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# Sunshine Circles: Randomized Controlled Trial of an Attachment-Based Play Group with Preschool Students Who are At-Risk

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## ABSTRACT

This article reports findings of a second randomized controlled trial of an early education classroom mental health intervention, Sunshine Circles. Sunshine Circles is an attachment-based play group intervention designed to assist children in feeling safe at school, develop social competencies, and improve emotional regulation skills. A previous study of the intervention found medium to large effect sizes across several measures of behavior and academics. The current trial enrolled 189 racially diverse preschool students in the United States, many of whom are refugees from high conflict regions. Sunshine Circles, which is led by specially trained teachers in their own classrooms, showed greater improvement across several bands of behavior and academic measures than did control classrooms. A description of the intervention is included. Implications for using this intervention with traumatized and chronically stressed young children are discussed.

## KEYWORDS

Attachment; emotional regulation; play groups; behavior; teacher-led intervention

## Impact of early trauma and chronic stress

Investment in the development of self-regulation and resilience in young children has potential for meaningful returns in the form of reduced suffering, decreased medical and social care costs, and increased developmental equality (Williford, Whittaker, Vitiello, & Downer, 2013). To this end, the development of early, efficient, cost-effective interventions that impact not only children but also caregivers is a priority to develop a truly integrated system in which children's physical, psychological, and educational flourishing are addressed in a holistic manner (Shonkoff, Boyce, & McEwen, 2009). Determining the focus, format, timing, and dosage of early childhood interventions continues to be a subject of discussion and research in the mental health field. The current study examines a classroom intervention and its usefulness in promoting resilience and self-regulation in children who have experienced significant life stress prior to entering kindergarten.

Early exposure to adversity is associated with changes in cortisol production, immune system functioning, and inflammatory processes in the body (Romens, McDonald, Svaren, & Pollock, 2015). These alterations contribute to the loss of developmental potential and suboptimal changes in the functioning of the entire HPA Axis, potentially resulting in a failure to develop healthy emotional regulation and resilience under even usual levels of stress (Romens et al., 2015; Shonkoff et al., 2009). For many children exposed to a lack of

safety either within the home and/or in the wider community, already-impaired stress “defense systems” are mismatched to the demands of the child’s environment. (Gold, 2017). This mismatch may manifest in entrenched patterns of dysregulation in which young children experience prolonged and frequent hyperarousal and/or hypoarousal, preventing joyful engagement with and exploration of their environments and leading to behavioral and psychological symptoms that may disrupt healthy development (Lieberman, Chu, Van Horn, & Harris, 2011; Lillas & Turnbull, 2009).

Negative impacts on school achievement, beginning as early as pre-school and continuing throughout the grade span, are strongly correlated with exposure to adversity in early life (Jimenez, Wade, Lin, Morrow, & Reichman, 2016; Morrow & Villodas, 2018). Commonly cited precursors to school drop-out; chronic absenteeism, school refusal, and poor academic performance, are also seen far more often in students with multiple adverse events than their peers with fewer of these experiences (Kasehagen et al., 2018; Morrow & Villodas, 2018; Stempel, Cox-Martin, Bronsert, Dickinson, & Allison, 2017). Disruptive or withdrawn behaviors, symptoms of poor self-regulation, are often seen as early as preschool in children with multiple risk factors (Kasehagen et al., 2018). Poor self-regulation at school can result in feelings of alienation and lack of belonging, leading to poor outcomes, including high school dropout (Morrow & Villodas, 2018). Young children’s lack of self-regulation is often a focus of concern for school and mental health counselors working in schools. Classroom-based preventative programming, such as the group modality discussed in this article, are needed to promote healthy brain and social-emotional development.

### ***Developing resilience***

Adverse and traumatic events impact not only individual children, but also dyadic, familial, school, and neighborhood social systems, leading to feedback loops of stress that may produce challenges within a child’s caregiver system (Gold, 2017; Lieberman et al., 2011). Chronically stressful patterns in both children and their caregivers may lead to fewer opportunities for calm togetherness, shared joy, “serve and return” interactions, and the play, stimulation, exploration, and growth that these states allow for (Lillas & Turnbull, 2009). Advances in neuroscience have confirmed that “serve and return” interactions are critical to the formation of the architecture of the right brain neurobiological systems, which are in turn critical to emotional processing and stress regulation (Facompre, Bernard, & Waters, 2018; Schore & Schore, 2008). Healthy “serve and return” interactions include a caregiver’s appraisal of cues and the provision of contingent, attuned responses, both verbal and nonverbal. Through this co-regulatory relationship, an infant develops “felt safety” as opposed to experiencing prolonged states of alarm or hypervigilance, which is more characteristic of children who have experienced mis-attuned or inconsistent care (Porges, 2011).

