OUTDOOR CHILD-CENTERED PLAY THERAPY WITH ATTENTION AND SOCIAL-EMOTIONAL COMPETENCIES IN CHILDREN

Kimberly L. A. Walker, MS, NCC, LPC Associate

Dissertation Prepared for the Degree of

DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

May 2021

APPROVED:

Dee C. Ray, Committee Chair
Leslie Jones, Committee Member
Brittany Wilson, Committee Member
Natalya Lindo, Committee Member and Chair of the Department of Counseling and Higher Education
Randy Bomer, Dean of the College of Education
Victor Prybutok, Dean of the Toulouse Graduate School

Walker, Kimberly L. A. *Outdoor Child-Centered Play Therapy with Attention and Social-Emotional Competencies in Children*. Doctor of Philosophy (Counseling), May 2021, 176 pp., 2 tables, 2 figures, 5 appendices, references, 180 titles.

Children experience a multitude of benefits in response to interactions with nature. Despite documented effects, children have increasingly spent less time outdoors over the last century and experienced higher rates of physical and emotional illnesses. Although child-centered play therapy (CCPT) is a culturally and developmentally responsive mental health treatment for children, researchers have limited study of environmental structure and materials employed in the therapeutic process of CCPT. In this study, I sought to further research on the integration of nature with CCPT by providing CCPT in an outdoor, contained playroom equipped with traditional CCPT toys and additional nature materials. Participants were 13 children in the southwestern U.S. with parent-reported attentional or self-regulation concerns (9 males, 6 females; ages 5-10, mean age $M = 8.0$). Parents reported participants' racial identities were 13% Black ($n = 2$), 13% Latinx ($n = 2$), 7% Turkish ($n = 1$), and 67% White ($n = 10$). Participants received 8 weeks of twice-weekly CCPT in an outdoor playroom. Results of two repeated measures ANOVAs revealed statistically significant improvement in attention on the Brown EF/A Scales and statistically significant improvement in social-emotional competencies on the SEARS-P. Results of this study illustrate the possible benefits of theoretically integrating CCPT and nature and the clinical impacts the novel approach could have on children's attention and social-emotional competencies. The study also provided insight into the viability of providing an outdoor CCPT intervention at a larger scale and some problems that may arise in creating and maintaining an outdoor playroom.

ACKNOWLEDGMENTS

The relationships that made my dissertation and counseling career journey into what it is are too numerous to properly express my gratitude to each within the confines of this acknowledgment page. To my partner, Christopher – thank you for believing in me and encouraging me to bring the possibilities in my mind into reality. You know all of me and love me unconditionally. Thank you for traveling beside me through all of my doubts and triumphs. To my parents, thank you for gifting me with the values of a lifelong love for learning and persistence. To my mom, your daily example of being the most giving person I know led me to want to help others too, especially those whose voices are undervalued. To my dad, your creativity and woodworking skills literally helped to build parts of the outdoor playroom. I see reflections of the best of both of you in all that I do. Dee, thank you for seeing my potential and helping me find a way to be my more integrated, authentic self with an established system. Because of your mentorship, I am more than just a better counselor educator, I believe I am a better person. Leslie, thank you for your presence and warmth. You taught me how to listen to my internal compass as a counselor which is a gift I hope to pass on to others. Natalya, thank you for inspiring me to pursue research topics that interested me and showing me we can change the world one step at a time. Brittany, thank you for your optimism and acceptance when I needed it most. You helped me discover who I wanted to be as a counselor. To my friends within my cohort, thank you for the support you have given me and for the lessons that I may have never learned if we did not get to go through this process together. To everyone who helped make this dissertation possible, thank you for sharing in my vision and for your commitment to making a tangible difference in children's lives, especially during a time when resources were strained. Finally, to all of CPT, thank you for being family.

TABLE OF CONTENTS

Page

LIST OF TABLES AND FIGURES

Page

Tables

Figures

OUTDOOR CHILD-CENTERED PLAY THERAPY WITH ATTENTION AND SOCIAL-EMOTIONAL COMPETENCIES IN CHILDREN

Outdoor Child-Centered Play Therapy: A Pilot Study on Outcomes

Nature can be found nearly anywhere from indoors with pets and houseplants to outdoors in a remote wilderness area of a national park or a neighbor's well-landscaped backyard. Research on the effects of nature interaction on humans has grown exponentially within the past 30 years (Frumkin et al., 2017; Hartig et al., 2014; Maller et al., 2005; Twohig-Bennett & Jones, 2018). Twohig-Bennett and Jones (2018) calculated 96% of the studies in their systematic review of greenspace exposure and health were published between 2008 and 2018 with no articles found before 1984. Researchers have established many beneficial effects in adults for encounters, observations, and other types of exposure to animals, plants, landscapes, and wilderness (Hartig et al., 2014; Maller et al., 2005; Twohig-Bennett & Jones, 2018). Nature exposure can affect the human body's response to physiological stress (Ulrich, 1984), cardiovascular health (Fong et al., 2018), vitality and mortality (Fong et al., 2018), cognitive functioning and directed attention (Berman et al., 2012), mental health (Zijlema et al., 2018), and spirituality (Brymer et al., 2010).

Further, researchers established a multitude of beneficial effects children experience due to interactions with nature (Dankiw et al., 2020). Table 1 presents a summary of literature highlighting the benefits of nature for children. Like adult benefits, researchers identified improvements in physical, cognitive, social-emotional, and moral/spiritual development in children related to nature encounters. Children who live in higher greenspace areas exhibit lower levels of blood pressure (Chawla, 2015) and parents report higher overall general health (Aggio et al., 2015). Greater exposure to nature in childhood is associated with increased attention (Stevenson et al., 2019; Ulset et al., 2017), increased working memory (Dadvand et al., 2015;

Torquati et al., 2017), decreased ADHD symptom severity (Taylor & Kuo, 2011; Yang et al., 2019), increased self-regulation (Bakir-Demir et al., 2019; Scott et al., 2018; Weeland et al., 2019), decreased peer relationship problems (Hinkley et al., 2018), and spiritual experiences (Robinson, 2019; Schein, 2014).

Table 1

Benefits of Nature Exposure for Children

Postulation	Key References
Physical Development	
Lower levels of blood pressure	Chawla, 2015; Markevych, Thiering et al., 2014
Higher birth weights	Dzhambov et al., 2014
Lower infant mortality rates	Kihal-Talantikite et al., 2013
Decreases likelihood of high Body Mass Index (BMI) ratios and increases likelihood of physical activity	Chawla, 2015; Kimbro et al., 2011; Sando, 2019; Ward et al., 2016
Cognitive Development	
Increases attention, decreases hyperactivity and impulsivity	Berto et al., 2015; Dadvand et al., 2015; Johnson et al., 2019; Mårtensson et al., 2009; Stevenson et al., 2019; Ulset et al., 2017; Wells, 2000
Increased working memory	Dadvand et al., 2015; Torquati et al., 2017
Decreases symptom severity of ADHD	Kuo & Taylor, 2004; Taylor & Kuo, 2011; Taylor et al., 2001; Yang et al., 2019
Social/Emotional Functioning	
Decreases stress	Wells & Evans, 2003
Increases self-regulation	Bakir-Demir et al., 2019; Scott et al., 2018; Weeland et al., 2019
Increases attachment	Scott et al., 2018
Decreases externalizing behaviors	Lee et al., 2019
Decreases likelihood of mental health concerns	Markevych, Tiesler, et al., 2014; Zach et al., 2016
Decreases peer relationship problems	Amoly et al, 2014; Hinkley et al., 2018; van Dijk-Wesselius et al., 2018
Moral/Spiritual Functioning	
Spiritual moments occur during contact with nature	Adam & Savahl, 2017; Robinson, 2019; Schein, 2014

Despite documented beneficial effects for nature exposure (Dankiw et al., 2020), children have increasingly spent less time outdoors over the last century (Louv, 2008; Rivkin & Schein, 2014). Increasing indoor-based play, such as video games and television viewing, combined with a shift in children's use of neighborhood greenspace has transformed childhood outdoor play into being more planned, time-limited, and often adult-controlled or supervised (Clements, 2004; Skår & Krogh, 2009). Further, pressure on teachers and school systems to ensure academic success in young students has led to outdoor recess in public schools being cut from schedules in favor of more time for structured classroom lessons since the 1980s (Rivkin & Schein, 2014). At the same time, public governments and housing associations have restricted children's access to nature through the criminalization of building structures such as forts and treehouses without permits, the closure of lands in an attempt to protect nature from human populations, and the limitation of the kinds of nature interactions the public is allowed to have on public property (Louv, 2008). To describe the cultural shift in childhood away from nature, Louv (2008) coined nature-deficit disorder. He did not consider nature-deficit disorder a medical diagnosis but rather defined it as "the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses" (p. 36). Louv (2008) believed nature-deficit disorder could be reversed at the individual, family, and community levels if nature exposure and meaningful interactions increased.

