The effects of *Positive Action* on preschoolers' social-emotional competence and health behaviors

Sara A. Schmitt, Kendra M. Lewis, Robert J. Duncan, Irem Korucu, Amy R. Napoli

Published: January, 2018
Grant support: IES Grants R305B120013 (PI: G. Duncan)
Citation: Schmitt, S. A., Lewis, K. L., Duncan, R. J., Korucu, I., & Napoli, A. (2018). The effects of Positive Action on preschoolers' social-emotional competence and health behaviors. Early Childhood Education Journal, 46, 141-151. doi: 10.1007/s10643-017-0851-0

Abstract

Children from low-income families are at greater risk for poor social-emotional development and physical health and may be in need of intervention. This study examined the extent to which the *Positive Action (PA)* preschool lessons improved low-income children's social-emotional competence and health behaviors. Mixed findings emerged with regard to whether the lessons facilitated growth in child outcomes. Results showed positive effects of *PA* on children's directly assessed social problem solving skills and their parent-rated social-emotional competence and health behaviors. Unexpectedly, program effects on teacher ratings of social-emotional competence were in the opposite direction. These findings provide preliminary evidence that *PA* may be effective in promoting positive social-emotional and health behavior outcomes for children, particularly when outcomes are assessed directly and by parents.

Key words: social-emotional competence, health behaviors, intervention, preschool

The effects of *Positive Action* on preschoolers' social-emotional competence and health behaviors

Evidence suggests that children from low-income families begin kindergarten at a disadvantage in their school readiness, including academic skills, social-emotional competence, and physical health (Bradley & Corwyn, 2002; Qi & Kaiser, 2003; Woodfield, Duncan, Al-Nakeeb, Nevill, & Jenkins, 2002), which may contribute to long-term social-emotional, educational, and health disparities (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Research indicates that comprehensive, classroom-based interventions can facilitate positive growth in young children's social-emotional readiness for school (Nix et al., 2016); however, less is known regarding whether these types of interventions may also have an impact on children's health-related behaviors (e.g., fruit and vegetable consumption). Emerging evidence suggests that social-emotional development and health-related behaviors may be related in young children (Hughes, Power, O'Connor, & Fisher, 2015), and thus, addressing these two domains simultaneously through classroom-based intervention may be a fruitful endeavor. In this study, we explore whether the *Positive Action* (*PA*) preschool program, a classroom-based, social-emotional learning and health promotion program, has an impact on children's social-emotional competence and health behaviors.

Importance of Developing Social-Emotional Competence and Healthy Behaviors

Social-emotional competence is broadly defined as the development of a child's capacity to behave appropriately in social situations by regulating his/her own emotions (Denham, 2006). The development of social-emotional skills begins in infancy, and continues in early childhood when children begin developing relationships with peers and adults in multiple settings. Studies have shown that the development of strong social-emotional competence in preschool is

necessary for successful interactions with peers and adults, and such interactions may lead to better school adjustment and academic success (Ladd, 1999). In contrast, deficiencies in early social-emotional skills are linked with behavioral problems such as aggressive tendencies, bullying, and poor problem solving (Laursen & Pursell, 2009).

Physical health is also an important predictor of school readiness and educational outcomes. Evidence suggests that children who have developed healthy behaviors (e.g., consumption of healthy foods) tend to have better physical health as well as stronger grades and more adaptive classroom behaviors (Fedewa & Ahn, 2011). In contrast, children who have not developed healthy behaviors are at risk for physical health problems and difficulties in school (Florence, Asbridge, & Veugelers, 2008). Thus, it is likely important to help children develop healthy behaviors when designing effective school-based interventions. Although research suggests that parents play a vital role in establishing preschool children's behavioral patterns (Benton, 2004), literature also documents that programs implemented in preschool settings can have a significant impact on health behaviors (Joseph, Gorin, Mobley, & Mobley, 2015).

An emerging body of research suggests that social-emotional competence and health may be related constructs. For example, evidence suggests that preschool children's weight status is associated with their social skills and behavioral adjustment over time (Tandon, Thompson, Moran, & Lengua, 2015). This is not surprising given that behavioral patterns in both the social and physical health domains are developing during the early childhood period (Birch & Fisher, 1998). Further, with samples of older children and adults, health-related behaviors, such as physical activity and consuming healthy and nutrient-rich foods are related to emotional intelligence and learning (Basch, 2011; London & Castrechini, 2011). As such, targeting these two constructs in classroom-based interventions may be an effective approach for promoting

school readiness and long-term academic success.

Disparities in Social-Emotional Competence, Health Behaviors, and School Readiness

In the United States, more than 1 in 5 children live in poverty (U.S. Census Bureau, 2011). Studies suggest that children from low-income families may be at elevated risk for both physical health problems and poor social-emotional development, which can lead to behavior problems and classroom difficulties (Qi & Kaiser, 2003). These deficits in important school readiness skills may play a significant role in the achievement gap between poor and non-poor children that is already present at kindergarten entry. Although children from low-income families may struggle with school readiness skills and health behaviors, they also typically benefit the most from interventions. In a review on behavioral interventions in preschool, Diamond and Lee (2011) reported that, in general, children coming from lower-income families experience the greatest improvements in school readiness as a result of intervention participation.