Having at least one caregiver who is able to use his or her social engagement system (SES) to engage with the child in a nurturing and structured manner allows the child to connect with the adult for comfort when distressed and to safely explore the world (Porges, 2011). Interactions between caregiver and child lead both to secure attachment patterns and the establishment of healthy self-regulation (Crespo, Trentacosta, Aikins, & Wargo-Aikins, 2017; Porges, 2011). The SES requires the adult to be able to feel emotionally close to the child without feeling defensive, and to be open to contact rather than avoidant (Hughes &

Baylin, 2012). Over time, parents, teachers, or other caregivers whose SES are intact helps the child to manage the stress of daily life (Hughes & Baylin, 2012; Porges, 2011). When caregivers are unable to mobilize the SES somewhat regularly, the child misses opportunities to practice regulation and may develop behavioral issues as a result (Hughes & Baylin, 2012; Porges, 2011).

Researchers emphasize the importance not only of parents or primary caregivers in promoting resilience in children, but also of other caregivers such as day care providers, other relatives, and teachers (Masten, 2012; Sciaraffa, Zeanah, & Zeanah, 2018). The ability of secondary caregivers to employ SES to help children co-regulate and then self-regulate emotion is one of the cornerstones of effective social-emotional interventions (Gold, 2017; Porges, 2011; Williford et al., 2013). The need for effective teacher–child relationships, and school-based intervention is especially important for children in families where the parents or primary caregivers may be unable to engage SES on a consistent basis. Teachers, in particular, can be important support figures for children in distress and can serve as secondary attachment figures for school-aged children (Al-Yagon & Mikulincer, 2006; Nur, Aktas-Arnas, Abbak, & Kale, 2018). Enhancing young at-risk children’s secondary relationships so that they are more intentionally nurturing and co-regulating is key in the prevention effort to help children develop stress-buffering relationships and skills. In addition, creating safe and supportive communities within natural environments, such as schools, are important aspects of comprehensive prevention efforts (Center for the Developing Child at Harvard University, 2011; Sciaraffa et al., 2018).

Given recent scientific developments related to attachment and regulation theory, two interrelated protective factors that may be important targets for preventative interventions are the development of stable caregiver–child relationships *in conjunction with* the development of regulatory skills in young children (Crespo et al., 2017; Rosenblum, Dayton, & Muzik, 2019). First, the development of secure relationships between caregivers (e.g., parent, teacher, relative) and children contributes to resilience in young children experiencing adversity by providing a protective buffer through the co-regulation provided within the relationship. Second, the active cultivation of skills related to executive functioning and self-regulation provides young children with alternative resources and skills to draw upon during stressful moments (National Scientific Council on the Developing Child, 2015; Nur et al., 2018). These two factors in tandem may provide a child with access to both co-regulation with a caregiver (i.e., “Breathe with me and we’ll calm down”) and self-regulation through the use of taught strategies (i.e., “I remember to breathe”) when facing stressful challenges.

### ***Intervention for social-emotional development and sunshine circles™***

Primary interventions targeting relational and regulatory functioning can be implemented across a child’s natural environments to reduce negative externalized behavior and increase positive social-emotional development in young children. In a 2018 meta-analysis of 26 research projects published since 1978 in Head Start and other early childhood programs, Barnes et al. (2018) found that as an aggregate, most show slightly significant improvement in at-school externalizing behavior. Of these school-based social-emotional learning programs cited in the meta-analysis for having established efficacy in improving student behavior, only a few involve parents (e.g., PATHS, Second Step), and play-based approaches

such as using puppets and songs (e.g., Second Step). However, all of these programs rely heavily on language and cognitive teaching and learning strategies to facilitate learning.

