implications for children's later development and adjustment. Significant rates of disruptive and aggressive behavior in early childhood, coupled with notable stability into adolescence and adulthood, points to the need for effective early prevention programs.

Primary Intervention for Social–Emotional Competence in Early Childhood

The preschool years constitute a developmentally optimal time for intervention, and for prevention of long-term negative consequences (Bierman and Motamedi 2015). Several approaches to preventive interventions are common. One approach has been to identify individual children with problem behavior and provide mental health services to those children. Another approach is to use classroom wide curricula. Current recommended practice suggests using a tiered system of classroom wide (or even school wide) primary prevention curricula and practices, with increasing levels of more targeted support for those children for whom primary prevention is insufficient (Greenwood et al. 2011; Carta and Young 2019).

A growing body of research supports the effectiveness of primary intervention programs for improving the social competence of children and youth. A large scale meta-analysis examined 213 school-based social emotional learning (SEL) programs involving children and youth in kindergarten through high school revealed significant improvements in skills, attitudes, and behaviors as well as an 11-percentile point gain in achievement (Durlak et al. 2011). Similarly, a meta-analytic review of 75 studies of universal school-based social, emotional and/or social–emotional behavior programs implemented in primary and/or secondary schools demonstrated beneficial effects with regard to social skills, antisocial behavior, substance abuse, positive self-image, academic achievement, mental health, and prosocial behavior (Sklad et al. 2012).

Implementation of primary prevention programs can help all the children in the classroom in increasing prosocial behaviors and reducing problem behaviors. Primary programs have been shown to significantly benefit children from kindergarten to high school (Taylor et al. 2017) and can raise the overall level of adjustment for all children and provide information for services for those in need of more intensive assistance (Greenberg et al. 2017).

The significance of the early childhood period for the growth of social–emotional competence, combined with the long-term impact and stability of early social–emotional competence, suggests the need for effective early prevention programs. Nationally, the Second Step program is widely used as a program for preventing aggression and teaching prosocial behavior. It has been rated one of the best such programs currently available, particularly in terms of program quality, developmental appropriateness, ease of administration, and teacher training (Drug Strategies 1998; Joseph and Strain 2003). It was identified as a Collaboration for Academic, Social and Emotional Learning (CASEL) SEL program on the basis of being well-designed, delivering high-quality training and other implementation supports, and being evidence-based (CASEL 2013). Its various versions can be used with children from preschool through middle school. A recent meta-analysis of 24 studies of outcomes of the Second Step program for various grade levels showed increased knowledge of program content and prosocial outcomes (Moy and Hazen 2018). Of the 24 studies included, however, only 5 of those included preschoolers and 3 of those five were dissertations rather than peer-reviewed published articles. While a substantial body of research supports the effectiveness of the program with older children (e.g. Espelage et al. 2015; Grossman et al. 1997; McMahon and Washburn 2003). A smaller body of emerging evidence

supports its positive effects on the social knowledge and behavior of preschool children as well, as will be detailed in the following section.

The Second Step program for preschool/kindergarten, which is titled "Second Step: A violence prevention curriculum, preschool/kindergarten" (Committee for Children 2002), the version that was used in the present study, is a 28-session curriculum, with brief structured teaching sessions conducted once or twice per week. Each lesson consists of an introductory activity (often including puppets), a photo card of children in a particular situation with an accompanying vignette, and role plays. Teachers are encouraged to facilitate generalization from the structured teaching sessions to the natural environment, through reinforcement for using behaviors presented in the teaching sessions. The "Empathy" component provides foundation for the subsequent components, which are labeled "Emotion Management", "Friendship Skills and Problem-solving", and "Transition to Kindergarten".

Research on the Use of Second Step with Preschoolers

In addition to strong evidence for the effectiveness of Second Step for older children, a small body of emerging evidence supports its positive effects on the social knowledge and behavior of preschool children as well. In an early pre-experimental study, 109 low income preschool and kindergarten children, predominantly African American, who experienced the Second Step: Violence Prevention Program (Committee for Children 1991) showed positive gains in social knowledge with regard to identifying feelings and facial cues, thinking about how and why children might respond in hypothetical conflict situations, and predicting consequences of responses in hypothetical conflict situations. Children also showed a reduction in observed aggressive and disruptive behavior (McMahon et al. 2000). There were no changes in children's social skills or problem behaviors. That study, however was seriously limited in several respects. There was no control or comparison group, so it is not clear that improvements were not due to maturation. In addition, behavioral data were collected at the group level, rather than the individual level, and therefore cannot be used to determine that individual changes in behavior occurred over the course of the intervention.