Intervention Research

Recent intervention work indicates that social-emotional skills are malleable in preschool and can be taught through classroom-based lessons (Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008). For example, the PATHS curriculum (used as part of the Head Start REDI curriculum) includes a series of lessons that are designed to promote preschool children's social-emotional competence and reduce problem behaviors. Several studies have indicated short- and longer-term positive effects of PATHS on preschool children's social competence as well as their emotion knowledge (Bierman et al., 2008; Nix et al., 2016). Similarly, there is evidence that children's health-related behaviors can be improved through intervention (Dauenhauer, Keating, & Lambdin, 2016), although few studies have focused on preschool children (Wolfenden et al, 2012). Data from some of this work suggests that health-related behaviors, such as fruit and

vegetable consumption, can be promoted through classroom-based interventions implemented at preschools (Witt & Dunn, 2012). From a health promotion perspective, theoretical frameworks, such as the Theory of Triadic Influence, suggest that interventions designed to improve health behaviors likely have greater effects when more distal and proximal factors, such as social-emotional components, are also included (Flay, Snyder, & Petraitis, 2009). Notably, *PA* has been effective in promoting health-related behaviors for older children (Bavarian et al., 2016).

The *Positive Action (PA)* Program. Taken together, evidence suggests that intervention and prevention efforts that target the domains of social-emotional competence and health behaviors may be particularly important for children from high-risk backgrounds (e.g., low-income families). The *PA* program focuses on promoting and strengthening positive behaviors that foster social-emotional, intellectual, and physical health (Flay & Allred, 2010). *PA* is guided by social learning as well as social cognitive theories and prior evidence on effective strategies for changing children's behavior. These theories posit that in order to see behavioral change, children must develop strong self-efficacy and learn to accurately interpret environmental cues and effectively deal with social problems (Luszczynska & Schwarzer, 2005). *PA* aims to build children's self-efficacy and social-emotional competence by giving them the tools and confidence to be able to engage in positive behaviors, including health-related behaviors. Extant literature has demonstrated the efficacy of *PA* for a variety of outcomes, including short-and long-term academic achievement (Flay & Allred, 2010), prosocial behavioral trajectories (Lewis et al., 2016), emotional well-being (Lewis et al., 2013), and health behaviors (Bavarian et al., 2016). Given these beneficial effects for older children and adolescents, and a recent focus on the importance of integrating social-emotional learning into preschool programs (Jones & Bouffard, 2012), the *PA* creators developed a curriculum designed for preschool classrooms.

To date, just one evaluation has been conducted on the preschool program (Schmitt et al., 2014). Results from this pilot study indicated that teachers found program implementation feasible and children were highly engaged, enjoyed the activities, and were able to understand the content. In addition, results suggested that the *PA* preschool program lessons were effective in improving teacher ratings of children's social-emotional competence and behavior. However, there were several limitations to this preliminary evaluation, including a quasi-experimental design, utilization of just one teacher-reported measure of children's skills and behaviors, and limited fidelity of implementation assessment.

The Current Study

Using a randomized controlled design, the current study examined whether: 1) children who participated in *PA* demonstrated improvements across several social-emotional competence and health behaviors measures, including parent reports, teacher reports, and a direct assessment, and 2) teachers could effectively implement *PA* with fidelity and engage children in *PA* lessons. It was hypothesized that relative to a control group, children who participated in *PA* would demonstrate greater improvements in their social-emotional competence and health behaviors. It was also expected that fidelity of implementation would be high.

Method

Participants

The current sample consisted of 75 children (47% female; $n = 40$ in intervention classrooms, $n = 35$ in control classrooms) enrolled in 10 preschool classrooms across 5 sites located in the Midwestern region of the United States. Informed consent was obtained from the parents of all children participating in the study. Consent forms were sent home to children in all classrooms, and approximately 50% of consent forms were returned. All of the sites primarily

served low-income children (e.g., 3 of the 5 sites were Head Start centers; 2 of the sites were community-based child care centers in low-resource neighborhoods); however, average parent education was significantly lower at Head Start centers ($M = 3.08$, $SD = 1.05$ versus $M = 5.09$, $SD = 1.86$; $t(72)=5.99$, $p<.001$). Children and families were recruited through letters sent home in the fall of the preschool year or through parent recruitment nights. Children ranged in age from 30 to 62 months ($M = 51.07$, $SD = 6.70$). Sixty-four percent of the sample was Caucasian, 6% were African American, 8% were Hispanic, and 22% were Multiracial. Twenty percent of parents in the sample had less than a high school diploma, 35% had a high school diploma or GED, 23% had some college, and 22% had a college or graduate degree. Participating families received a $20 gift card, and participating teachers received a $40 gift card. All teachers reported that they did not currently use a social-emotional learning or health curriculum in their classrooms.

Procedure

Prior to the study period, the Principal Investigator worked with *PA* staff to develop an implementation schedule of lessons that fit the study duration for implementation (15 weeks). Research assistants that administered direct assessments were blind to condition. Furthermore, in an attempt to keep parents blind to condition, the research team did not communicate assignment to parents, and teachers were asked to not share this information with parents as well. In the fall at study baseline, parents were asked to complete demographic questionnaires.