Child-Centered Play Therapy and Nature

Child-centered play therapy (CCPT) is an effective, developmentally appropriate therapeutic intervention for children experiencing a wide range of mental health concerns (Bratton et al., 2005; Lin & Bratton, 2015; Ray et al., 2015). Originally termed nondirective play therapy, CCPT was founded on person-centered theory and principles (Axline, 1969). Axline

(1969) adapted Rogers's (1951) person-centered theory to meet the developmental traits of children, emphasizing the importance of the relationship between the play therapist and child as paramount to the therapeutic process's success. Axline integrated Rogers's (1957) six necessary and sufficient conditions for therapeutic change into CCPT. The conditions are: 1) the therapist and client are in psychological contact, 2) the client is in a state of incongruence, 3) the therapist is congruent in the relationship, 4) the therapist experiences unconditional positive regard for the client, 5) the therapist has an empathic understanding of the client's world, and 6) the client perceives the therapist's unconditional positive regard and empathy (Rogers, 1957). Landreth (2012) expanded Axline's work into the current theoretical practice of CCPT.

Research to support the use of CCPT as an effective mental health intervention for young children exhibiting a range of concerns is well-documented in multiple meta-analyses (Bratton et al., 2005; Lin & Bratton, 2015; Ray et al., 2015). Multiple randomized controlled trial studies examined the effectiveness of CCPT with children who experienced social-emotional deficits and disruptive behavior problems (Bratton et al., 2013; Cheng & Ray, 2016; Ray et al., 2013; Wilson & Ray, 2018). Further, individual studies explored the effectiveness of CCPT with children who experienced symptoms of attention deficit hyperactivity disorder (ADHD) and general attention problems with mostly positive outcomes (Kram, 2019; Muro et al., 2006; Ray et al., 2007; Robinson et al., 2017; Schottelkorb & Ray, 2009).

Although an established literature base exists to support CCPT as an effective intervention for numerous presenting concerns, researchers have limited study of environmental structure and materials employed in the therapeutic process of CCPT (Ray et al., 2013). Researchers have attempted to integrate the healing value of exposure to nature into CCPT to enhance the therapeutic process and expand holistic treatment of clients (Swank & Shin, 2015;

Swank et al. 2015; Swank et al. 2017). Swank and Shin (2015) developed nature-based child-centered play therapy (NBCCPT). In their approach, Swank and Shin emphasized CCPT principles and focused on the child's relationship with nature. Although empirical research has focused primarily on taking CCPT processes into nature with different materials, some researchers have conceptualized integrating natural materials indoors into an existing CCPT playroom (Swank et al., 2020). No research has explored the possibility of combining traditional CCPT toys with natural toys in a contained outdoor-based playroom.

Purpose of Study

A primary goal of the current study was to explore use of nature in CCPT. Many researchers have focused on whether CCPT is an effective intervention across populations and presenting concerns (Bratton et al., 2005; Lin & Bratton, 2015; Ray et al., 2015). However, few researchers have shared insights into how the parts of CCPT, such as the space, toys, and materials, work in the therapeutic process (Ray, Lee, et al., 2013). Although research regarding the benefits of exposure to nature for adults and children is growing (Dankiw et al., 2020; Maller et al., 2005), research for the inclusion of nature or nature materials into CCPT is limited (Swank et al., 2015; Swank et al., 2017; Swank et al., 2020). Both CCPT and exposure to nature have been separately associated with improved attention and self-regulation in children. However, no research has combined CCPT and nature to explore effects on attention and social-emotional competencies. I sought to further research the integration of nature with CCPT by providing CCPT in an outdoor, contained playroom equipped with traditional CCPT toys based on Landreth's (2012) suggestions and additional nature materials based on Swank and Shin's (2015) NBCCPT approach. The specific research question of interest was; what is the impact of CCPT in an outdoor playroom on improving executive functioning/attention and social-emotional

competencies in children 5-10 years old?

Methodology

I utilized a single group, repeated-measures analysis of variance (ANOVA) to analyze outcomes on attentional and social-emotional competencies. Due to the exploratory nature of the study's intervention, I chose a single-group design in accordance with accepted steps to pilot exploratory interventions to discern feasibility of large-scale implementation and potential effects on outcomes of the intervention (Lynskey & Sussman, 2001; O'Reilly et al., 2013). I chose to use repeated-measures as a way to increase the rigor and strength of the study. Repeated-measures designs are an effective way to investigate individual's growth, particularly when looking at changes over time in clinical populations (Lix & Keselman, 2019).

Participants

The current study was conducted through a university center focused on play therapy services in the context of the 2020 COVID-19 pandemic. As a consequence of the pandemic, in-person services had been terminated. The center served as a referral bank to help caretakers identify play therapy services. Once the outdoor playroom was established and COVID-19 procedures were in place, the center offered participation in the current study, which included free play therapy services to caretakers interested in on-site services. Therapists at the center are licensed professional counselor interns and licensed professional counselors.

To be eligible for participation, participants had to: a) be between the ages of 5-10 years, b) experience attentional or self-regulation concerns in home or school settings as reported by parents, c) score in the Moderately or Markedly Atypical range on the total composite score of the Brown EF/A Scales or score in the At Risk or High Risk range on the total score of the Social Emotional Assets and Resilience Scales, and d) be comfortable with in-person services in an

outdoor environment. According to G*Power a priori power analysis based on alpha of 0.05, medium effect size of 0.25, and power of 0.8, 21 participants were needed. However, due to restrictions following COVID-19 precautionary procedures, a total of 15 participants were able to be served.

Parents identified participant demographics. Participants' ages ranged from 5 to 10 years, with a mean age of 8.0. When asked about race, parents reported participants' racial identities were 13% Black (n = 2), 13% Latinx (n = 2), 7% Turkish (n = 1), and 67% White (n = 10). When asked about ethnicity, parents reported participants identified as 7% African (n = 1), 7% Black (n = 1), 52% Caucasian (n = 8), 27% Hispanic (n = 4), and 7% Turkish (n = 1). When asked about sex and gender separately, each parent reported the same answer for both demographic questions. Parents reported participants identified 60% male (n = 9) and 40% female (n = 6).

Instruments

Demographic Questionnaire

Each participant's guardian completed a demographic questionnaire containing multiple-choice and open-ended questions. The demographic questionnaire asked the following: child's age, sex, gender, race, ethnicity, average number of hours spent outdoors on a weekday, average number of hours spent outdoors on a weekend day, average number of hours of screen time on a weekday, and average number of hours of screen time on a weekend day. The four questions asked regarding outdoor time and screen time were asked during the intake and following the participant's final session.

Brown Executive Function/Attention Scales

The Brown Executive Function/Attention Scales (Brown EF/A Scales) are a set of

assessments measuring executive functions related to attention-deficit/hyperactivity disorder (ADHD) in people ages 3 years and older (Brown, 2019). The Brown EF/A Scales measure attention as a group of executive functions and potential impairments. For this study, the Brown EF/A Scales Parent Form - Early Childhood for children ages 3 to 7 years and the Brown EF/A Scales Parent Form - Child for children ages 8 to 12 years were utilized. The Brown EF/A Scales Parent Forms were scored using computer scoring software. Reliability estimates for the Brown EF/A Scales Parent Forms were considered strong with internal consistency ranging from .77 to .97. Test-Retest reliability estimates at an interval of 7-28 days between ratings were strong and ranged from .71 to .92.

Social Emotional Assets and Resilience Scales (SEARS)

The Social Emotional Assets and Resilience Scales (SEARS) is a strength-based assessment measuring social-emotional competencies of children and adolescents ages 5 to 18 years from multiple perspectives (Merrell, 2011). The SEARS measures adaptive characteristics important for a child's success at school, with peers, and in other environments from a strength-based perspective. For this study, the SEARS-Parent was utilized. The SEARS-P was scored using computer scoring software. Reliability estimates for the SEARS-P were considered strong with internal consistency ranging from .87 to .96. Test-Retest reliability estimates at a 2-week interval were strong and ranged from .88 to .93.

Procedures

First, I obtained human subjects approval from the University of North Texas Institutional Review Board. In addition to recruitment through the center, participants were recruited with convenience sampling via a flyer posted on social media pages and sent to all elementary school counselors in a local school district. Participants contacted the center to

schedule an intake appointment. After receiving informed consent from participant guardians at the beginning of the intake session, guardians completed the demographic questionnaire, the age-appropriate Brown EF/A Scales, and the SEARS-P. If the child met inclusion criteria, I scheduled play therapy sessions for the participant.