A more recent pilot study examined outcomes of a newer version of Second Step, Second Step: A violence prevention curriculum, preschool/kindergarten (Committee for Children 2002), which was adapted for the study from the publisher-recommended weekly schedule to four times a week in 15-min sessions (Upshur et al. 2013). In this study, the outcomes for year one were small and accounted for by baseline difference. In year two, there was evidence of expected differences between intervention and control classrooms on classroom climate and teacher interactions, but children in the intervention and control classrooms did not differ with regard to changes in social skills or problem behaviors.

The contribution of Second Step, consultation with teachers, and play therapy (for a subgroup of identified children) was examined in a 3-year study of 3 and 4-year-old children in a moderately disadvantaged area (Ocasio et al. 2015). The Second Step Early Learning Program (Committee for Children 2011), the most recently published version of Second Step for use with young children, was used in this study. After 1 year of services (including in-class curriculum and play therapy for those for whom it was appropriate), children showed increases in social cooperation, social interaction, and social independence, and reduction in both externalizing and internalizing behavior problems. Because this study did not assess use of Second Step in the absence of ongoing availability of teacher consultation it is not possible to conclude that measured changes were due to Second Step. As a pre-test post-test comparison design with no comparison group, it is not possible to confidently conclude that changes in social skills and problem behavior were not due to maturation.

In another study, the Second Step Early Learning program (Committee for Children 2011) was evaluated using a randomized efficacy trial carried out in Head Start and low-income community preschools (Upshur et al. 2017). Site-based differences were controlled by random assignment to condition within sites. Classrooms participated for 2 years. Because this study was an efficacy trial, teachers were given a high level of training and coaching (higher than might be feasible outside of the context of this type of study). Outcomes measured were executive functioning skills and social–emotional skills. Primary outcome analyses indicate that the Second Step intervention significantly contributed to the development of children's executive functioning skills, while contribution to social and emotional skills was only marginally significant.

Summary

There is substantial research support for the effectiveness of Second Step programs with elementary and middle school children, and the data in support of Second Step's use with preschool children is growing. Results thus far are mixed, but generally supportive. The present study was designed to overcome some of the limitations of previous preschool studies of Second Step, including reliance on pre-experimental designs and absence of behavioral observation data on individual children. The present quasi-experimental study examines the effect of teacher implementation of Second Step: A violence prevention curriculum, preschool/kindergarten (Committee

for Children 2002) on ratings of social skills and problem behaviors, observed aggressive behaviors, and directly-assessed social–emotional knowledge for children identified as either high or low in social–emotional competence. The present study addresses two general hypotheses: (1) preschool children who receive the Second Step intervention will have greater improvement of their social–emotional competence compared with the comparison group and (2) the effects of the Second Step intervention will differ according to children's initial level of social–emotional competence.

Methods

Setting

This study was conducted with participants from 10 preschool classrooms in the southeastern United States. Six classrooms (in two different centers) were recruited to serve as the sites for the experimental condition. All teachers in these classrooms had previously been trained to use the Second Step curriculum and had been using it for at least 1 year. Teachers' training had consisted of a 2-h training by a trainer who had been directly trained by Committee for Children (creators of Second Step) personnel, followed by monthly oversight and mentoring for appropriate implementation. Four classrooms (located in three different centers) were recruited to serve as the sites for the comparison condition. Teachers in these classrooms had not been trained in the Second Step curriculum and did not use Second Step in their classrooms. Centers were identified for recruitment by soliciting recommendations from agency personnel familiar with the programs, in order to exclude programs of low quality. After identifying the classrooms, each classroom was evaluated using the Early Childhood Environment Rating Scale-Revised (ECERS-R; Harms et al. 2004) to insure that none of the identified classrooms scored below 4 (on a 1–7 scale) on the total ECERS-R score. For the experimental classrooms, ECERS-R scores ranged from 4.31 to 6.14, with a mean score of 5.52. For the comparison classrooms, scores ranged from 5.34 to 5.85, with a mean score of 5.57. Lead teachers in all classrooms held a Child Development Associate (CDA) credential and either a bachelors or associates degree. Based on these indicators, no classrooms appear to be of low quality and there does not appear to be a difference in quality between experimental and comparison groups. All programs served primarily middle-class families. Within each condition (the experimental and the comparison group) approximately half of the children attended a college campus child care program and the other half attended community child care programs.