Pre-test and post-test data collection. In the fall (prior to intervention implementation) and again in the spring (following intervention implementation), parents and teachers were asked to rate children's social-emotional competence as well as health behaviors on the Student Rating Scale (Schmitt et al., 2014). Parents also completed a separate scale measuring child health

behaviors. Teachers were asked to rate children's social skills and problem behaviors on the Social Skills Improvement Rating Scale (Gresham & Elliot, 2008). Finally, a direct assessment measuring children's social problem solving skills (Aber, Brown, Jones, & Samples, 1995) was administered by trained research assistants and took approximately 10 minutes to complete.

Intervention. Following pre-test data collection, teachers were randomly assigned to a *Positive Action* (*PA*; intervention) condition or a control condition (business-as-usual). Control teachers were asked to conduct their classrooms as they would normally and to not introduce new curricula focused on social-emotional learning or health during the study. After study completion, all control teachers received the intervention materials. Teachers in the treatment condition (n = 5) attended a 3-hour *PA* training workshop hosted by *PA* staff via webinar. Teachers also received classroom kits containing materials and detailed lesson plans. During the training, teachers were first introduced to the *PA* model, philosophy, and six units. Then, teachers learned about previous research and evaluations of *PA* and associated outcomes. Finally, the teachers worked with the materials in the classroom kit and became familiar with the lessons and content. Immediately following the training workshop, teachers completed an evaluation of the training. On a 5-point scale (1 = poor, 5 = excellent), teachers rated the trainer, workshop content, and overall training. Overall, teacher ratings were high across these domains (trainer M = 4.50; workshop content M = 4.75; overall training M = 4.75). After the initial training, teachers in the intervention condition implemented the *PA* curriculum and teachers in the control condition delivered business-as-usual curricula. Control teachers reported implementing no social-emotional or health-focused curricula during the study.

Over the course of 15 weeks, intervention teachers implemented 64, 10-15 minute daily scripted lessons that were integrated into the regular curriculum. All children in the intervention

classrooms participated in the lessons; however, pre- and post-test data were only collected on those with parent consent. The lessons were based on six units: Unit 1: understanding of *PA* and self-concept; Unit 2: physical health and intellectual health; Unit 3: self-management and self-control; Unit 4: respect, considerate, and social bonding; Unit 5: honesty with self and others; and Unit 6: self-improvement (see Schmitt et al., 2014 for an overview of unit themes and goals). Each unit builds on the prior unit(s) and becomes slightly more complex. Lessons utilized a variety of age-appropriate strategies and methodologies (e.g., puppets, manipulatives, games, music, stories; Allred, 2009). Within all lessons, there are opportunities for children to engage with the materials and discuss concepts to ensure active learning. For a more comprehensive description of the lessons, see the *Positive Action* website (https://www.positiveaction.net/).

Measures

Student Rating Scale. The Student Rating Scale (Schmitt et al., 2014), a parent and teacher report, consists of 33 items assessing the different social-emotional domains and health behaviors that the *PA* program addresses (i.e., understanding of *PA*, self-concept, health behaviors, intellectual health, self-management, self-control, respect, consideration, social bonding, honesty, and self-improvement). Accordingly, the Student Rating Scale consists of 11 subscales, consisting of three items each. For each item, parents and teachers were asked to rate how much the item described the child's behavior on a 7-point scale from not at all (1) to very much (7). Example items include "Follows rules, accepts limits, and cleans up his/her mess when asked" (self-management) and "Likes to eat healthy food and avoid unhealthy foods" (health behaviors). A mean score was calculated for the total scale (all 33 items). The responses for three negatively worded items were reversed before calculating the average, so that higher scores on all scales represented better behavior. This scale has demonstrated strong reliability in previous

work (Schmitt et al., 2014) and in the current study (parent-report α pre-test = .94; post-test = .97; teacher-report α pre-test = .97; post-test = .96).

Social Skills Improvement System-Rating Scale (SSIS-RS). The SSIS-RS is a teacher report that assesses children's social skills and problem behaviors (Gresham & Elliot, 2008). The scale consists of 76 items (46 for the social skills domain and 30 for the problem behaviors domain). Example items include: "interacts well with other children" (social skills domain) and "gets distracted easily" (problem behaviors domain). Frequencies of behaviors are scored on a 4-point scale (0 = never, 3 = almost always). Mean scores were created for the two scales: social skills and problem behaviors. The scales demonstrated strong internal consistency in the sample (α social skills pre-test = .97, post-test = .94; problem behaviors pre-test = .94, post-test = .96).

Health behaviors scale. Parents completed an 11-item survey assessing the frequency of their child's health behaviors. This measure was adapted from the student self-report version utilized in a prior study of *PA* (Bavarian et al., 2016). Example items include: "my child eats fresh fruits and vegetables" and "my child exercises hard enough to make him/her sweat and breathe hard." Frequencies of behaviors were scored on a 4-point scale (1 = never, 4 = always). A mean score was created to represent the frequency of health behaviors, with higher scores indicating higher frequency of healthy behaviors. This assessment demonstrated good internal consistency in the current sample (α pre-test = .73, post-test = .78).