Play therapists provided the play therapy intervention with participants in the outdoor playroom. Participants received two 30-minute play therapy sessions per week for eight weeks for a total of 16 play therapy sessions. Guardians completed the Brown EF/A Scales and the SEARS-P during sessions four, eight, twelve, and sixteen. They completed the four questions regarding outdoor time and screen time during session 16. Thus, five total points of measurement were completed over the study with approximately two weeks between each measurement point.

Due to compliance with COVID-19 precautionary measures, the outdoor room was closed on Thanksgiving and did not reopen for the last two weeks of the fall semester. Thus, some participants were unable to complete 16 sessions. Of the 15 participants, 10 participants completed all 16 sessions, 3 participants completed 15 sessions, one participant completed 13 sessions, and one participant completed 12 sessions. The guardians of the 3 participants who completed 15 sessions filled out the final round of assessments during what would have been the sixteenth session even though their child was unable to be seen on that day due to the restriction of the room's closure. Thus, a total of 13 participants completed all five measurement points.

Intervention

Four play therapists who provided services to participants as a part of this study met the minimum requirements to be a doctoral level student enrolled in their second year of study or greater in a Council for Accreditation of Counseling & Related Educational Programs (CACREP) accredited program and completion of two CCPT courses with at least one semester

of supervised experience in CCPT. One play therapist was a White female counselor educator. The second play therapist was a White female who was a fourth year doctoral student. The third play therapist was an East Asian female who was a second year doctoral student. The fourth play therapist was a Chinese female who was a second year doctoral student.

Prior to implementing services for this study, all play therapists attended a one-hour orientation. The orientation reviewed CCPT philosophy and skills, introduced the outdoor playroom's structural components and the natural materials that were added into the playroom, and addressed implications of the space and natural toys such as limit-setting concerns. The orientation also included information on procedures related to the COVID-19 safety plan including protocols for disinfecting toys and equipment, face masks, social distancing practices, and hand sanitizing. All play therapists were required to follow a CCPT protocol (Ray, 2011) for the study duration and recorded all of their sessions with participants through session 16 or termination of therapy services, whichever occurred first.

The outdoor playroom was set up daily by therapists for sessions and taken down to store inside overnight and on weekends. The playroom consisted of a 10'x10' canopy with a clear vinyl roof, full length white canvas panel on one side, half-length white panels on two sides, and a fully open side. Materials in the playroom included: a mud kitchen on wheels, a picnic table, a garden box on wheels, hanging bamboo windchimes, a bucket of various sized sticks, a portable sandbox, two logs, and two shelves with toys organized into clear containers. Toys on the shelves included both natural materials such as seashells, feathers, and rocks, and more traditional CCPT toys such as dart guns, wooden vehicles, and various animal figures.

Before I analyzed data, one play therapy session per participant was randomly selected to be reviewed by an outside auditor to ensure the play therapists adhered to the CCPT protocol

with each participant. The auditor was a Master's level student in a CACREP-accredited counseling program who had taken at least two play therapy courses and received one semester of supervised CCPT supervision. Further, the auditor was trained in fidelity procedures and had previous experience completing the fidelity analysis. The auditor utilized Ray et al.'s (2017) CCPT – Research Integrity Checklist to tabulate therapist responses according to the categories listed with particular attention to non-CCPT responses. I calculated the integrity percentage after the audit was completed. A 98.9% agreement among all sessions for following the CCPT protocol was met.

Data Analysis

To answer this study's primary research question, I planned two repeated measures ANOVAs using Total Composite Score on the Brown EF/A Scales and Total Score on the SEARS-P as the dependent variables. Prior to running the analyses, the dataset was examined to determine if the assumptions for a repeated measures ANOVA were met. All assumptions were met. Because G*Power indicated a necessary sample size of 21 participants, post power analysis was run on each ANOVA to address credible effects. If the analyses were found to be statistically significant, post hoc analyses were examined to determine between which time points change occurred.

For the purpose of this study, statistical significance was determined by a p-value less than 0.05. After running the repeated measures ANOVA analysis in SPSS, the output was examined to determine if there was a statistically significant difference across time. I completed post hoc pairwise comparison analyses to determine between which points of measurement significant changes occurred. To test for practical significance, I calculated Cohen's *d* effect sizes for the dependent variable to determine the magnitude of the differences between the

measurement points. I interpreted effect sizes of .2 to represent a small effect, .5 a medium effect, and .8 a large effect (Cohen, 1988). I examined clinical significance results by noting the change in clinical categories among participants between measurements.

Results

Separate repeated measures ANOVAs were conducted for each dependent variable to evaluate the impact of CCPT in an outdoor playroom across five points of measure. A reduction in scores on the Brown EF/A Scales and an increase in scores on the SEARS indicate improvement. Time served as the independent variable, including points of measure at the intake session and during Sessions 4, 8, 12, and 16.

Group means, standard deviations, and range of scores are reported in Table 2.

Table 2

*Mean Scores of Each Dependent Variable Across Time (*n = *13)*

		M	*SD*	Range
Brown EF/A Scales Total Composite Score	Intake	67.77	7.30	55-81
	Session 4	63.54	9.61	49-78
	Session 8	62.23	9.05	49-79
	Session 12	58.23	8.60	47-74
	Session 16	56.92	7.90	46-70
SEARS-P Total Score	Intake	38.31	6.13	31-50
	Session 4	41.92	7.16	30-52
	Session 8	42.46	7.15	31-55
	Session 12	45.23	7.38	32-55
	Session 16	44.62	7.16	33-56

Note. A decrease in mean scores on the Brown EF/A Scales indicates improvement in executive functioning/ attention symptoms. An increase in mean scores on the SEARS-P indicates improvement in social-emotional competencies.

The ranges indicate a large spread of data across participants at each data point, indicating that

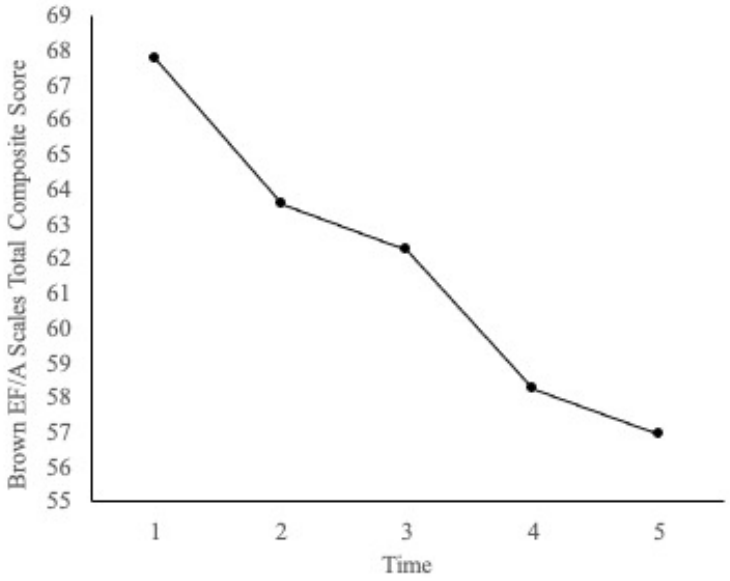
some participants scored higher or lower than other participants on the same assessment at the same data point. Mean scores are impacted by large variations between individual scores as indicated by range values.

Brown EF/A Scales Total Composite

The first repeated measures ANOVA assessed the impact of outdoor CCPT on participants' executive functioning/ attention scores on the Brown EF/A Scales across time as reported by parents. The assumptions for level of measurement, independent observations, and normal distribution were all reasonably met. When examining the means of participants over time, observation indicates a decrease in the average Brown EF/A Total Composite scores from intake to session 16, marking overall improvement in children's executive functioning/ attention.

Figure 1

Means over Time on Brown EF/A Scales Total Composite



There was a statistically significant effect for time, Wilks' Lambda = .21, F (4, 9) = 8.447, p = .004, observed power = .96. Thus, a statistically significant decrease in Total

Composite scores across the five points of measurement was found. Because a statistically significant result was obtained, a Pairwise Comparisons analysis utilizing the Bonferroni method was completed to determine where the difference in scores occurred. Cohen's *d* was calculated for each statistically significant difference. Statistically significant differences were found between time points 1 and 3 with a medium effect ($p = .043$, $d = .674$), 1 and 4 with a large effect ($p < .001$, $d = 1.196$), 1 and 5 with a large effect ($p < .001$, $d = 1.427$), 3 and 4 with an approaching medium effect ($p = .031$, $d = .453$), and 3 and 5 with a medium effect ($p = .025$, $d = .625$). In summary, there was a statistically significant difference in Total Composite scores between the first and last points of measure with a large effect.