Participants and Recruitment

This study used the extreme groups approach (EGA) which is a widely-used sampling method to examine relationships between two variables by selecting individuals on the basis of extreme scores (Preacher et al. 2005). The extreme groups for this study were produced by a nomination procedure. Each classroom lead teacher was asked to nominate the 3 most socially competent children in the class, as well as the three least socially competent children in the class. This yielded a total of 45 children from 10 classes. However, 8 children were excluded from analyses because the child dropped from the program during the study, or because of incomplete data due to high absenteeism (absent more than 20% of the days during the 28-week intervention period). This resulted in 37 participating children, 17 experimental and 20 control group. Table 1 presented an overview of participant demographic characteristics. The mean ages of the participants were 3.41 years for the experimental and 3.75 years for the control group. Approximately 52.9% of the experimental group children were girls and 40% of the control group children were girls. The majority of participants were identified as White, 70.6% of the experimental and 65% of the control group. None of participants has reported any disabilities. Based on the teachers' nomination procedure, 58.8% of the experimental group children were selected as high in social–emotional competence and 41.2% were selected as low in social–emotional competence. For the control group, 60% of children were selected as high in social–emotional competence and 40% were selected as low in social–emotional competence.

Intervention: Second-Step

For the experimental group, the preschool-kindergarten version of the Second Step program (Committee for Children 2002) was implemented during the normal academic year (September through May). The Second Step Violence Prevention curriculum/PreK Kindergarten version (Committee for children 2002) kit contains three units: empathy (12 sessions), emotion management (6 sessions), and problem-solving (10 sessions), for a total of 28 sessions including teaching aids (e.g., instructional photo cards, posters, puppets, music CDs, and tokens for the reinforcements). The program was delivered by classroom lead teachers. This version of the Second Step program (2002) was used because it had been previously purchased for programs county-wide and was the version still in use.

Procedures

All participants in both conditions were pretested (at beginning of the school year in fall) and post-tested (at the end

Table 1 Descriptive statistics and comparison of demographic characteristics and by treatment condition

	Treatment condition		Chi square	*p* value
	Experimental (*n* = 17)	Control (*n* = 20)		
Total mean age in months at pretest (*SD*)	46.96 (6.68)	49.4 (4.52)		
Age: mean (*SD*)	3.41 (.51)	3.75 (.45)	3.07	.08
% 3-Year-olds	58.8%	25%		
% 4-Year-olds	41.2%	75%		
Gender			.21	.65
% Boys	47.1%	60%		
% Girls	52.9%	40%		
Ethnicity			1.29	.52
% White	70.6%	65%		
% African American	17.6%	10%		
% Asian	11.8%	25%		
Disabilities				
% Yes	0%	0%		
% No	100%	100%		
Social competence level[a]			.00	1.00
% High	58.8%	60%		
% Low	41.2%	40%		

[a]Teachers were asked to nominate the children's level of social competence

of the school year in spring) to assess the impact of the program. These pre- and posttest measures included a child interview, teacher-ratings of child behavior, and naturalistic observation of child behavior. Child interviews were collected individually in a corner of the classroom or playground, by trained research staff. Teachers' rating forms were distributed and obtained from classroom lead teachers. The observational data were collected in the classroom during free play, by trained research staff. During the period between pretest and posttest, the 28-session Second Step curriculum was conducted in the experimental classrooms by the lead teachers. The teachers in the comparison group conducted "business-as-usual" in their classrooms, which did not include a specific SEL program.

Measures

Child Interviews

The Second Step Knowledge Assessment Interview (Committee for Children 2004) was used to examine children's knowledge in the areas of anger management, perspective-taking, determining the emotional state of another, and social problem solving. The semi-structured interviews were conducted individually with children by researchers and trained graduate research assistants, according to the protocol provided by Committee for Children. Duration of interviews was about 10–20 min and all responses