Social problem solving. A direct assessment was administered that measured each child's social problem solving skills (Aber et al., 1995). Children were presented with five vignettes and associated pictures describing various social scenarios. After the experimenter read each vignette aloud, the child was provided with five different responses to each scenario and chose which best described how he or she would respond. An example of one vignette is: "Pretend this is YOU

and this is a boy or girl in your class. The other child has been on the swing for a long, long time and doesn't seem to want to share the swing with you. You would really like to play on the swing. What would you say or do so that you could play on the swing? Would you …" Response choices were as follows: A. say, "You'd better let me play?" B. ask them to share the swing? C. ask the teacher to make them get off the swing? D. tell the teacher to not let them play anymore? E. just leave? One variable was created from each vignette to assess whether children's responses were aggressive or not (0 = not aggressive response; 1 = aggressive response). For example, in the vignette provided above, answers B, C, D, and E were scored as 0, and A was scored as 1. Inter-item consistency was fairly low for this scale (α pre-test = .36, post-test = .55); however, there were only five items and the frequency with which children responded aggressively was relatively low, both of which have an impact on Cronbach's alpha.

Teacher implementation survey. Each week, intervention teachers completed an implementation survey that included questions related to curriculum delivery and attitudes about the *PA* program. An example item related to curriculum delivery included: "How many lessons did you teach this week?" Items also included frequency questions, such as "How often did you deliver the lessons as was intended?" These items were rated on a 4-point scale (1 = rarely, 4 = always). Example items related to attitudes about *PA* included: "The more effort I put into the *Positive Action* lessons, the more effective they are" and "The time required by *Positive Action* is well worth it in improved student behavior and classroom management." These items were rated on a 4-point scale (1 = strongly disagree, 4 = strongly agree).

Observation of implementation fidelity. Independent observers visited intervention classrooms biweekly to assess adherence and quality of implementation as well as child engagement. Observers rated adherence and quality of implementation on several items on a 3-

point scale ranging from not at all (*0*) to very much (*3*). An example item of implementation adherence is: "Teacher followed lesson procedures." An example item of implementation quality is: "Teacher kept a positive tone throughout the lesson." Observed child engagement was assessed using similar procedures as Ling and Barnett (2013). Throughout the lesson, observers used a stopwatch to track time. After each one-minute interval, observers would scan the room and count the number of children who were engaged in the lesson (i.e., oriented toward teacher). The total number of children engaged was then recorded. Following lesson implementation, the total number of engaged children during each one-minute interval was divided by the number of children present. The percentage of children engaged across all of the one-minute intervals was averaged to create an overall child engagement variable across all observations.

Analyses

All analyses were conducted in Stata version 14. Multivariate regression analyses that used the generalized Huber-White sandwich estimator to adjust standard errors for non-independence (clustering by classroom) were conducted to test the effects of *PA* on children's social-emotional competence and health behaviors. In each analysis, standardized post-test scores were regressed on condition (0 = control, 1 = intervention), pre-test scores, child age, gender, and race (race coded as white versus non-white). Post-test scores were standardized in order to interpret the estimated standard deviation change in the outcome (i.e., a standardized effect size). Additionally, full information maximum likelihood estimators were used to take advantage of all available data, which provide less biased estimates that listwise deletion.

Although no significant differences emerged between groups at baseline with regard to children's pre- or post-intervention outcomes or control demographics, there were significant baseline differences between children in the control group and children in the intervention group

on two variables: half-day versus full-day classrooms and Head Start versus non-Head Start programs. However, we did not include these variables as baseline covariates in our models because these they were highly confounded with the intervention variable. Specifically, the large majority of children in the intervention attended Head Start (89.47%), which were all half-day programs. The small sample size and lack of coverage of program type across groups prevents accurately estimating the contributions of these two different effects (i.e., preschool type and classroom time) independent of the intervention assignment. Therefore, effect sizes (ES) presented are the predicted intervention effect on the standardized post-test score conditional on children's pre-test score, sex, age, and race (all of which did not significantly differ by condition).

Descriptive statistics were used to analyze fidelity and engagement data. We only report on descriptive statistics rather than inferential regression estimates due to a lack of power as the fidelity sample was restricted to only children in the *PA* program (n = 15 – 33). The regression-estimated effects of student engagement, teacher implementation, and teacher attitudes on outcomes for children in *PA* are available by request.

Sensitivity and attrition analyses. As a sensitivity analysis, we present regression models in which standardized post-test scores were regressed on condition and pre-test scores only and there were no adjustments for clustering or demographics. We also present independent samples t-tests on child post-test scores (unstandardized) as the unconditional program effects. We tested whether any outcomes or demographics differed by condition. There were few significant demographic differences (white children had more post-intervention reports completed) and, for outcomes, there were significantly fewer teacher reports at post-intervention for the control group, which may be due to one control teacher not completing any post-

intervention reports.

Post-hoc power analysis. We focus primarily on the substantive significance rather than the statistical significance in part because the study was underpowered. When calculating power, we considered how variations in the sample size and effect size would influence the likelihood of finding statistically significant results. For example, if the true effect size was .25 and our sample was 75 (the number recruited for participation), we would only detect a statistically significant effect 19% of the time. Furthermore, if the true effect size was actually .50 and the sample was 75, we would still only detect a statistically significant effect 56% of the time. Finally, due to missing data on parent reports, some outcomes had as few as 27 observations. In this scenario, our likelihood of reaching statistically significance drops to 9% of the time for a true effect size of .25 and 23% of the time for a true effect size of .50. Thus, statistical significance and substantive significance are both considered when interpreting our results.