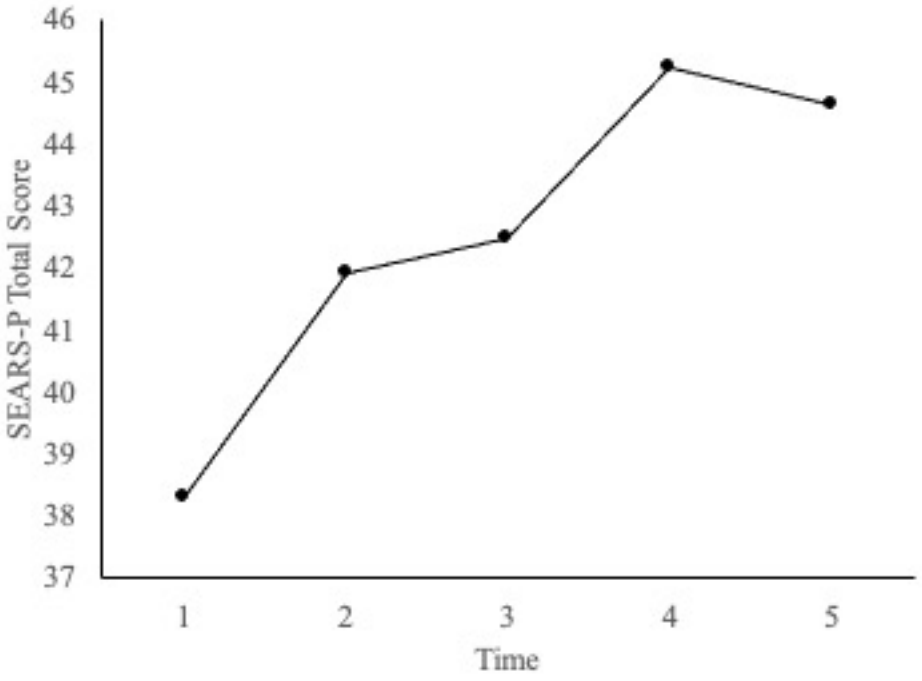
When examining participants' means over time, results indicate clinically significant change in executive functioning/ attention. On average, children's scores at the first time measurement ($M = 67.77$) were in the Moderately Atypical range signifying a significant problem with attention-related behaviors. At the final time measurement, children's scores had improved ($M = 56.92$) and were in the Somewhat Atypical range signifying a possible significant problem with attention-related behaviors. This decrease in scores represented a one-tier decrease in the classification of clinical severity of symptoms reported by parents.

SEARS-P Total Score

The second repeated measures ANOVA assessed the impact of outdoor CCPT on participants' social-emotional competencies scores on the SEARS-P across time as reported by parents. The assumptions for level of measurement, independent observations, and normal distribution were all reasonably met. When examining the means of participants over time, observation indicates an increase in the average SEARS-P Total Scores from intake to session 16, marking overall improvement in children's social-emotional competencies.

Figure 2

Means over Time on SEARS-P Total Score



There was a statistically significant effect for time, Wilks' Lambda = .16, F (4, 9) = 11.809, p = .001, observed power = .99. Thus, a statistically significant decrease in Total Scores across the five points of measurement was found. Because a statistically significant result was obtained, a Pairwise Comparisons analysis was completed to determine where the difference in scores occurred. Cohen's d was calculated for each statistically significant difference. Statistically significant differences were found between time points 1 and 3 with a medium effect (p = .016, d = .623), 1 and 4 with a large effect (p = .011, d = 1.020), 1 and 5 with a large effect (p < .001, d = .947), and 3 and 5 with a small effect (p = .007, d = .302). In summary, there was a statistically significant difference in Total Scores between the first and last points of measure with a large effect.

When examining the means of participants over time, results indicate clinically

significant change in social-emotional competencies. On average, children's scores at the first time measurement (M = 38.31) were in the Tier 2 range signifying they were at risk for emerging deficits in social-emotional competencies (Merrell, 2011). At the final time measurement, children's scores had improved (M = 44.62) and were in the Tier 1 range signifying average to excellent social emotional competencies (Merrell, 2011). This decrease in scores represented a one-tier decrease in the classification of clinical severity of symptoms reported by parents.

Discussion

The current study results indicate that CCPT in an outdoor playroom may be a potential treatment modality to use when improving attention and social-emotional competencies in children. Previous research on the effects of nature exposure indicates children who are diagnosed with attention disorders, specifically ADD and ADHD, benefit from increased exposure to the natural world outdoors (Kuo & Taylor, 2004; Taylor & Kuo, 2011; Taylor et al., 2001; Yang et al., 2019). Taylor and colleagues (2001) found parents reported less severity in ADD/ADHD symptoms the greener their child's everyday play environment. Further, Kuo and Taylor (2004) found parents reported significantly reduced ADD/ADHD symptoms following green outdoor activities. Consistent with previous research (Kram, 2019; Muro et al., 2006; Ray et al., 2007; Robinson et al., 2017; Schottelkorb & Ray, 2009), findings from the current study affirm CCPT as a treatment for children with attention disorders with overall positive results. Therefore, results of the current study on reducing executive functioning/attention problems are supported by previous randomized controlled trial studies where participants also demonstrated improvement after receiving CCPT in a traditional setting.

Additionally, previous research on the effects of increased nature exposure indicates children experience social-emotional benefits, including increased emotional self-regulation

(Bakir-Demir et al., 2019; Scott et al., 2018; Weeland et al., 2019) and decreased peer relationship problems (Amoly et al., 2014; Hinkley et al., 2018). Consistent with historical research (Bratton et al., 2013; Cheng & Ray, 2016; Ray, Stulmaker, et al., 2013; Wilson & Ray, 2018), findings from the current study affirm the effectiveness of CCPT as a treatment for children who experience social-emotional deficits with overall positive results. To date, no quantitative studies examining the effect on social-emotional competencies of an intervention based on CCPT principles in an outdoor environment have been conducted. Thus, the results of the current study provide novel insight. Overall, the outdoor aspect of this study's intervention served to explore the effects of therapy in an outdoor environment further, indicating that CCPT presented in a nature-based setting resulted in improvement in participants' attention and overall social-emotional competencies with large effects.

CCPT Integration with Nature

The current study sought to ground CCPT in the outdoors to capitalize on the therapeutic benefits of both. Consistent with previous research (Swank & Shin, 2015; Swank & Smith-Adcock, 2018), findings from the current study affirm the establishment of CCPT in outdoor settings with children struggling with attention. When Swank et al. (2015) explored the implementation of NBCCPT with children exhibiting behavioral concerns related to attention, they found children demonstrated decreased total problems and increased on-task behavior following the integrated intervention. Further, Swank and Smith-Adcock (2018) found NBCCPT improved on-task behaviors for children with reported ADHD diagnoses. Researchers have not investigated the impact of NBCCPT on social-emotional competencies in children. No quantitative studies examining the effect of an intervention based on CCPT principles in an outdoor environment have been conducted to date. Thus, the current study results provide novel

insight into possible improvement in children's social-emotional competencies through continued exploration of nature integration with CCPT interventions. Placing CCPT in an outdoor playroom allowed participants to cope with their attention deficits and strengthen their social-emotional competencies through an accepting, understanding relationship with a play therapist while in an environment where they could also experience fewer cognitive demands on attention and explore the edges of their social-emotional competencies through relationships with other living beings.

From this perspective of grounding nature in CCPT, I took an additive approach to combine the therapeutic benefits of both while limiting the dilution of the numerous factors comprising either one. Because research supported the effectiveness of both traditional CCPT (Cheng & Ray, 2016; Kram, 2019; Ray et al., 2007; Wilson & Ray, 2018) and NBCCPT (Swank & Smith-Adcock, 2018; Swank et al., 2015), I wanted to combine the kinds of spaces and toys utilized in both. Thus, the outdoor playroom had both a covered area and a free nature space for play. In the outdoor playroom, children were also offered a combination of traditional CCPT toys defined by Landreth (2012) and natural toys including some of the ones suggested by Swank and Shin (2015). As I endeavored toward greater theoretical integration and actively practiced play therapy from this lens throughout the study, two challenges for further consideration developed. One challenge involved a need to clarify the goals of play therapy from an integrated lens. The second challenge was to assess the present relationships with nature and determine the appropriate degree of interaction with them during sessions.