Language and cognitive-heavy teaching strategies clearly are able to help students, as shown in a recent meta-analysis (Barnes et al., 2018). However, new findings in neuroscience suggest that, especially for children from violent or stressful backgrounds, less verbal, more intensively relational strategies may be more effective in facilitating improved self-regulation and other pro-social skills when used either prior to, or in conjunction with, the cognitively oriented social emotional curricula (Sciaraffa et al., 2018).

One such intervention is Sunshine Circles (SC), a group intervention designed to help teachers and other child-care providers build a culture of secure relationships, emotional resilience, and strong executive skills (i.e., problem-solving) for children. SC was developed at The Theraplay® Institute of Evanston, Illinois. Theraplay, ® originally developed by psychotherapists Ann Jernberg and Phyllis Booth in the Chicago-area Head Start program in the 1960s, focuses on improving attachment and regulation through dyadic play, gentle touch, eye contact, and movement. Theraplay® was designated as an evidence-based intervention by Substance Abuse and Mental Health Services Administration (SAMHSA) in 2016, based on empirical studies demonstrating improvements in internalizing symptoms and symptoms related to autism in children (Siu, 2009, 2014).

SC, a Theraplay® model for groups and classrooms, are therapeutic teacher-led classroom groups lasting approximately 20–30 minutes once or more per week. SC employ Theraplay® principles of structure, nurture, engagement, and challenge to create therapeutic group experiences (Booth & Jernberg, 2010). During these groups, teachers mobilize their SES to provide opportunities for children to practice up- and down-regulation, social connection, and attunement with a caregiver. Embedded within SC is the development of executive skills and positive relationships. SC are typically led by teachers, mental health professionals, or other human services professionals. A recent randomized trial with 206 preschoolers demonstrated significant improvements in social-emotional skills, behavior regulation, problem-solving, and fine motor development in the group receiving SC (Authors, 2017). Based on these findings, SC demonstrates promise as a group-based intervention that can be embedded within early childhood education curriculum, engage teachers and children, and may be associated with children's self-regulation and social-emotional learning.

## The current study

The purpose of this study was to compare the differential response of participants randomly assigned to receive either the Sunshine Circles (SC) Intervention or programming-as-usual (PAU) on common measures used in early education programs. The study was designed to answer two research questions: (a) Are there statistically significant differences in participant responses to SC and PAU across scores on academic and behavioral scales? and (b) What are the magnitudes representing practical difference in participant responses to SC and PAU across scores?

The current study tested the effects of SC in a two-phase randomized trial, which was approved by a University Institutional Review Board. We hypothesized that the intervention group would demonstrate improvements in indicators of social and emotional functioning above that demonstrated by the control group. We also hypothesized that

participants in the control group would demonstrate similar improvements after receiving the SC intervention.

## Methods

### *Participants and setting*

Participants were 189 preschool students attending preschool in a Midwestern U.S. state. Both waitlist control group ( $n = 92$ ) and the intervention group ( $n = 97$ ) included three state-funded classrooms and two Head Start classrooms each. Classrooms contained between 17 and 20 children each. All students participated in the study. The five state-funded classrooms were a half-day program, while the Head Start classrooms were a half-day preschool with half-day childcare combined. Teachers were licensed early childhood educators. Three teachers in both the intervention and waitlist control groups were dual licensed as general education and special education teachers. All students met requirements for free and reduced lunch. Participants were representative of a racially diverse community: African or African American, 36%; Asian, 3%; Caucasian, 20%; North African or Middle Eastern, 19%; Hispanic/Latino, 19%; Mixed Race, 3%. Seventeen participants had an Individualized Education Program (IEP) related to an identified disability or delay. Dual language learners were 49.7% of participants. Children in foster care made up 4.6% of participants. Classrooms were comprised of both 3- and 4-year-olds or 4-year-olds.

About half of the families in the Head Start program reported recent immigration to the United States. Families have migrated from many countries, including: Republic of Congo, Vietnam, Somalia, Syria, and other high-conflict areas, such as the countries in Central America. Specific narratives were not shared by the families with the researchers, but knowing that many of them recently arrived from areas of active conflict and/or government collapse allows us insight into the probable stress levels felt by many of the children.