Results

Descriptive analyses

Correlations between measures at time 1 (pre-test) and time 2 (post-test) are reported in Table 1. In general, correlations among measures were higher among common assessors (e.g., teachers) than among common constructs (e.g., Student Rating Scale). The direct assessment of Aggressive Problem Solving was not significantly correlated with parent or teacher ratings, with the exception of parent ratings of the Student Rating Scale at time 1 ($r = -.24$, $p < .001$). The pre- and post-test means and standard deviations for the control and the *PA* groups are shown in Table 2, as well as t-tests for differences at each time point. Children in the *PA* and control group did not significantly differ on any of the baseline measures of social-emotional competence and health behaviors. At post-test, children in the *PA* group were marginally higher on parent-rated

health behaviors, but also marginally lower on teacher-rated social skills.

Effects of *PA* on Social-Emotional Competence and Health Behaviors

Results demonstrated program effects in the intended directions for the two parent-rated measures and the direct assessment (see Figure 1), although none of these findings were significant at the $\alpha = .05$ level. That is, children who participated in the *PA* program showed greater improvements on the parent-rated Student Rating Scale compared to children in the control group (effect size [*ES*] = .70, standard error [*SE*] = .42). Parents rated children who participated in *PA* as roughly two-thirds of a standard deviation better on the Student Rating Scale (which included health behaviors) at post-test than children in the control group. Furthermore, children who participated in *PA* showed greater improvements on the parent-rated Health Behaviors Scale compared to the control group (*ES* = .29, *SE* = .24). That is, parents rated children in the *PA* condition as engaging in more healthy behaviors at post-test compared to children who were not in *PA*, roughly equivalent to one-third of a standard deviation increase in healthy behaviors. Finally, children who participated in *PA* had fewer aggressive responses on the Social Problem Solving direct assessment compared to the control group (*ES* = -.29, *SE* = .30). This effect is equivalent to roughly one quarter of a standard deviation fewer aggressive responses on situational vignettes.

Unexpectedly, and inconsistent with the parent ratings and direct assessment, the teacher ratings showed iatrogenic (i.e., non-beneficial) program effects (see Figure 1). Children who participated in *PA* showed fewer improvements on the teacher-rated Student Rating Scale (*ES* = -.24, *SE* = .25), equivalent to roughly one quarter of a standard deviation worse. Children who participated in *PA* showed fewer improvements on the teacher-rated SSIS-RS (*ES* = -.54, *SE* = .42), equivalent to roughly half of a standard deviation worse. Finally, children showed increases

in behavior problems as assessed by the SSIS-RS (*ES* = .12, *SE* = .36). Therefore, from the teachers' perspective, children who participated in the *PA* program generally demonstrated poorer social-emotional outcomes than control children. However, teachers were aware of program assignment whereas direct assessors and parents were not.

Sensitivity analyses. The sensitivity analyses revealed similar results. However, two of the six models were statistically significant at the α = .05 level: teacher-rated SSIS-RS (*ES* = -.51, *SE* = .24, *p* = .04) and parent-rated Student Rating Scale (*ES* = .65, *SE* = .29, *p* = .03). Independent samples t-tests revealed no significant results.

Fidelity of Implementation and Child Engagement

On average, over the course of 15 weeks, teachers reported delivering nearly four lessons each week (*M* = 3.50, *SD* = .41) that ranged from 10-15 minutes each, which was the targeted duration and dosage. Teachers also indicated that, on average, they implemented the lessons as intended (*M* = 3.22, *SD* = .38; between often and always on the scale). Furthermore, teachers largely reported very positive attitudes regarding the *PA* program and its utility (*M* = 3.63, *SD* = .18; between agree and strongly agree). Observations of implementation fidelity generally mirrored those of teacher reports. Across seven observations, observers rated children as being highly engaged in *PA* lessons the majority of the time (mean percentage of child engagement = 84.31%, SD = 3.99; range = 80.5% - 91.49%). Moreover, on average, adherence and quality of implementation scores from observations were high (*M* = 2.40, *SD* = .28 on a 3-point scale). In general, teachers reported implementing the program with fidelity, teachers reported positive attitudes toward the program, and children were engaged in the *PA* lessons.

Discussion

In the present study, mixed results emerged regarding the effectiveness of *PA* on social-

emotional outcomes and health behaviors for children primarily from low-income families. Although not statistically significant, parents reported improvements on the Student Rating Scale and health behaviors for children who participated in *PA* compared to a control group. Further, results indicated that the *PA* program decreased aggressive responses to the social problem solving direct assessment (though not statistically significant). In contrast, the *PA* program effects on teacher ratings were in the iatrogenic direction, though also not statistically significant. Teachers rated children who participated in *PA* as having poorer social-emotional skills compared to a control group.

Both observed and teacher-rated fidelity results indicated that *PA* teachers implemented the intended number of lessons, generally taught lessons as intended, and had positive attitudes about the program. Furthermore, observed child engagement was high during lesson implementation. This study provides evidence that the *PA* preschool program is feasible for early childhood teachers and may be effective in promoting positive social-emotional and health behaviors; however, this study also calls attention to potential issues with measurement and study design when evaluating classroom-based interventions.