The first challenge of clarifying the goals of outdoor CCPT arose from pondering how to address limit-setting around harmful interactions with living other-than-human organisms and why it mattered. When reviewing Landreth's (2012) general therapeutic objectives of CCPT, all

ten focused on developing the child's understanding of self, including qualities such as self-concept, self-responsibility, and self-directing. However, returning to person-centered theory from which CCPT was adapted, Rogers (1951, 1957) discussed therapy in broader terms as a way to resolve breaks in self-concept. Breaks resulted from a person having a significant degree of incongruence between their experience and self-concept. Incongruencies accumulate as experiences that meet conditions of worth become accurately perceived into awareness and experiences that contradict conditions of worth are perceived partly through distortion, ignored, or denied as a means of defense (Rogers, 1959). Rogers (1957) described the six conditions that he believed were necessary and sufficient for therapy to resolve incongruencies (i.e., both persons in psychological contact, client in state of vulnerability, therapist congruence, therapist unconditional positive regard, therapist empathic understanding, and client perceives unconditional positive regard and empathic understanding). The third through fifth conditions require the therapist to be congruent within the relationship, experience unconditional positive regard for the client, and communicate an empathic understanding of the client's experience. The last condition is that the client, to some degree, senses the therapist's empathic understanding and unconditional positive regard.

Considering Rogers' (1957) six conditions as the goals of person-centered therapy, and by extension as the goals for CCPT, the purpose of including nature in therapy starts to become clearer. First, the play therapist can increase their own congruence in the therapeutic relationship by recognizing congruence exists at many levels, including consistency between self, experience, and the world, also known as organismic integration (Cornelius-White, 2011). Organismic integration highlights that congruence exists for persons from the cellular to ecological level (Cornelius-White, 2011). Therefore, the inclusion of nature allows the therapist to convey a

higher level of congruence because they practice at the organismic integration level. Second, the play therapist can increase their communication of empathic understanding of the child's experience because they attend to an additional aspect of that experience – the child's experience of nature and the natural world.

The second challenge of theoretically integrating CCPT and nature was how to assess the present relationships with nature and determine the appropriate degree of interaction with such relationships during sessions. From an ecotherapy perspective, nature serves as another therapeutic agent and as an input of nonverbal communication. For the current study, level of therapist awareness of this role of nature varied across play therapists. Further, when the play therapist noticed a communication source from nature, she had to decide what to bring to the child's awareness versus save for her own observations. For example, in one session a child was processing grief from a family pet dying. As the child somberly sifted sand to create a grave scene, a butterfly flew into the canopy and rested on the canopy frame. When the child shifted his play to a happier crafting activity, the butterfly left the canopy and did not return. Although the therapist was aware of how the butterfly sat with the child throughout his processing of grief, the therapist chose not to bring the child's attention to how the insect had found the playroom and the child's grief safe to rest with because the therapist did not think it matched the child's experience of the moment. In comparison, when a child pointed out a moth sitting on the ground, the therapist reflected the child had noticed the insect. Then, the moth flew away and the child took a plastic butterfly and mimicked the moth's flight pattern from the ground to past the edge of the canopy frame. The therapist reflected how the child liked how the moth flew so much that he wanted to fly the same way.

Greater theoretical integration of CCPT and nature will require play therapists to continue

accruing play therapy experience from this lens. The two challenges described above continue to lack clear resolution. Thus, future play therapists should continue to examine the theoretical implications of what true integration would encompass.

Limitations

Although this study's intervention was exploratory in nature and a repeated-measures design improved credibility and rigor, some limitations impacted the interpretation of results. The primary limitation was the use of a single group design. Given the study's exploratory nature and a lack of a control group, maturational effects cannot be completely ruled out. Without a control group, I cannot determine if participants' improvement in attention and social-emotional competencies is primarily due to the outdoor CCPT intervention or other extraneous variables the participants may have shared.

Furthermore, the study consisted of a small sample size (n = 13). When calculating suggested sample size with G*Power prior to data collection, a total of 21 participants were suggested. Although I was unable to meet the suggested size, my observed power for both repeated measures ANOVAs was .96 and .99. This observed power level suggests a high probability that the tests correctly rejected the null hypothesis and I avoided making a type II error in interpreting the results, indicating that positive change over time in CCPT actually occurred.

Implications

This study yielded many implications for both current clinical practice and future research in CCPT. This study provides evidence that CCPT can be integrated into outdoor spaces and potentially have positive effects on children's attention and social-emotional competencies. Furthermore, this study can help expand the development of creative and theoretically grounded

interventions, specifically those that demonstrate the flexible application of CCPT principles within novel therapeutic contexts.

This study provided insight into the application of CCPT in an outdoor environment where the play therapist has less control over the space itself and may be confronted with unexpected changes in the environment. Additional considerations ranged from expanding CCPT theoretical rationale to include a respect for nature in introducing the therapeutic space and limit-setting to overcoming obstacles related to being exposed to various weather conditions. Physical changes to the outdoor space over the course of the study included changes to the ground under the canopy, wet and cold weather, and a time change from daylight savings time to standard time. As therapists were confronted with new obstacles related to being outdoors, I helped create solutions that would maintain the theoretical integrity of CCPT while honoring the integration of nature into therapeutic practice.

Among multiple considerations, therapists and participants adjusted preparations for sessions based on changes in weather and time of day, something that would typically not occur for sessions held indoors. Therapists, children, and caregivers were mindful of the weather forecasted and experienced during sessions. Weather determined what kind of clothing participants needed to wear to feel comfortable and less distracted by discomfort related to the outdoor temperature. Whereas some therapists may set limits around bringing drinks to sessions indoors, children were allowed to bring water bottles to the outdoor room as another way to help regulate their body's needs in hotter weather. Further, parents were encouraged to consider sun protection (e.g., sunscreen, hats, etc.) and bug protection (e.g., bug spray) for children. Weather also affected how long therapists needed to set up the room at the beginning of the day. During colder weather, the clear vinyl roof took more effort to attach to the canopy. Therefore, on colder

days room set up was scheduled to start earlier. Similarly, when it was raining, set up took longer and adjustments to the schedule were made to accommodate the additional time.

In addition to physical changes to the space, outdoor considerations involved unexpected occurrences that arose out of being in a less controlled environment. One of the most frequent occurrences outside of the therapists' control was noise including sounds such as birdsong, bird screeches, cars and large buses passing on a nearby street, roofing repair of nearby apartment buildings, students from the neighboring building creating art outdoors by sawing into a concrete mold, and monthly weather warning siren tests. Whenever loud sounds occurred unexpectedly, therapists followed the child's lead in responding while also mentally observing how the child responded. One example of this across different participants was with bird sounds. Birds became more active and vocal in the trees on space's boundary during later afternoon sessions. One participant responded to the loud bird noises by commenting about them to the counselor and continuing with her play despite the distraction. Although she expressed frustration, she also demonstrated a high tolerance level. Later in the session, she shared that she thought the birds were having a meeting about something which demonstrated a level of empathy she could hold for other living creatures sharing the space with her. Another participant verbally expressed frustration at the loud sounds followed by taking the mallet and banging it on the trees at his eye level. This action caused the birds to stop and the child expressed satisfaction in his problem-solving. In both situations, the therapists were able to gain insight into how both children approached conflict resolution in the moment.

Finally, one unexpected occurrence during outdoor sessions was needing to protect the space from other people interrupting the session or breaching the confidential playroom. During the intake session, I prepared participants' parents during the informed consent process that

sessions outdoors have a higher probability of people walking by to potentially walk closer to the canopy and overhear their child before the therapist intervened. Parents appeared to be understanding of this added risk and no participants chose to opt out of services due to this information. Further, the outdoor space itself was prepared to discourage anyone from entering the space without the therapist's permission. Signs were placed approximately 10 feet away from the canopy on all three sides open to a parking lot or tree line. The signs stated that no more than two people should be within the perimeter at any time without the therapist's verbal consent. Even with planning in place, one therapist did have to respond to a person interrupting a session. The therapist took on an active role, stood up, and placed herself between her client and the third person. The therapist communicated a limit to the third person and they left the space. During the interaction, the client continued their play and the therapist immediately returned to attending to the client following the interruption.

While this study begins to explore the viability and impact of providing CCPT in an outdoor playroom, future studies need to be conducted to understand further the potential outcomes of integrating nature into CCPT treatment. Randomized controlled trials comparing the effects of CCPT in an outdoor playroom with outcomes from a waitlist control group and traditional CCPT are recommended. Such designs would determine the effectiveness of CCPT in an outdoor playroom and isolate the variable of nature inclusion to determine differences between treatment effects. Additionally, randomized controlled trials would require a larger sample size and thus increase the generalizability of findings.

Conclusion

The current study illustrates the possible benefits of theoretically integrating CCPT and nature and the clinical impacts the novel approach could have on children's attention and social-

emotional competencies. The study also provided insight into the viability of providing an outdoor CCPT intervention at a larger scale and some problems that may arise in creating and maintaining an outdoor playroom. Through CCPT in an outdoor playroom, children were reported to have reduced problematic symptoms affecting their daily functioning, but also were provided the opportunity to explore what it was like to be understood holistically as an individual interconnected with the other-than-human world around them.