### *Procedures*

Classrooms were selected into either the control or intervention group by random drawing of lots prior to the start of the school year. Informed consent was obtained from parents during back-to-school events. Consent forms were translated from English into Spanish, French, and Arabic to accommodate languages spoken in the community. Consent was explained to parents or legal guardians by office staff at each site to avoid parents feeling pressure from teachers. All staff involved with the project were trained in ethical research procedures prior to the start of the study period. Students were placed in classrooms prior to the assignment of control versus intervention conditions by site administrators as per usual practice at the sites.

Teachers in the intervention group were trained in SC at the beginning of the year, and teachers in the waitlist control groups received similar training midway through the year, just prior to beginning intervention. The intervention group received SC intervention once a week for 15 weeks. Fidelity was evaluated via a standardized form in the SC manual (see Appendix A). Coaching for the teachers in problem-solving with difficult student behaviors was offered by an on-site SC trainer.

In September, January, and May, teachers scored the instruments, which is usual practice in the classrooms. Only one instrument, the Preschool Behavior Questionnaire (Behar & Stringfield, 1974), was added. A special education consultant for the district collected scores and entered them without names into a spreadsheet. This spreadsheet was then sent to a researcher for data analysis. Six students moved during the year and were removed from the analysis.

### **Assessments and measures**

Instruments used to gather data included the Ages and Stages Questionnaire, 3rd Edition (ASQ-3; Squires et al., 2009), the Ages and Stages Questionnaire: Social Emotional (ASQ:SE; Squires et al., 2009), the GOLD (Lambert, Kim, Taylor, & McGee, 2010), the Devereux Early Childhood Assessment for Preschool children (DECA-P; LeBuffe & Naglieri, 1999), and the Preschool Behavior Questionnaire (PBQ; Behar & Stringfield, 1974). The PBQ was added to give additional depth to data on behavioral problems and to facilitate tracking of the intensity of these problems over the course of the school year. Although none of the assessments directly examine changes in the HPA-axis or brain, measures of pre-academics, behavior, self-regulation, attachment may be seen as proximal measures of brain growth, in that improvements in those areas do not occur without concomitant development in the underlying neurological structures that govern these activities (Porges, 2011).

#### **ASQ-3**

The ASQ is a developmental assessment for children ages 0–66 months. Children are rated by parents on an array of behaviors that demonstrate growth in communications, gross and fine motor skills, problem solving, and personal-social skills (Squires et al., 2009).

#### **ASQ:SE**

An extension of the ASQ-3, the SE focuses in on social emotional skills in young children. On the SE form, parents or caregivers rate children's behaviors across self-regulation, compliance, social-communication, adaptive functioning, autonomy, affect, and interaction with people. When scored, the SE can help teachers and others decide if a child needs to be referred for additional assistance with behavioral concerns (Squires et al., 2009).

#### **GOLD**

Children are rated by their teacher on a variety of emerging academic skills including cognitive, language, literacy, math, and social skills (Lambert et al., 2010). The GOLD is designed to assess for growth in early education programs that employ the Creative Curriculum programs.

#### **DECA-P**

The DECA for 3–5 years-old children is a behavior rating scale completed by parents and/or teachers that gives an assessment of protective factors central to social and emotional health and resilience. In this study, it was completed by teachers. It is also a screener for behavioral problems (LeBuffe & Naglieri, 1999).

## PBQ

The PBQ is a quick rating scale teachers can use to detect behavior problems in preschool children. The PBQ gives a total score and three subscores: hostile/aggressive, anxious, and distractible/hyperactive (Behar & Stringfield, 1974).

## Intervention

In SC, intervention is delivered through 20–30 minute weekly whole-class groups focused on simple and joyful games and routines that also promote secure relationships between adults and children as well as the acquisition of self-regulatory skills. SC follow a predictable routine, beginning with a song, rules (“Stick together, no hurts, have fun!”), and check-ins, followed by a sequence of caring for “boo boos,” and 3–5 games designed to stimulate social and emotional learning. Activities alternate between exciting, up-regulating games and relaxing, down-regulating activities. Groups end with a snack and song time designed to strengthen the bonds between adults and children in the group. Although there is a published list of typical activities, teachers may modify games to meet the needs of specific students (Schieffer, 2013/2017).