PA Effects on Social-Emotional Competence and Health Behaviors

Results from analyses using parent reports and a direct assessment suggest that the *PA* program shows preliminary evidence for improving children's social-emotional competence. Although not statistically significant, the effect sizes were comparable to those documented in other intervention studies focused on social-emotional development (Bierman et al., 2008; Durlak et al., 2011), and the effect size for the Student Rating Scale exceeded those reported in previous studies. These findings are important given empirical evidence for pervasive gaps in these domains for children from high-risk populations (Qi & Kaiser, 2003). Indeed, research

suggests that children from low-income families often enter kindergarten with lower levels of social-emotional functioning (Qi & Kaiser, 2003), and poorly developed social skills in early childhood can have long-term implications for children's development (Denham et al., 2003). Identifying effective interventions that can be implemented prior to formal school entry may be critical for alleviating disparities and potentially improving developmental trajectories for children from disadvantaged backgrounds.

In contrast to parent reports and direct assessment, results showed negative effects (though not statistically significant) on teacher-reported social-emotional competence as a result of *PA* participation. These findings are inconsistent with the previous evaluation of the *PA* preschool program that demonstrated positive effects of *PA* lessons on children's teacher-rated social-emotional skills (Schmitt et al., 2014). There are a few possible explanations for these discrepant results. For instance, in the first evaluation (Schmitt et al., 2014), teachers were not randomly assigned to implement the intervention as they were in the current study. This self-selection could have resulted in teachers being more favorable to the program, and perhaps, over-reporting positive effects. Indeed, unlike the current study, there were significant pre-test differences on teacher ratings of children's social-emotional skills in the Schmitt et al. (2014) study, suggesting children were not equivalent across groups at baseline.

Another potential explanation is with regard to teacher training prior to *PA* implementation. In the first evaluation, teachers did not receive training from *PA* staff on the program or on how to implement it. In the current study, teachers assigned to implement the intervention attended a 3-hour training workshop on the *PA* program delivered by *PA* staff. This training focused on how to effectively implement the *PA* lessons, as well as previous research and evaluations of *PA* and associated outcomes. Including previous research as part of the

training was intended to enhance teacher buy-in of the program, although it is possible that it created a bias in teachers that had an inadvertent effect on their ratings of children. Specifically, reference bias may have emerged, such that following training, intervention teachers may have upwardly redefined their definition of what strong social-emotional skills look like in early childhood and what sort of impact *PA* would have on these skills and thus, rated children more critically. Indeed, this type of reference bias has emerged in other literature looking at self-report (West et al., 2015). Similarly, teachers may have been more sensitive to, and aware of, the behaviors the program intends to improve as a result of explicitly teaching the skills. This sensitivity and awareness may have resulted in teachers noticing the behaviors/skills (positive and negative) in the classroom more than teachers who were assigned to the control condition and, in turn, reporting them more or less frequently on the surveys.

Finally, although control teachers were given access to intervention materials following the study, they may have unintentionally rated children as being higher or lower on certain skills as a result of compensatory rivalry (Shadish, Cook, & Campbell, 2002), or believing that despite not getting an intervention, children in their classrooms were showing improvement in social-emotional skills. As in any evaluation, caution should be exercised when utilizing ratings of children's behavior that are completed by the same people who delivered the intervention. Evidence suggests stakeholders should be particularly cautious of using teacher report in evaluation work as these reports come with a host of limitations, including misinterpretation of items, lack of accuracy, and social desirability bias (Duckworth & Yeager, 2015).

Notably, the *PA* program is one of the first early childhood interventions designed to improve social-emotional competence *and* health behaviors simultaneously, and results suggest that participation in *PA* has the potential to improve children's health behaviors over the course

of the preschool year. Physical health is an important component of school readiness, and although early childhood programs often include services related to certain aspects of child health (e.g., hearing screenings), promoting healthy behaviors is often overlooked in early childhood intervention efforts. Explicitly teaching children positive health behaviors in preschool may be important as this is when many behavioral health patterns are being established.

Fidelity of Implementation

Descriptive results from teacher ratings and independent observations indicated that teachers implemented the program with fidelity and had positive attitudes toward the program, and that children were engaged in the activities. These findings are important because the quality with which teachers are implementing the lessons and the extent that children are engaged with *PA* content can have an impact on whether the intervention will positively affect the intended outcomes (Pettigrew et al., 2015). Indeed, previous research suggests that when teachers can feasibly implement a classroom-based intervention focused on social-emotional functioning, children are more likely to demonstrate improvements in these skills (Durlak et al., 2011).

Limitations

Although this study has a number of strengths relative to the previous preschool *PA* evaluation, limitations must be noted. First, our sample was relatively small, particularly for post-program parent reports. The small sample size limited the analyses that could be conducted and created large standard error estimates. Furthermore, differences between the intervention and control groups were present on program type (i.e., Head Start versus non Head Start; full-day versus half-day) indicating that the randomization may have failed to distribute differences equally across conditions. Importantly though, children did not significantly differ by condition on pre-test measures of social-emotional competence and health behaviors or demographic

characteristics. It will be critical for future *PA* evaluations to recruit larger samples to confirm that results hold across different types of early childhood programs.