References

Adams, S., & Savahl, S. (2017). Children's discourses of natural spaces: Considerations for children's subjective well-being. *Child Indicators Research, 10,* 423-446. https://doi.org/10.1007/s12187-016-9374-2

Aggio, D., Smith, L., Fisher, A., & Hamer, M. (2015). Mothers' perceived proximity to green space is associated with TV viewing time in children: The growing up in Scotland study. *Preventative Medicine, 70,* 46-49. https://doi.org/10.1016/j.ypmed.2014.11.018

Amoly, E., Dadvand, P., Forns, J., López-Vicente, M., Basagaña, X., Julvez, J., Alvarez-Pedrerol, M., Nieuwenhuijsen, M. J., & Sunyer, J. (2014). Green and blue spaces and behavioral development in Barcelona schoolchildren: The BREATHE project. *Environmental Health Perspectives, 122*(12), 1351-1358. https://doi.org//10.1289/ehp.1408215

Axline, V. M. (1969). *Play therapy*. Ballantine.

Bakir-Demir, T., Berument, S. K., & Sahin-Acar, B. (2019). The relationship between greenery and self-regulation of children: The mediation role of nature connectedness. *Journal of Environmental Psychology, 65*. https://doi.org/10.1016/j.jenvp.2019.101327

Berman, M. G., Kross, E., Krpan, K. M., Askren, M. K., Burson, A., Deldin, P. J., Kaplan, S., Sherdell, L., Gotlib, I. H., & Jonides, J. (2012). Interacting with nature improves cognition and affect for individuals with depression. *Journal of Affective Disorders, 140*, 300-305. https://doi.org/10.1016/j.jad.2012.03.012

Berto, R., Pasini, M., & Barbiero, G. (2015). How does psychological restoration work in children? An exploratory study. *Journal of Child & Adolescent Behavior, 3*(3), 1000200. https://doi.org/10.4172/2375-4494.1000200

Bratton, S. C., Ceballos, P. L., Sheely-Moore, A. I., Meany-Walen, K., Pronchenko, Y., & Jones, L. D. (2013). Head start early mental health intervention: Effects of child-centered play therapy on disruptive behaviors. *International Journal of Play Therapy, 22*(1), 28-42. https://doi.org/10.1037/a0030318

Bratton, S. C., Ray, D., Rhine, T., & Jones, L. (2005). The efficacy of play therapy with children: A meta-analytic review of treatment outcomes. *Profession Psychology: Research and Practice, 36*(4), 376-390. https://doi.org/10.1037/0735-7028.36.4.376

Brown, T. E. (2019). *Brown executive functioning/attention scales.* Pearson.

Brymer, E., Cuddihy, T. F., & Sharma-Brymer, V. (2010). The role of nature-based experiences in the development and maintenance of wellness. *Asia-Pacific Journal of Health, Sport and Physical Education, 1*(2), 21-27. https://doi.org/10.1080/18377122.2010.9730328

Chawla, L. (2015). Benefits of nature contact for children. *Journal of Planning Literature, 30*(4), 433-452, https://doi.org/10.1177/0885412215595441

Cheng, Y., & Ray, D. C. (2016). Child-centered group play therapy: Impact on social-emotional assets of kindergarten children. *The Journal for Specialists in Group Work, 41*(3), 209-237. https://doi.org/10.1080/01933922.2016.1197350

Clements, R. (2004). An investigation of the status of outdoor play. *Contemporary Issues in Early Childhood, 5*(1), 68-80. https://doi.org/10.2304/ciec.2004.5.1.10

Cohen, J. W. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Cornelius-White, J. H. D. (2011). Congruence: An integrative five-dimension model. *Person-Centered & Experiential Psychotherapies, 6*(4), 229-239. https://doi.org/10.1080/14779757.2007.9688444

Dadvand, P., Nieuwenhuijsen, M. J., Esnaola, M., Forns, J., Basagaña, X., Alvarez-Pedrerol, M., Rivas, I., López-Vincente, M., Pascual, M. D. C., Su, J., Jerrett, M., Querol, X., & Sunyer, J. (2015). Green spaces and cognitive development in primary schoolchildren. *Proceedings of the National Academy of Sciences of the United States of America, 112*(26), 7937-7942. https://doi.org/10.1073/pnas.1503402112

Dankiw, K. A., Tsiros, M. D., Baldock, K. L., Kumar, S. (2020). The impacts of unstructured nature play on health in early childhood development: A systematic review. *PLoS ONE 15*(2), e0229006. https://doi.org/10.1371/journal.pone.0229006

Dzhambov, A. M., Dimitrova, D. D., & Dimitrakova, E. D. (2014). Association between residential greenness and birth weight: Systematic review and meta-analysis. *Urban Forestry & Urban Greening, 13*(4), 621-629. https://doi.org/10.1016/j.ufug.2014.09.004

Fong, K., Hart, J. E., & James, P. (2018). A review of epidemiologic studies on greenness and health: Updated literature through 2017. *Current Environmental Health, 5*(1), 77-87. https://doi.org/10.1007/s40572-018-0179-y

Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Kahn, P. H., Jr., & Lawler, J. J. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives, 125*(7), 75001. https://doi.org/10.1289/ehp1663

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health, 35*, 207-228. https://doi.org/10.1146/annurev-publhealth-032013-182443

Hinkley, T., Brown, H., Carson, V., & Teychenne, M. (2018). Cross sectional associations of screen time and outdoor play with social skills in preschool children. *PLoS ONE, 13*(4), e0193700. https://doi.org/10/1371/journal.pone.0193700

Johnson, S. A., Snow, S., Lawrence, M. A., & Rainham, D. G. C. (2019). Quasi-randomized trial of contact with nature and effects on attention in children. *Frontiers in Psychology, 10,* 2652. https://doi.org/10.3389/fpsyg.2019.02652

Kihal-Talantikite, W., Padilla, C. M., Lalloué, B., Gelormini, M., Zmirou-Navier, D., & Deguen, S. (2013). Green space, social inequalities and neonatal mortality in France. *BMC Pregnancy and Childbirth, 13*(1), 191. https://doi.org/10.1186/1471-2393-13-191

Kimbro, R. T., Brooks-Gunn, J., & McLanahan, S. (2011). Young children in urban areas: Links among neighborhood characteristics, weight status, outdoor play, and television watching. *Social Science & Medicine, 72*, 668-676. https://doi.org/10.1016/j.socscimed.2010.12.015

Kram, K. (2019). *Child centered play therapy and adverse childhood experiences: Effectiveness on impulsivity and inattention* [University of North Texas]. ProQuest Dissertations & Theses Global. https://www.proquest.com/docview/2317707884?accountid=7113

Kuo, F. E., & Taylor, A. F. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health, 94*(9), 1580-1586. https://doi.org/10.2105/AJPH.94.9.1580

Landreth, G. L. (2012). *Play therapy: The art of the relationship*. Routledge.

Lee, M., Kim, S., & Ha, M. (2019). Community greenness and neurobehavioral health in children and adolescents. *Science of the Total Environment, 672,* 381-388. https://doi.org/10.1016/j.scitotenv.2019.03.454

Lin, Y. W., & Bratton, S. C. (2015). A meta-analytic review of child-centered play therapy approaches. *Journal of Counseling & Development, 93*, 45-58. https://doi.org/10.1002/j.1556-6676.2015.00180.x

Lix, L. M., & Keselman, H. J. (2019). Analysis of variance: Repeated-measures designs. In G. R. Hancock, L. M. Stapleton, & R. O. Mueller (Eds.), *The reviewer's guide to quantitative methods in the social sciences* (2nd ed., pp.15-28). Routledge.

Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder.* Algonquin Books of Chapel Hill.

Lynskey, M. & Sussman, S. (2001). Pilot studies. In Sussman, S. (Ed.), *Handbook of program development for health behavior research and practice* (pp. 391-421). Sage. https://doi.org/10.4135/9781412991445

Maller, C. M., Townsend, M., Pryor, A., Brown, P., & St Leger, L. (2005). Healthy nature healthy people: 'Contact with nature' as an upstream health promotion intervention for populations. *Health Promotion International, 21*(1), 45–54. https://doi.org/10.1093/heapro/dai032

Markevych, I., Thiering, E., Fuertes, E., Sugiri, D., Berdel, D., Koletzko, S., von Berg, A., Bauer, C., & Heinrich, J. (2014). A cross-sectional analysis of the effects of residential greenness on blood pressure in 10-year old children: Results from the GINIplus and LISAplus studies. *BMC Public Health, 14,* 477. https://doi.org/10.1186/1471-2458-14-477

Markevych, I., Tiesler, C. M. T., Fuertes, E., Romanos, M., Dadvand, P., Nieuwenhuijsen, M. J., Berdel, D., Koletzko, S., & Heinrich, J. (2014). Access to urban green spaces and behavioural problems in children: Results from the GINIplus and LISAplus studies. *Environment International, 71,* 29-35. https://doi.org/10.1016/j.envint.2014.06.002

Mårtensson, F., Boldemann, C., Söderström, M., Blennow, M., Englund, J. E., & Grahn, P. (2009). Outdoor environmental assessment of attention promoting settings for preschool children. *Health & Place, 15,* 1149-1157. https://doi.org/10.1016/j.healthplace.2009.07.002

Merrell, K. W. (2011). *Social emotional assets and resilience scales: Professional manual.* PAR.