were recorded in writing by the interviewer. The interview contains 20 questions with 5 gender-specific photographs and story-and-question formats to ask children to identify emotions (e.g., how might a child in the picture be feeling based on the situation?), predict consequences of a solution (e.g., what might happen if the child in the picture enacted an aggressive behavior?), and propose prosocial solutions to a problem (e.g., what could the child in the picture do to get to play with the others?). For example, when presented with a photo of two boys playing in the "kitchen" and one hovering on the edge of the area, the adult says, "Here is the first picture. This is Jessie. He really wants to play with these two boys. Which one is Jessie? Can you point to him? Who does Jessie want to play with? What are the two boys playing? Yes, they are playing "house" or "kitchen". How do you think Jessie is feeling right now? How can you tell Jessie feels ___? What can Jessie do so the two other boys will want to play with him? If Jessie said something to the boys, what could he say? What might happen if Jessie pushed his way in and started playing? If you were Jessie, and you wanted to play with these two kids, what would you do or say? If that didn't work, then what would you do or say?" Each acceptable answer (according the CFC, 2004 protocol) was awarded one point (maximum 20 points) and extra points could be obtained by multiple responses (maximum 20 extra points). The sum scores of all responses including extra points represented the participants' degree of social–emotional knowledge. One-third of the interviews were scored independently by two graduate students, and

the very minimal scoring differences were resolved through discussion with the principal investigator. The remainder of the interviews were scored by one graduate student.

There is limited evidence regarding norms or psychometric information since validity and reliability studies have not been examined with this measure. However, previous studies with and without comparison groups, (e.g., McMahon et al. 2000; Moore and Beland 1992) revealed that preschool and kindergarten children who were provided the Second Step program, showed significant differences on the child interview scores. These findings provide support for the validity of this measure.

Teacher-Rated Child Behavior

To assess children's social skills, the preschool level of the Social Skills Rating System-Teacher form (SSRS-T; Gresham and Elliott 1990) was completed by the classroom lead teachers prior to and after the Second Step intervention. The SSRS-T consists of 40 items that are scored on a 3-point Likert-type scale (i.e., 0 = Never, 1 = Sometimes, and 2 = Very Often). The SSRS-T yields two main scale scores, Social Skills (item examples: "Accepts peers' ideas for group activities" "Waits turn in games or other activities") and Problem Behavior (item examples: "Has temper tantrums" "Acts sad or depressed"). Each of these two scales is comprised of several subscales: For Social Skills these are cooperation, assertion, and self-control. For Problem Behaviors, these are externalizing behaviors and internalizing behaviors.

The original study by Gresham and Elliott (1990) reported adequate reliability of each scale with alpha coefficients of .94 for social skills and .82 for problem behaviors, and test–retest of .85 for social skills and .84 for problem behaviors. In addition, the SSRS-T demonstrated reasonable convergent validity with other social skill measurements such as the Vineland Adaptive Behavior Scales (Lyon et al. 1996) the revised Conners Rating Scales-Teacher Form (VonBrock Treuting and Elliott 1997), and the Child Behavior Checklist (Achenbach and Edelbrock 1983).

For the current study, the SSRS-T yielded acceptable internal consistency (Coefficient Alpha) for both pretest and posttest. The pretest internal reliability of social skills was .95 and .91 for problem behaviors. At posttest, social skills internal reliability was .91 and .90 for problem behaviors scale.

Naturalistic Observation of Child Behavior

Naturalistic observations were carried out to record each individual child participant's behavior during free play. Each child was observed on 3 separate 10-min occasions, on a minimum of two separate days, for both pretest and for posttest. Thus, a total of 60 min of observation was completed through 6 intervals of data per child. The observers, both with several years' experience in using running records to record young children's behavior in classrooms, made running records of the child's actions and words during each 10-min segment, and also recorded (to the extent possible) the behavior and words of others with whom the child interacted. After examining 25% of the written running records, the lead author and a graduate assistant collaborated to create a three-category system for coding aggressive behavior by the target child toward another child or children. This process produced frequencies of each of the following behavioral coding categories: physical aggression, verbal aggression, and relational aggression. Physical aggression included children's intentional behaviors (not accidental) that may cause physical or emotional harm to others through physical acts (e.g., hitting, pushing, or forcibly taking objects). This also included physical taunting, physical threats of physical harm, and intentional destruction of property. Verbal aggression includes antagonistic verbal teasing, mean names, or insult not expressed at friendship status (e.g., "Stop that!" or "Shut up!"), verbal threats of physical harm, and verbal threats to destroy property. Relational aggression includes intentional harm caused to others by damaging their social relationships or feelings of peer acceptance, as well as excluding from the peer group, spreading rumors, withdrawing friendship, maliciously telling lies, and ignoring a peer (e.g., "You can't come to my party", or deliberately turning away and ignoring a peer's request to join play). The percent agreement for each category of aggression was .95 or higher.