Group play activities should change weekly in order to maintain the interest of the students. Three essential elements of the group circle time should remain stable and predictable across sessions. These elements are: an opening song, a feeding activity, and a closing song and procedure (ritual). Maintaining these three key elements constant while rotating in novel games and play activities, allows the group to remain comfortably predictable while also providing new and exciting experiences. In some settings, feeding activities may be impossible due to health rules or to children’s abilities to participate in feeding routines. In these cases, feeding may be replaced with a different nurturing, down-regulating ritual (e.g., checking for hurts or blowing kisses to each child), but this ritual needs to remain consistent each session (Schieffer, 2013/2017/2017).

In planning for a SC group session, the teacher should plan to strategically organize the activities to alternate between quieter, down-regulating games and more boisterous, up-regulating ones. Alternating levels of arousal helps children develop better emotional regulation when practiced over time (Porges, 2011). As children are able to tolerate more time together in the group, more play activities may be added to the middle of the session. However, care should be taken not to allow children to become too overstimulated or bored.

## Data analysis

We completed an *a priori* power analysis to determine the sample size needed to detect a moderate treatment effect at the .80 level given our research design and  $\alpha = .05$ . Results indicated that a minimum sample size of 86 was required for our primary analysis. Our sample size of 189 suggested an adequate degree of power to allow for statistical inferences related to group differences when inspecting data for participants at termination of treatment.

Separate univariate analysis of variance (ANOVA) procedures was completed for each dependent variable with adjustments to alpha based on the Bonferroni correction to control for type one error among scores on the ASQ (.05/5 = .010), PBQ (.05/1 = .050), and DECA (.05/4 = .012). This strategy was selected instead of multivariate procedures based on the



assumption that our interest in identifying the differential impact of intervention versus control across unique dependent variables was univariate in nature (Barrio Minton & Lenz, 2019). We estimated practical significance of differential responses using the Hedge’s *g* effect size metric and related confidence levels at the 95% level. Hedge’s *g* was selected due to the inclusion of a correction factor within the formula that accounts for the influence of sample size and sampling error between groups of participants. Hedge’s *g* values were interpreted by applying the conventions suggested by Ellis (2010) for describing magnitudes as small ( $ES \leq .20$ ), medium ( $ES = .50$ ), and large ( $ES \geq .80$ ), conceptualized in units of standard deviation, and referenced to participant context.

## Results

Descriptive and summary statistics, *F*-tests, *p*-values, and Hedge’s *g* effect sizes for comparisons between SC and PAU groups for scores on ASQ, PBQ, and DECA scales are presented in Table 1.

### ASQ

Statistically significant differences between groups were detected for increased scores on the ASQ Communication scale,  $F(1, 188) = 19.33, p < .001, g = .64$  (CI95 = -1.23, 2.50) indicative of a medium effect size. This finding suggests that participants receiving SC intervention tended to report an increase in communication skills about 64% of one standard deviation more when compared to participants assigned to the Control

**Table 1.** Descriptive Statistics, *F*-tests, *P*-values, and Hedge’s *G* Effect Sizes for Comparisons of Sunshine Circles to Programming-As-Usual

Measure & Constructs	Group	Posttest		<i>F</i>	<i>p</i>	<i>g</i> (95% CI)	Favors Control		Favors SC	
		<i>M</i>	<i>SD</i>							
<b>ASQ-3</b>										
<i>Communication</i>	SC	50.10	10.50	19.33	< .001*	.64 (-1.23, 2.50)			●	
	PAU	41.68	15.46							
<i>Gross Motor</i>	SC	55.15	7.03	.734	.393	.06 (-.89, 1.01)			●	
	PAU	54.73	6.39							
<i>Fine Motor</i>	SC	49.43	9.67	10.29	.002*	.47 (-1.15, 2.08)			●	
	PAU	44.13	12.89							
<i>Problem Solving</i>	SC	53.09	7.51	23.28	< .001*	.70 (-.77, 2.17)			●	
	PAU	45.82	12.69							
<i>Personal-Social</i>	SC	54.85	7.48	18.06	< .001*	.62 (-.71, 1.94)			●	
	PAU	49.08	10.98							
-2   -1   0   1   2										
<b>PBQ</b>										
<i>Total Score</i>	SC	4.26	4.15	.11	.734	-.04 (-.69, .59)			●	
	PAU	4.48	4.91							
-2   -1   0   1   2										
<b>DECA</b>										
<i>Initiative</i>	SC	57.35	2.18	115.46	< .001*	1.55 (.99, 2.12)			●	
	PAU	51.13	5.24							
<i>Self-Regulation</i>	SC	57.48	3.83	163.38	< .001*	1.85 (1.08, 2.61)			●	
	PAU	47.49	6.62							
<i>Attachment/Relationships</i>	SC	58.36	2.96	254.77	< .001*	2.35 (1.61, 3.01)			●	
	PAU	46.90	6.38							
<i>Behavior Concerns</i>	SC	36.67	10.12	97.11	< .001*	1.74 (.39, 3.09)+			●	
	PAU	53.23	8.69							
-2   -1   0   1   2										