Muro, J., Ray, D., Schottelkorb, A., Smith, M. R., & Blanco, P. J. (2006). Quantitative analysis of long-term child-centered play therapy. *International Journal of Play Therapy, 15*(2), 35-58. https://doi.org/10.1037/h0088914

O'Reilly, M., Ronzoni, P. & Dogra, N. (2013). Choosing a method for your research. In *Research with children* (pp. 158-176). Sage. https://doi.org/10.4135/978152648

Ray, D. C. (2011). *Advanced play therapy: Essential conditions, knowledge, and skills for child practice.* Routledge.

Ray, D. C., Armstrong, S. A., Balkin, R. S., & Jayne, K. M. (2015). Child-centered play therapy in the schools: Review and meta-analysis. *Psychology in the Schools, 52*(2), 107-123. https://doi.org/10.1002/pits.21798

Ray, D. C., Lee, K. R., Meany-Walen, K. K., Carlson, S. E., Carnes-Holt, K. L., & Ware, J. N. (2013). Use of toys in child-centered play therapy. *International Journal of Play Therapy, 22*(1), 43-57. https://doi.org/10.1037/a0031430

Ray, D. C., Purswell, K., Haas, S., Aldrete, C. (2017). Child-Centered Play Therapy-Research Integrity Checklist: Development, reliability, and use. *International Journal of Play Therapy, 26*(4), 207-217.

Ray, D. C., Schottelkorb, A., & Tsai, M. (2007). Play therapy with children exhibiting symptoms of attention deficit hyperactivity disorder. *International Journal of Play Therapy, 16*(2), 95-111. https://doi.org/10.1037/1555-6824.16.2.95

Ray, D. C., Stulmaker, H. L., Lee, K. R., & Silverman, W. K. (2013). Child-centered play therapy and impairment: Exploring relationships and constructs. *International Journal of Play Therapy, 22*(1), 13-27. https://doi.org/10.1037/a0030403

Rivkin, M. S., & Schein, D. (2014). *The great outdoors: Advocating for natural spaces for young children.* National Association for the Education of Young Children.

Robinson, A., Simpson, C., & Hott, B. L. (2017). The effects of child-centered play therapy on the behavioral performance of three first grade students with ADHD. *International Journal of Play Therapy, 26*(2), 73-83. https://doi.org/10.1037/pla0000047

Robinson, C. (2019). Young children's spirituality: A focus on engaging with nature. *Australasian Journal of Early Childhood, 44*(4), 339-350. https://doi.org/10.1177/1836939119870907

Rogers, C. R. (1951). *Client-centered therapy: Its current practice, implications, and theory.* Constable and Company.

Rogers, C. R. (1957). The necessary and sufficient conditions of the therapeutic personality change. *Journal of Consulting Psychology, 21*(2), 95-103. https://doi.org/10.1037/h0045357

Rogers, C. R. (1959). A theory of therapy, personality, and interpersonal relationships, as developed in the client-centered framework. In S. Koch (Ed.) *Psychology: A study of a science: Vol. 3. Formulations of the person and the social context* (184-256). McGraw-Hill.

Sando, O. J. (2019). The outdoor environment and children's health: A multilevel approach. *International Journal of Play, 8*(1), 39-52. https://doi.org/10.1080/21594937.2019.1580336

Schein, D. (2014). Nature's role in children's spiritual development. *Children, Youth and Environments, 24*(2), 78-101.

Schottelkorb, A. A., & Ray, D. C. (2009). ADHD symptom reduction in elementary students: A single-case effectiveness design. *Professional School Counseling, 13*(1), 11-22.

Scott, J. T., Kilmer, R. P., Wang, C., Cook, J. R., & Haber, M. G. (2018). Natural environments near schools: Potential benefits for socio-emotional and behavioral development in early childhood. *American Journal of Community Psychology, 62*, 419-432. https://doi.org/10.1002/ajcp.12272

Skår, M., & Krogh, E. (2009). Changes in children's nature-based experiences near home: From spontaneous play to adult-controlled, planned and organised activities. *Children's Geographies, 7*(3), 339-354. https://doi.org/10.1080/14733280903024506

Stevenson, M. P., Dewhurst, R., Schilhab, T., & Bentsen, P. (2019). Cognitive restoration in children following exposure to nature: evidence from the attention network task and

mobile eye tracking. *Frontiers in Psychology, 10,* 42. https://doi.org/10.3389/fpsyg.2019.0042

Swank, J. M., Cheung, C., Prikhidko, A., & Su, Y., (2017). Nature-based child-centered group play therapy and behavioral concerns: A single-case design. *International Journal of play Therapy, 26*(1), 47-57. https://doi.org/10.1037/pla0000031

Swank, J. M., & Shin, S. M. (2015). Nature-based child-centered play therapy: An innovative counseling approach. *International Journal of Play Therapy, 24*(3), 151-161. https://doi.org/10.1037/a0039127

Swank, J. M., Shin, S. M., Cabrita, C., Cheung, C., & Rivers, B. (2015). Initial investigation of nature-based, child-centered play therapy: A single-case design. *Journal of Counseling & Development, 93*, 440-450. https://doi.org/10.1002/jcad.12042

Swank, J. M., & Smith-Adcock, S. (2018). On-task behavior of children with attention-deficit/hyperactivity disorder: Examining treatment effectiveness of play therapy interventions. *International Journal of Play Therapy, 27*(4), 187-197. https://doi.org/10.1037/pla0000084

Swank, J. M., Walker, K. L. A., & Shin, S. (2020). Indoor nature-based play therapy: Taking the natural world inside the playroom. *International Journal of Play Therapy, 29*(3), 155-162. https://doi.org/10.1037/pla0000123

Taylor, A. F., & Kuo, F. E. (2011). Could exposure to everyday green spaces help treat ADHD? Evidence from children's play settings. *Applied Psychology: Health and Well-Being, 3*(3), 281-303. https://doi.org/10.1111/j.1758-0854.2011.01052.x

Taylor, A. F., Kuo, F. E., & Sullivan, W. C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior, 33*(1), 54-77. https://doi.org/10.1177/00139160121972864

Torquati, J., Schutte, A., & Kiat, J. (2017). Attentional demands of executive function tasks in indoor and outdoor settings: Behavioral and neuroelectrical evidence. *Children, Youth and Environments, 27*(2), 70-92.

Twohig-Bennett, C., & Jones, A. (2018). The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes. *Environmental Research, 166,* 628-637. https://doi.org/10.1016/j.envres.2018.06.030

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*(4647), 420-421. https://doi.org/10.1126/science.6143402

Ulset, V., Vitaro, F., Brendgen, M., Bekkhus, M., & Borge, A. I. H. (2017). Time spent outdoors during preschool: Links with children's cognitive and behavioral development. *Journal of Environmental Psychology, 52*, 69-80. https://doi.org/10.1016/j.jenvp.2017.05.007

van Dijk-Wesselius, J. E., Maas, J., Hovinga, D., van Vugt, M., & van den Berg, A. E. (2018). The impact of greening schoolyards on the appreciation, and physical, cognitive and social-emotional well-being of schoolchildren: A prospective intervention study. *Landscape and Urban Planning, 180,* 15-26. https://doi.org/10.1016/j.landurbplan.2018.08.003

Ward, J. S., Duncan, J. S., Jarden, A., & Stewart, T. (2016). The impact of children's exposure to greenspace on physical activity, cognitive development, emotional wellbeing, and ability to appraise risk. *Health & Place, 40,* 44-50. https://doi.org/10.1016/j.healthplace.2016.04.015

Weeland, J., Moens, M. A., Beute, F., Assink, M., Staaks, J. P. C., & Overbeek, G. (2019). A dose of nature: Two three-level meta-analyses of the beneficial effects of exposure to nature on children's self-regulation. *Journal of Environmental Psychology, 65*, 101326. https://doi.org/10.1016/j.jenvp.2019.101326

Wells, N. M. (2000). At home with nature: Effects of "greenness" on children's cognitive functioning. *Environment and Behavior, 32*(6), 775-795.