Results

Preliminary Analyses

As a preliminary analysis of the distribution of participants, Chi square analyses were conducted for demographic characteristics by treatment condition to examine any potential differences between the two groups on the demographic variables of age, gender, and ethnicity. Table 1 presents the comparison and descriptive statistics for the children's demographic variables by treatment condition. The results of Chi square tests indicated no significant association between group and demographic characteristics: age, χ^2 (1, $n = 37$) = 3.07, $p = .08$; gender, χ^2 (1, $n = 37$) = .21, $p = .65$; and ethnicity, χ^2 (2, $n = 37$) = 1.29, $p = .52$. These results show that the demographic proportions of the experimental group did not differ from the demographic proportions of the control group.

Bivariate correlation analyses were used to assess relationships among key dependent variables including subscales for pre- and post-tests (the social–emotional

knowledge interview, and the SSRS- ratings on the two main scales: social skills and problem behaviors). Although there were fewer significant correlations between pretest social–emotional knowledge (SSKAI) and other variables, posttest SSKAI was significantly related to most other variables. These results support the construct validity of the measures utilized in this study, as the correlations are theoretically consistent.

To approve a valid predictor for the main analysis, a series of multiple regression analyses were conducted. The results indicated that treatment condition was statistically significant to the posttest score of SSRS-Social Skills, F $(5, 31) = 3.092$, $p = .022$, $\beta = -.37$, $t = -2.31$, $p = .028$. This suggested support for the hypothesis that preschool children who receive the Second Step intervention will have greater improvement of their social–emotional competence compared with control group. In addition, children's level of social–emotional competence variable was significant contributions to both pre- and posttest scores, with the exception of posttest SSKAI.

Given these preliminary analyses, the results supported the hypotheses of the current study and suggested that children's 'treatment condition' (*H1*) and 'social competence level' (*H2*) were statistically significant predictors for some of the dependent measures. Thus, these significant variables were retained for the main analyses.

Comparisons by Treatment Condition

Hypothesis 1, preschool children who receive the Second Step intervention will have greater improvement of their social-emotional competence compared with the comparison group. Based on sample and cell sizes of this study, a series of univariate comparison analyses (e.g., *t* test and ANOVA)

were conducted instead of using multivariate analysis of variance to avoid insufficient statistical power (i.e., unacceptable effect size) or any possible violation of assumptions.

First, independent-sample t-tests were conducted to compare the dependent variables (i.e., SSKAI social–emotional knowledge, SSRS-T problem behaviors and social skills) between experimental and control groups using the pretest scores. There were no significant differences on any of these scores between the two groups before intervention. Thus, additional independent-sample t-tests were conducted to compare both groups' posttest scores. On average, children who received the Second Step intervention (the experimental group), had higher scores on SSRS-cooperation ($M = 16.59$, $SD = 2.32$) and SSRS-total social skills ($M = 45.88$, $SD = 7.85$), than those children who did not receive the intervention (the comparison group) (SSRS-cooperation, $M = 14.05$, $SD = 4.44$; SSRS-total social skills ($M = 39.35$, $SD = 10.45$). The difference for SSRS-cooperation, 2.54, 95% CI [.13, 4.95] was significant $t(35) = 2.14$, $p = .04$. The difference for total score of SSRS-social skills, 6.53, 95% CI [27, 12.80] was also significant $t(35) = 2.19$, $p = .04$. The eta squared statistic indicated a moderate effect size for both results (.12 and .11, respectively). The results of t-test analyses for both pre- and posttests appear in Table 2.

In addition to the independent sample t-tests, paired-samples t-tests were conducted to evaluate the impact of the Second Step intervention on children's scores on social–emotional competence for each treatment and control group. The results revealed that only the treatment groups' test scores showed statistically significant increase for SSKAI, $t(16) = -2.15$, $p = .048$, and SSRS-Total social skills, $t(16) = -4.18$, $p = .001$, cooperation, $t(16) = -4.17$, $p = .001$, assertion, $t(16) = -2.77$, $p = .014$, and self-control, $t(16) = -2.41$, $p = .028$, from pretest (prior to the

Table 2 Independent sample t-tests comparing treatment versus control group dependent measures by treatment condition