Another limitation worth noting is that we found low correlations between teacher and parent reports of the same measure. That is, construct validity is called into question when measures administered by different assessors but intended to tap the same, or similar, constructs are unrelated. For example, parent and teacher ratings of the Student Rating Scale were only correlated at .36 at pretest and .07 at posttest. Furthermore, the direct assessment of aggressive behaviors was only significantly related to parent-ratings on the Student Rating Scale at pretest, and unrelated to all other social-emotional competence measures. Finally, similar to potential issues of relying on teacher reports noted above, there may also be limitations when using parent reports as well, including small reference groups and reporter bias. Measurement issues of social-emotional skills are a pressing concern for the field of early childhood development and a need for well-validated, reliable measures is necessary to better understand intervention effects and to generalize findings across studies (Jones, Zaslow, Darling-Churchill, & Hallie, 2016).

Conclusion

This study provides preliminary evidence that the *PA* preschool lessons may improve children's parent-rated social-emotional competence and health behaviors, as well their social problem solving skills. Further, results suggest that teachers can implement *PA* with fidelity and that children enjoy the lessons. Children from low-income families may be at elevated risk for poor social-emotional functioning and health (Qi & Kaiser, 2003), and thus, identifying feasible and effective interventions aimed to improve these important components of school readiness is critical. The *PA* preschool program deserves continued refinement, and more evaluation research is needed to unpack these promising, yet conflicting results.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

References

Aber, J. L., Brown, J. L., Jones, S., & Samples, F. (1995). Adapting measures of children's beliefs, attributions and skills for use in the evaluation of violence prevention projects: New York: National Center for Children in Poverty, Columbia University.

Allred, C. G. (2009). *Prekindergarten Instructor's Manual*. Twin Falls, ID: Positive Action, Inc.

Basch, C. E. (2011). Breakfast and the achievement gap among urban minority youth. *Journal of School Health, 81*, 635–640.

Bavarian, N., Lewis, K. M., Acock, A., DuBois, D. L., Yan, Z., Vuchinich, S., . . . Flay, B. R. (2016). Effects of a school-based social–emotional and character development program on health behaviors: A matched-pair, cluster-randomized controlled trial. *The Journal of Primary Prevention*, 1-19. doi:10.1007/s10935-016-0417-8

Benton D. (2004). Role of parents in the determination of the food preferences of children and the development of obesity. *International Journal of Obesity, 28*, 858-869. doi:10.1038/sj.ijo.0802532

Bierman, K. L., Nix, R. L., Greenberg, M. T., Blair, C., & Domitrovich, C. E. (2008). Executive functions and school readiness intervention: Impact, moderation, and mediation in the Head Start REDI program. *Developmental Psychopathology, 20,* 821-843. doi:10.1017/S0954579408000394

Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics, 101,* 539-549.

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual*

Review of Psychology, 53, 371-399. doi:0084-6570/02/0201-0371$14.00

Dauenhauer, B., Keating, X., & Lambdin, D. (2016). Effects of a three-tiered intervention model on physical activity and fitness levels of elementary school children. *The Journal of Primary Prevention, 37*(4), 313-327. doi:10.1007/s10935-016-0430-y

Denham, S. A. (2006). Social-emotional competence as support for school readiness: What is it and how do we assess it? *Early Education and Development, 17*, 57-89, doi:10.1207/s15566935eed1701_4

Denham, S. A., Kimberly, A. B., DeMulder, E., Levitas, J., Sawyer, K., Auerbach-Major, A., & Queenan, P. (2003). Preschool emotional competence: Pathway to social competence? *Child Development, 74*, 238-256. doi:10.1111/1467-8624.00533

Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science, 333*, 959–964. doi:10.1126/science.1204529

Duckworth, A. L., & Yeager, D. S. (2015). Measurement matters: Assessing personal qualities other than cognitive ability for educational purposes. *Educational Researcher, 44,* 237-251. doi:10.3102/0013189X15584327

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions, *Child Development, 82,* 405-432. doi:10.1111/j.1467-8624.2010.01564.x.

Fedewa, A. L., & Ahn S. (2011). The effects of physical activity and physical fitness on children's achievement and cognitive outcomes: a meta-analysis. *Research Quarterly for Exercise & Sport*. *82*, 521–35. doi:10.1080/02701367.2011.10599785

Flay, B. R., & Allred, C., G. (2010). The Positive Action Program: Improving academics,

behavior and character by teaching comprehensive skills for successful learning and living. In T. Lovat & R. Toomey (Eds.), *International handbook on values education and student well-being* (pp. 471–501). Dortrecht, Netherlands: Springer.

Flay, B. R., Snyder, F., & Petraitis, J. (2009). The Theory of Triadic Influence. In R. J. DiClemente, M. C. Kegler & R. A. Crosby (Eds.), *Emerging Theories in Health Promotion Practice and Research* (Second ed., pp. 451-510). New York: Jossey-Bass.

Florence, M. D., Asbridge, M., & Veugelers, P. J. (2008). Diet quality and academic performance. *Journal of School Health, 78,* 209-215. doi:10.1111/j.1746-1561.2008.00288.x

Gresham F. M, & Elliott, S. N. (2008). The Social Skills Improvement System Rating Scales. San Antonio, TX: Pearson.