\* indicates statistical significance when accounting for Bonferroni correction; + indicates effect size transposed to positive value for consistency of representation with related DECA scales.

Group. Inspection of confidence intervals for the Hedge's  $g$  value of .64 indicate modest degree of precision wherein the true effect may range from  $-1.23$  in favor of PAU to  $2.50$  in favor of SC.

Statistically significant differences were not detected between groups indicating no meaningful differences in increased scores on the ASQ Gross Motor scale,  $F(1, 188) = .73$ ,  $p = .393$ ,  $g = .06$  (CI95 =  $-.89, 1.01$ ) indicative of a null effect. This finding suggests that participants receiving SC intervention tended to report similar increases in gross motor skills when compared to participants assigned to the Control Group. Inspection of confidence intervals for the Hedge's  $g$  value of .06 indicate modest degree of precision wherein the true effect may range from  $-.89$  in favor of PAU to  $1.01$  in favor of SC.

Statistically significant differences between groups were detected for increased scores on the ASQ Fine Motor scale,  $F(1, 188) = 10.29$ ,  $p = .002$ ,  $g = .47$  (CI95 =  $-1.15, 2.08$ ) indicative of a small effect size. This finding suggests that participants receiving SC intervention tended to report an increase in fine motor skills about 47% of one standard deviation more when compared to participants assigned to the Control Group. Inspection of confidence intervals for the Hedge's  $g$  value of .47 indicate modest degree of precision wherein the true effect may range from  $-1.15$  in favor of PAU to  $2.08$  in favor of SC.

Statistically significant differences between groups were detected for increased scores on the ASQ Problem Solving scale,  $F(1, 188) = 23.28$ ,  $p < .001$ ,  $g = .70$  (CI95 =  $-.77, 2.17$ ) indicative of a medium effect size. This finding suggests that participants receiving SC intervention tended to report an increase in problem solving skills about 70% of one standard deviation more when compared to participants assigned to the Control Group. Inspection of confidence intervals for the Hedge's  $g$  value of .70 indicate modest degree of precision wherein the true effect may range from  $-.77$  in favor of PAU to  $2.17$  in favor of SC.

Statistically significant differences between groups were detected for increased scores on the ASQ Personal-Social scale,  $F(1, 188) = 18.06$ ,  $p < .001$ ,  $g = .62$  (CI95 =  $-.71, 1.94$ ) indicative of a medium effect size. This finding suggests that participants receiving SC intervention tended to report an increase in personal-social skills about 62% of one standard deviation more when compared to participants assigned to the Control Group. Inspection of confidence intervals for the Hedge's  $g$  value of .70 indicate modest degree of precision wherein the true effect may range from  $-.71$  in favor of PAU to  $1.94$  in favor of SC.

Statistically significant interactions were not detected between group, gender, and scores on the Communication ( $p = .44$ ), Gross Motor ( $p = .77$ ), Fine Motor ( $p = .29$ ), Problem Solving ( $p = .66$ ), or Personal-Social ( $p = .88$ ) subscales.

## **PBQ**

Statistically significant differences were not detected between groups indicating no meaningful differences for desired change on the PBQ screener,  $F(1, 188) = .11$ ,  $p = .734$ ,  $g = -.04$  (CI95 =  $-.69, .59$ ) indicative of a null effect. This finding suggests that participants receiving SC intervention reported similar levels of symptoms associated with the emergence of emotional problems when compared to participants assigned to the Control Group.

Inspection of confidence intervals for the Hedge's  $g$  value of  $-.04$  indicate modest degree of precision wherein the true effect may range from  $-.69$  in favor of PAU to  $.59$  in favor of SC. Statistically significant interactions were not detected between group, gender, and PBQ Total scores ( $p = .55$ ).