Measure	Pretest ($df = 35$)					Posttest ($df = 35$)				
	Exp. ($n = 17$)		Con. ($n = 20$)			Exp. ($n = 17$)		Con. ($n = 20$)		
	M	SD	M	SD	t	M	SD	M	SD	t
SSKAI	16.82	5.24	18.40	5.22	− .91	19.06	4.09	20.25	5.51	− .74
SSRS-SS										
Cooperation	14.65	3.48	14.35	4.10	.24	16.59	2.32	14.05	4.40	2.14*
Assertion	13.82	3.61	13.50	3.89	.26	15.41	2.79	13.60	2.91	1.93
Self-control	11.82	4.60	11.10	5.48	.43	13.88	3.60	11.70	4.17	1.69
Total-SS	40.82	9.50	38.95	12.79	.50	45.88	7.85	39.35	10.45	2.19*
SSRS-PB										
Externalizing	4.76	3.21	4.60	4.33	.13	4.71	3.20	5.70	3.95	− .83
Internalizing	1.12	2.21	1.30	1.98	− .27	1.18	1.90	1.33	1.80	− 1.37
Total-PB	5.88	4.83	5.90	5.68	− .01	5.88	3.79	7.60	5.33	− 1.11

SSKAI second step knowledge assessment interview, *SSRS* social skills rating system, *SS* social skills, *PB* problem behaviors

*p < .05

intervention) to posttest (after the intervention). The large effect sizes were found for these significant findings using the eta squared statistic (.52, .22, .52, .32, and .27, respectively). There was no significant difference in scores between pretest and posttest for the control group. Table 3 indicates results of repeated measures for both groups' pre- and posttest scores. These results showed that the Second Step intervention program positively affected the experimental group's test scores comparing between pre- and posttest scores. The results also revealed that the comparison group did not show increased scores from pretest to posttest.

Comparison by Social Competence Level

To test *hypothesis 2, that the effects of the Second Step intervention will differ according to children's initial level of* *social-emotional competence (high or low, as nominated by* *the teacher),* paired-samples t-tests were conducted. Table 4 shows the results of paired-samples t-tests. The results show statistically significant increases in scores of both treatment groups, low and high social-competence. Specifically, low social-competence children from the treatment group increase in four measurement scores, SSKAI, $t(6) = -3.33$, $p = .016$, and SSRS-Total social skills, $t(6) = -4.61$, $p = .004$, cooperation, $t(6) = -3.67$, $p = .01$, and assertion, $t(6) = -5.29$, $p = .002$, from pretest (prior to the intervention) to posttest (after the intervention). Large effect sizes were found for these significant findings using the eta squared statistic (.69, .78, .69, and .82, respectively). The high social-competence children from the treatment group showed increased scores in SSRS-Total social skills, $t(9) = -2.46$, $p = .036$ and cooperation, $t(9) = -3.16$, $p = .012$, from pretest

Table 3 Paired-samples t-tests for pre- and post dependent measures

Measure	Paired differences (pretest–posttest)					
	Experimental ($n = 17$, $df = 16$)			Control ($n = 20$, $df = 19$)		
	M	SD	t	M	SD	t
SSKAI	−2.24	4.29	−2.15*	−1.85	4.74	.37
SSRS-SS						
Cooperation	−1.94	1.92	−4.17***	.25	3.06	.37
Assertion	−1.71	2.54	−2.77**	−.10	2.40	−.19
Self-control	−2.06	3.53	−2.41**	−.60	3.09	−.87
Total-SS	−5.18	5.10	−4.18***	−.45	7.06	−.29
SSRS-PB						
Externalizing	.06	2.08	.12	−1.10	2.77	.20
Internalizing	−.06	1.35	−.18	−.60	1.79	.24
Total-PB	.00	2.45	.00	−1.70	4.33	.33

SSKAI second step knowledge assessment interview, *SSRS* social skills rating system, *SS* social skills, *PB* problem behaviors, *Pre* pretest, *Post* posttest

*$p < .05$, **$p < .01$, ***$p < .001$

Table 4 Paired-samples t-tests for pre- and posttest dependent measures divided by level of social skills

	High SS ($n = 10$)			Low SS ($n = 7$)		
	M	SD	t	M	SD	t
SSKAI	−2.30	3.97	−1.83	−4.14	3.29	−3.33*
SSRS-SS						
Cooperation	−1.10	1.10	−3.16*	−3.14	2.27	−3.67**
Assertion	−.70	2.67	−.83	−3.14	1.57	−5.28**
Self-control	−1.70	3.77	−1.43	−2.57	3.36	−2.03
Total-SS	−2.60	3.34	−2.46*	−8.86	5.08	−4.61**
SSRS-PB						
Externalizing	−.60	2.22	−.85	1.00	1.53	1.73
Internalizing	−.50	.71	−2.24	.57	1.81	.83
Total-PB	−1.10	2.23	−1.56	1.57	1.90	2.19