Hughes, S. O., Power, T. G., O'Connor, T. M., & Fisher, J. O. (2015). Executive functioning, emotion regulation, eating self-regulation, and weight status in low-income preschool children: How do they relate? *Appetite*, *89*, 1-9. doi:10.1016/j.appet.2015.01.009

Jones, S. M., & Bouffard, S. M. (2012). Social and emotional learning in schools: From programs to strategies. *Society for Research in Child Development Social Policy Report, 26,* 1–33.

Jones, S. M., Zaslow, M., Darling-Churchill, K. E., & Halle, T. G. (2016). Assessing early childhood social and emotional development: Key conceptual and measurement issues. *Journal of Applied Developmental Psychology*. doi:10.1016/j.appdev.2016.02.008

Joseph, L. S., Gorin, A. A., Mobley, S. L., & Mobley, A. R. (2015). Impact of a short-term nutrition education child care pilot intervention on preschool children's intention to choose healthy snacks and actual snack choices. *Childhood Obesity, 11*, 513-520.

doi:10.1089/chi.2015.0028

Ladd, G. W. (1999). Peer relationships and social competence during early and middle childhood. *Annual Review of Psychology*, *50*, 333-359. doi:10.1146/annurev.psych.50.1.333

Laursen, B. & Pursell, G. (2009). Conflict in peer relationships. In K.H. Rubin, W.M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp.267-286). New York: The Guilford Press.

Lewis, K. M., DuBois, D. L., Bavarian, N., Acock, A., Silverthorn, N., Day, J., . . . Flay, B. (2013). Effects of Positive Action on the emotional health of urban youth: A cluster-randomized trial. *Journal of Adolescent Health, 53,* 706-711. doi:10.1016/j.jadohealth.2013.06.012

Lewis, K. M., Vuchinich, S., Ji, P., DuBois, D. L., Acock, A., Bavarian, N., . . . Flay, B. R. (2016). Effects of the positive action program on indicators of positive youth development among urban youth. *Applied Developmental Science, 20*, 16-28. doi:10.1080/10888691.2015.1039123

Ling, S. T., & Barnett, D. W. (2013). Increasing preschool student engagement during group learning activities using a group contingency. *Topics in Early Childhood Special Education, 33,* 186-196. doi:10.1177/0271121413484595

London, R. A., & Castrechini, S. (2011). A longitudinal examination of the link between youth physical fitness and academic achievement. *Journal of School Health, 81*, 400–408.

Luszczynska, A., & Schwarzer, R. (2005). Social Cognitive Theory. In M. Conner & P. Norman (Eds.), *Predicting Health Behavior* (2nd edition, pp. 127-169). Buckingham: Open University Press.

Nix, R. L., Bierman, K. L., Heinrichs, B. S., Gest, S. D., Welsh, J. A., & Domitrovich, C. E. (2016). The randomized controlled trial of Head Start REDI: Sustained effects on developmental trajectories of social–emotional functioning. *Journal of Consulting and Clinical Psychology, 84*, 310-322. doi:10.1037/a0039937

Pettigrew, J., Graham, J. W., Miller-Day, M., Hecht, M. L., Krieger, J. L., & Shin, Y. J. (2015). Adherence and delivery: Implementation quality and program outcomes for the seventh-grade keeping' it REAL program. *Prevention Science, 16*, 90–99. doi:10.1007/s11121-014-0459-1

Qi, C. H., & Kaiser, A. P. (2003). Behavior problems of preschool children from low-income families: A review of the literature. *Topics in Early Childhood Special Education, 23,* 188-216. doi:10.1177/02711214030230040201

Rosenthal, M. K., & Gatt, L. (2010). 'Learning to Live Together': Training early childhood educators to promote socio-emotional competence of toddlers and pre-school children. *European Early Childhood Education Research Journal*, *18*, 373-390. doi:10.1080/1350293X.2010.500076

Schmitt, S. A, Flay, B. R., & Lewis, K. (2014). A pilot evaluation of the *Positive Action* prekindergarten lessons. *Early Child Development and Care, 184,* 1978-1991. doi:10.1080/03004430.2014.903942

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin Company.

Tandon, P., Thompson, S., Moran, L., & Lengua, L. (2015). Body mass index mediates the effects of low income on preschool children's executive control, with implications for behavior and academics. *Childhood Obesity, 11*(5), 569-576.

U.S. Census Bureau (2011). Child poverty in the United States 2009 and 2010: Selected race groups and Hispanic origin. American Community Survey Briefs. Retrieved from www.census.gov/prod/2011pubs/acsbr10-05.pdf

West, M. R., Kraft, M. A., Finn, A. S., Martin, R. E., Duckworth, A. L., & Gabrieli, J. D. E. (2015). Promise and paradox: Measuring students' non-cognitive skills and the impact of schooling. *Educational Evaluation and Policy Analysis, 38,* 148-170. doi:10.3102/0162373715597298

Witt, K. E., & Dunn, C. (2012). Increasing fruit and vegetable consumption among preschoolers: Evaluation of Color Me Healthy. *Journal of Nutrition Education and Behavior, 44*(2), 107-113. doi:10.1016/j.jneb.2011.01.002

Woodfield, L., Duncan, M., Al-Nakeeb, Y., Nevill, A., & Jenkins, C. (2002). Sex, ethnic, and socioeconomic differences in children's physical activity. *Pediatric Exercise Science, 14,* 277-285.