## DECA

Statistically significant differences between groups were detected for increased scores on the DECA Initiative scale,  $F(1, 188) = 115.46, p < .001, g = 1.55$  (CI95 = .99, 2.12) indicative of a large effect size. This finding suggests that participants receiving SC intervention tended to report an increase in personal-social skills about 155% of one standard deviation more when compared to participants assigned to the Control Group. Inspection of confidence intervals for the Hedge's  $g$  value of 1.55 indicate moderate degree of precision wherein the true effect may range from .99 to 2.12 in favor of SC.

Statistically significant differences between groups were detected for increased scores on the DECA Self-Regulation scale,  $F(1, 188) = 163.38, p < .001, g = 1.85$  (CI95 = 1.08, 2.61) indicative of a large effect size. This finding suggests that participants receiving SC intervention tended to report an increase in self-regulation skills about 185% of one standard deviation more when compared to participants assigned to the Control Group. Inspection of confidence intervals for the Hedge's  $g$  value of 1.85 indicate moderate degree of precision wherein the true effect may range from 1.08 to 2.61 in favor of SC.

Statistically significant differences between groups were detected for increased scores on the DECA Attachment/Relationships scale,  $F(1, 188) = 254.77, p < .001, g = 2.35$  (CI95 = 1.61, 3.01) indicative of a large effect size. This finding suggests that participants receiving SC intervention tended to report an increase in self-regulation skills about 185% of one standard deviation more when compared to participants assigned to the Control Group. Inspection of confidence intervals for the Hedge's  $g$  value of 2.35 indicate moderate degree of precision wherein the true effect may range from 1.61 to 3.01 in favor of SC.

Statistically significant differences between groups were detected for increased scores on the DECA Behavior Concerns scale,  $F(1, 188) = 97.11, p < .001, g = 1.74$  (CI95 = .39, 3.09) indicative of a large effect size. This finding suggests that participants receiving SC intervention tended to report improvements in behavioral concerns about 174% of one standard deviation more when compared to participants assigned to the Control Group. Inspection of confidence intervals for the Hedge's  $g$  value of 1.74 indicate modest degree of precision wherein the true effect may range from .39 to 3.09 in favor of SC.

A statistically significant interaction was detected indicating an interaction effect group and gender for scores on the DECA Behavioral Concerns subscale,  $F(1, 187) = 5.02, p = .02$ . This finding revealed that although all participants in the SC group tended to demonstrate greater intervention effects, girls tended to exhibit greater reductions in behavioral problems over time. No statistically significant interactions were detected between group, gender, and scores on the Initiative ( $p = .34$ ), Self-Regulation ( $p = .89$ ), or Attachment/Relationships ( $p = .81$ ) subscale.

### **Limitations and future directions**

Though the sample of children in this study was very diverse, it is possible that some cultural or geographic factors unknown to the researchers may have influenced the results. The study should be replicated in a different geographic location with other children to eliminate this possibility.

Additionally, because the measures used were rating scales, there is always a concern about rater bias. Using standardized measures and training raters can reduce the likelihood of bias, but it remains a potential concern, even given the large number of children enrolled in the study. Teacher raters are commonly used in educational research due to lack of funding for additional raters, privacy concerns, and staff shortages. Funding for Head Start centers is based on metrics that include these same scores in a high stakes situation. Further, the reliability of these instruments was established by teachers rating their own students. No research outside of a laboratory can fully control for bias. In this study, teachers could not be blinded to whether or not they were doing the intervention. The use of inter-rater reliability scores, the use of reliable and valid instruments, and the lack of incentives may contribute to more valid results.

Behavioral ratings are also problematic due to variables such as the relationship of rater to child, race, gender, and social class bias, and other factors (Phillips & Lonigan, 2010). However, the GOLD and ASQ-SE are based on observing a child doing or not doing a behavior rather than on the rater's opinion of the child's behavior, which should serve to mediate some bias. Additionally, the DECA requires teachers to be trained to reliability prior to using the instrument, which improves confidence in those scores. Similar results were found in an earlier study (Authors, 2017), which may help to bolster the validity of the findings. Teachers were not rewarded or punished in any way based on the data provided, and researchers emphasized the need for ratings to be as impartial as possible. The use of fidelity forms helped to reduce variation in the application of the intervention. In future research, multiple raters should be used.