SSKAI second step knowledge assessment interview, *SSRS* social skills rating system, *SS* social skills, *PB* problem behaviors

*$p < .05$, **$p < .01$, ***$p < .001$

(prior to the intervention) to posttest (after the intervention). Large effect sizes were found for these results using the eta squared statistic (.40 and .53, respectively). These results show that the Second Step intervention positively affected both high and low social skill groups from the experimental groups' test scores comparing between pre- and posttest scores.

Comparison by Treatment Level: Observed Aggressive Behavior

Coded transcripts of observed behavior during free choice time revealed few incidences of aggression overall. Though transcripts were coded for verbal, physical, and relational aggression, these categories were collapsed into a single "aggression" code due to the overall low incidence. The results indicated that there was a total of 21 incidences of aggression (average 1.24 per child) observed pre-intervention for the experimental group and a total of 9 incidences of aggression (average .53 per child) observed post-intervention. For the control group, there was a total of 37 incidences of aggression (average 1.83 per child) observed pre-intervention, and a total of 36 observed post-intervention (average 1.80 per child).

Discussion

This study was designed to examine the effectiveness of the Second Step: A Violence Prevention Curriculum/PreK-Kindergarten (Committee for Children 2002) for increasing preschool children's social knowledge and social skills, and for reducing their problem behaviors and rates of aggressive behavior. The study was quasi-experimental in design and as such can allow more confident conclusions about causation than studies which rely on a "pre-experimental" one group design, with no control or comparison group. This study provides support for the use of Second Step with preschool age children, as a means of increasing both their social skills and their social knowledge. Many young children come to kindergarten without the social competencies needed to participate optimally in the kindergarten environment, and social–emotional learning interventions such as Second Step can help to better prepare preschool children and ease their transition to more formal schooling. Discussion of major findings are organized below according to the hypotheses that were posed.

The first hypothesis predicted that preschool children who receive the Second Step intervention would have greater improvement in social–emotional competence than will children in the comparison group. Only children who received the Second Step intervention showed significant gains in social–emotional competence, specifically in knowledge of

social skills and in cooperation, assertion, self-control and total social skills. The large effect sizes for these increases suggest the effectiveness of the Second Step intervention in enhancing preschool children's social knowledge and social skills. The Knowledge of Social Skills measure probed children's ability to generate potential solutions to typical social problem situations, to predict consequences of those solutions, to correctly interpret children's emotions in those situations, and their knowledge of anger management strategies. Unfortunately, the protocol for scoring the interview provides only a single total score and does not allow conclusions about children's scores on particular aspects of the interview. The findings regarding increased social skills are similar to the Ocasio et al. (2015) finding that preschool children experiencing Second Step showed increases in social cooperation, social interaction, and social independence. However, conclusions from those results were limited, since there was no comparison group in that study and because the design made it impossible to separate the possible influence of Second Step and a teacher consultation component of their intervention. Thus, the findings of the current study lend further support to the contribution of Second Step to increases in social skills, as well as increases in social knowledge.

Results suggest that the group who received the Second Step intervention, as compared to the group who did not, showed a reduction in observed aggression. The group that did not receive the intervention showed virtually no reduction in observed aggression from pre- to post-test. In this study, we collected pre- and post- behavioral data for treatment and comparison children. Specifically, 30 min of observational data in the form of running records were collected for each individual child before intervention period, and 30 min for each individual child after the intervention period. These transcripts were then coded for incidences of aggressive behavior. This method was intended to improve upon a previous study (McMahon et al. 2000) which collected behavioral observation data only at the classroom level, and to allow statistical examination of whether there were overall changes in individual children's incidences of aggression. Incidences of aggression were too few, however, to allow for these analyses. Case by case examination of the number of aggressive behavior incidences shows that in the group of children who received Second Step, the overall number of aggressive behaviors dropped from 21 prior to the intervention to 9 after the intervention. For the children who did not receive Second Step, the overall number of aggressive behaviors was 37 prior to the intervention period and 36 after the intervention period. This suggests the possibility that more extensive collection of observational data may allow for statistical analysis which might demonstrate a greater reduction in aggressive behavior for treatment as compared to control children. Alternatively,

since aggressive behavior is a fairly low-incidence behavior, another approach would be to observe and record incidences of pro-social behaviors, to examine whether children in the treatment group show greater increases in prosocial behavior as compared to comparison group children.