### **Discussion**

Sunshine Circles, when used regularly in early childhood group settings, may lead to more optimal social and emotional development in areas such as attachment, self-regulation, making friends, solving problems, and taking initiative. Findings indicated that positive gains can be made in related developmental areas such as fine motor development and communication. The authors interpret these findings to mean that gains in fine motor skills are related to an increase in felt safety, which then allows the sensory system to accommodate to environmental demands. Results also indicated a steep decrease in problem behaviors for the treatment group, although the waitlist control group results indicated more mixed outcomes, particularly related to the PBQ measurement. However, the overall trend in current findings confirm what is widely understood in early childhood pedagogical practice; that is, decreased problem behavior may “make space” for increased practice of prosocial behavior as well as overall global developmental flourishing. In neuroscience terms, increased felt sense of safety is believed to reduce the children's need to constantly monitor the environment for threats, and to increase time spent in a calm, alert state in which learning can take place (Luby et al., 2013; Porges, 2011).

Additionally, play is believed to be a special state that allows children to extend their time in an optimal state of arousal where learning can occur (Porges, 2011).

Although not measured in this study, it is also possible that teachers grew in their own relationship to their students and that SC experiences generalized to other areas of instruction and behavior management. Future replication research that measures this potential effect of SC may be beneficial. Overall, improvements were made across a range of indicators for children receiving the intervention, including gains for the waitlist group once intervention began. Findings indicated steeper growth may be expected in the first half of the school year due to initial adjustments to school, suggesting that it is important to begin the school year with the classroom bonding and connection facilitated by Sunshine Circles.

SC is a relatively simple and cost-effective intervention that could be scaled for widespread use as both a universal Tier 1 intervention and a Tier 2 intervention for children with social and emotional vulnerabilities, including those related to environmental stressors, such as the children in this study. The SC platform is flexible, and can be used by teachers in classrooms, by special educators or counselors in small groups, or in its dyadic form Theraplay, with individual children or families, thus making it possible to serve a wide array of children with a single type of intervention. In contrast to many interventions requiring large investments and licensed mental health clinicians, SC requires few materials and can be implemented by a variety of service providers such as early childhood education, early intervention, special education, and universal prevention programs. SC can also be integrated easily into current programming and can enhance existing social-emotional learning programs. Future research should examine SC in a variety of settings using experimental designs and independent observational ratings.

## Conclusion

The current study replicates and expands on earlier findings by Authors (2013/2017) to support SC as an effective way to reduce problem behavior and increase prosocial behavior in early childhood settings. Given SC's impact on important proxy measures of child well-being and feelings of safety, it appears to help teachers and classmates build bonds and relax together, potentially leading to more time spent in positive states and space for exploration and growth. SC appears to target two interrelated protective factors that may be important targets for preventative interventions; the development of stable caregiver-child relationships and the development of regulatory skills in young children (Crespo et al., 2017; Rosenblum et al., 2019). School counselors and clinical counselors who work in schools can use SC either in their own intervention practices or train teachers to implement it in the classroom setting, making SC a flexible and multi-use intervention.

SC is unique in its design and methods of implementation. It is based on attachment theory and is congruent with recent brain research in relationship to quality of care, toxic stress, and trauma. Although other interventions are designed to help children manage the impacts of toxic stress and trauma, the authors of this study are not aware of any other interventions that harness the teacher's social engagement system in order to co-regulate with the child, improve the child's felt sense of safety, and open the sensitive neurological gate to learning via play. Emphasizing playful relational engagement in the classroom helps children to build a stronger neuroception of safety (Porges, 2011). SC appears to be effective in improving both academic and social-emotional learning due to this focus. Adding SC,

a less-verbal, more emotionally connecting intervention to early educational classrooms may serve the purpose of better preparing children to learn from standard curricula as well as better manage their behavior.

## Disclosure statement

In accordance with ethical guidelines, we are disclosing the following:

Kay Schieffer is now Executive Director of The Theraplay Institute. At the time of the study, she did not have a formal position at TTI and did not receive any remuneration for her work on this study.

Catherine Tucker is Research Director at TTI and assisted in the writing of this article for publication as part of her paid responsibilities. She was an associate professor at Indiana State University at the time of the data collection for this study.

Strategies are in place for managing any potential conflicts of interest resulting from our current employment.

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