The second hypothesis predicted that effects of the Second Step Intervention would differ according to children's initial level of social–emotional competence. Among those children who received the Second Step intervention, those who had been nominated by their teacher as low in social–emotional competence showed significant increases (with large effect sizes) from pre- to post-test in knowledge of social skills and in cooperation, assertion, and total social skills. The children who had been nominated as high in social–emotional competence showed significant increase (with large effect sizes) in cooperation and in total social skills. This suggests the possibility that the Second Step intervention may have broader effectiveness for children who begin with lower social–emotional competence. It is useful to examine differential effects of interventions, to determine for whom a particular intervention works, why it works, toward what ends it works, and under what conditions (Schindler et al. 2017; Shonkoff 2017). Many studies have shown that social–emotional learning interventions have the strongest effects for children who start with lower baseline levels of social competence skills (McClelland et al. 2017). This also suggests the potential effectiveness of Second Step for children living in poverty; it is well-established in the literature that the social and emotional skills of children from low SES backgrounds are less well-developed than those of their more privileged peers (Dearing et al. 2006; Evans and Kim 2013; Raver et al. 2017). Even more disturbing, recent studies suggest that poverty itself exacerbates early social emotional deficits (Erhart et al. 2019; Raver et al. 2015). Such findings provide evidence of the need for effective universal (Tier 1) interventions to support high risk preschoolers' social emotional competence.

Conclusions and Limitations

Due to the quasi-experimental design of this study, we can have greater confidence in its internal validity. In other words, we can more clearly suggest that the differences in outcomes for the experimental group and the comparison group are due to receiving or not receiving the Second Step program, rather than being attributable to other factors such as maturation, testing effects, or the effect of simply being in a novel experimental situation. This is further supported by the absence of differences between the experimental and control group on pre-intervention assessments. However, because the sample size was small and composed of children attending programs characterized as serving primarily middle SES families, future research should seek to replicate these findings with a larger and more diverse or different sample. It would be useful to know more about the effectiveness of this primary intervention with low SES children, who are at greater risk of social–emotional deficits (Dearing et al. 2006; Evans and Kim 2013; Raver et al. 2017). The broader impact of Second Step on the lower social competence children in this study suggests the efficacy of this intervention for low SES children as well. In this study, children were nested within classrooms; future research could use randomized control trials with random assignment at the individual participant level. Future research would benefit from long-term follow up of participants, as well as planned examination of which specific components of the program contribute to child outcomes. Furthermore, this study did not include systematic collection of data to demonstrate fidelity of implementation by the teachers in the experimental group. For further suggestions regarding research on SEL interventions for early childhood, see McClelland et al. (2017).

One strategy that appears to make social–emotional learning interventions more effective is involvement of families, in such a way that children can develop and practice their social skills and knowledge through compatible processes both at home and at school (McClelland et al. 2017). The producers of Second Step have created materials to enable parents to use their teaching processes in the home. While this study did not examine whether these at-home components were being used by parents, future research should be directed toward determining the added value of parent participation in the program.

This study differs from previous preschool studies of Second Step, in that the intervention was delivered by the children's own classroom teachers, rather than by research personnel or clinicians. These teachers had all been using Second Step for at least 1 year, so they presumably had a level of comfort and competence with the program. It is useful to demonstrate that this program can be implemented with success by preschool classroom teachers. This finding aligns with the meta-analytic work of Durlak et al. (2011), which found that classroom teachers and other school support staff effectively conducted a large number of SEL programs.

The early childhood years are an optimal time for preventive intervention in supporting social–emotional competence. Because second step programs are inexpensive and do not impose a heavy implementation burden, it is important to continue to accrue data to demonstrate the utility of second step with a variety of young children. The present study was designed to overcome some of the limitations of previous preschool studies of second step, including reliance on pre-experimental designs and absence of behavioral observation data on individual children. Results suggest that the Second Step Violence Prevention Curriculum/Prek-K can be used

effectively by preschool lead teachers to increase children's social knowledge and social skills, and that these effects may differ according to children's perceived beginning level of social competence. Preliminary evidence suggests that changes in rates of observed aggression can be reduced as well.

Compliance with Ethical Standards

Conflict of interest The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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