Wells, N. M., & Evans, G. W. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior, 35*(3), 311-330. https://doi.org/10.1177/0013916503251445

Wilson, B. J., & Ray, D. (2018). Child-centered play therapy: Aggression, empathy, and self-regulation. *Journal of Counseling & Development, 96,* 399-409. https://doi.org/10.1002/jcad.12222

Yang, B., Zeng, X., Markevych, I., Bloom, M. S., Heinrich, J., Knibbs, L. D., Dharmage, S. C., Kin, S., Jalava, P., Guo, Y., Jalaludin, B., Morawska, L., Zhou, Y., Hu, L., Yu, H., Yu, Y., & Dong, G. (2019). Association between greenness surrounding schools and kindergartens and attention-deficit/hyperactivity disorder in children in China. *JAMA Network Open, 2*(12), e1917862. https://doi.org/10.1001/jamanetworkopen.2019.17862

Zach, A., Meyer, N., Hendrowarsito, L., Kolb, S., Bolte, G., Nennstiel-Ratzel, U., Stilianakis, N. I., & Herr, C. (2016). Association of sociodemographic and environmental factors with the mental health status among preschool children – Results from a cross-sectional study in Bavaria, Germany. *International Journal of Hygiene and Environmental Health, 219,* 458-467. https://doi.org/10.1016/j.ijheh.2016.04.012

Zijlema, W. L., Avila-Palencia, I., Triguero-Mas, M., Gidlow, C., Maas, J., Kruize, H., Andrusaityte, S., Grazuleviciene, R., & Nieuwenhuijsen, M. J. (2018). Active commuting through natural environments is associated with better mental health: Results from the PHENOTYPE project. *Environment International, 121*, 721-727. https://doi.org/10.1016/j.envint.2018.10.002

APPENDIX A

EXTENDED LITERATURE REVIEW

The following review is an integration of pertinent literature and research within the following areas: (a) child-centered play therapy (CCPT), (b) definitions of nature and general benefits of exposure to nature, (c) history and research exploring benefits of nature specifically for children, and (d) research exploring the use of nature with children through CCPT. This chapter will conclude with a rationalization for continued research of the relationship regarding children's exposure to nature in child-centered play therapy.

Child-Centered Play Therapy (CCPT)

In the following section, I detail the progression of CCPT from its foundation in person-centered theory to its current practice based on Garry Landreth's (2012) conceptualization. Then, I detail the traditional space suggested for CCPT sessions and materials provided by the therapist when utilizing CCPT. Finally, I provide a summary of the available research regarding the effectiveness of CCPT as an intervention.

Person-Centered Theory

Carl Rogers formulated person-centered theory as a means to conceptualize personality development and the human change process (Rogers, 1951). In 1951, Rogers delineated *The Propositions* of person-centered theory to define personality development across the lifespan, origins of psychological maladjustment, and the change process toward holistic wellness. Through his 19 propositions, Rogers theorized humans enter the world aligned with an understanding of themselves and on a path towards growth and reaching more and more of their potential. He believed it was interaction with the social environment that altered that alignment and began to create differentiation between the true experience of the organism and the self-concept. Further, Rogers demonstrated the resiliency of people in their ability to change and,

when provided environments free of conditions, that people would progress towards self-actualization.

According to Rogers (1951, 1959), personality development begins during infancy when the organism exists within a world of changing experience and perceives its own experience as reality. The organism reacts to its experience and possesses an inherent tendency toward actualizing. Rogers (1959) defined the actualizing tendency as the organism's propensity to grow and develop all its capacities in ways that serve to maintain or enhance itself. Further, Rogers stated the actualizing tendency is an organism's sole motive, making behavior goal-oriented and leading the organism toward increased autonomy. As the infant experiences its environment, it values each experience according to how well it facilitates actualization. This process is called the organismic valuing process. Following the process, the infant then responds as an organized whole to the experience.

Rogers (1951, 1959) hypothesized as an individual ages, some experiences are symbolized into an awareness of being, and this starts to form a sense of self versus other. Through continual interaction with the environment with emphasis placed on evaluational social interaction, this sense of self begins to be represented in the experiential field as a self-concept. Simultaneously with the emergence of the self, Rogers (1959) believed a need for positive regard developed. Rogers described the need as universal, pervasive, and persistent among humans. Although he stated it did not matter whether the need was inherent or learned, Rogers's claim that the actualizing tendency was the only inherent drive would suggest he considered the need for positive regard as something learned through relational experiences. Out of the development of the need for positive regard, the individual starts to establish a sense of self-regard (Rogers,

1959). Self-regard relates to the individual's associations of experiences with the level of positive regard gained or lost independent of social interaction.

Once the self-concept and need for positive regard are established within the individual, a shift occurs that has lasting repercussions on development from that point forward. Instead of the individual following the judgment of their organismic valuing process towards experiences that facilitate actualization, the need for positive regard outweighs this process, and the individual discriminates experiences based on their worthiness of positive regard and self-regard (Rogers, 1959). When the individual seeks or avoids experience primarily based on its level of worth, they have obtained what Rogers (1959) termed a condition of worth. Incongruencies begin to exist between the individual's experience and self-concept as experiences that meet conditions of worth get accurately perceived into awareness and experiences that contradict conditions of worth get perceived partly through distortion, ignored, or denied as a means of defense.

Rogers (1959) hypothesized the required events for an individual to be congruent but concluded the likelihood of such occurring to be practically nonexistent in actuality. Thus, incongruence appears to be a normalized fact of life. However, if a significant degree of incongruence exists, the individual experiences psychological tension or anxiety (Rogers, 1951, 1959). If the individual is unable to utilize their defense system to minimize the threat to their self-concept, the experience is accurately perceived into awareness, and the self-concept breaks from an inability to integrate conflicting messages. As a result, an individual's behaviors seem inconsistent as they sometimes act in accordance with their experience and sometimes with their self-concept (Rogers, 1959).

Rogers (1951, 1959) trusted people were resilient and capable of resolving these breaks if given a healthy environment. Rogers posited a decrease in conditions of worth, along with an

increase in unconditional positive self-regard, lead to healing. Not only would an individual heal the fracture between self-concept and experience, but also increase awareness of the organismic valuing process resulting in a freer movement toward actualization.

Although Rogers (1951) posited in his propositions that certain conditions must be present for a person's self-structure to change and assimilate inconsistent experiences, he concluded that more study was needed to understand the exact conditions. In a 1957 publication, Rogers definitively resolved his question about the conditions for change in therapy. Rogers (1957) stated six conditions were both necessary and sufficient for therapy to be effective. As long as all conditions were present, the client would holistically work toward alignment between self-concept and experience.

The first condition is psychological contact between two people (Rogers, 1957). Theoretically, the relationship component, however minimal, is the essential step toward personality change. Without this first condition met, none of the other five can follow. It is also worth noticing that Rogers (1957) used the term two people rather than client and therapist. According to Rogers (1957), this process was not confined to counseling relationships but could occur in any relationship in which the other five conditions were present.

The second through sixth conditions focus on the two people's roles in relationship (Rogers, 1957). Within therapy, the two people would be considered the client and the therapist. The second condition states that the client is incongruent and being vulnerable. The third through fifth conditions require the therapist to be congruent within the relationship, experience unconditional positive regard for the client, and communicate an empathic understanding of the client's experience. The last condition is that the client, to some degree, senses the therapist's empathic understanding and unconditional positive regard.

Theoretical Framework of CCPT

Virginia Axline (1969), a student and colleague of Rogers, adapted person-centered theory to application with children. She called her form of therapy non-directive play therapy, later referred to as child-centered play therapy (CCPT). Axline believed children, if given the opportunity to use their natural medium of expression, would play out their feelings and gain a sense of themselves. She acknowledged the uniqueness of a therapy in which children were free from adult influence and experienced complete acceptance and leniency to explore themselves as they holistically were. Axline (1969) proposed eight basic principles to summarize her approach and guide play therapists' in their therapeutic role with child clients. Axline's principles included:

1. The therapist must develop a warm, friendly relationship with the child, in which good rapport is established as soon as possible.
2. The therapist accepts the child exactly as he is.
3. The therapist establishes a feeling of permissiveness in the relationship so that the child feels free to express his feelings completely.
4. The therapist is alert to recognize the feelings the child is expressing and reflects those feelings back to him in such a manner that he gains insight into his behavior.
5. The therapist maintains a deep respect for the child's ability to solve his own problems if given an opportunity to do so. The responsibility to make choices and institute change is the child's.
6. The therapist does not attempt to direct the child's actions or conversation in any manner. The child leads the way; the therapist follows.
7. The therapist does not attempt to hurry the therapy along. It is a gradual process and is recognized as such by the therapist.
8. The therapist established only those limitations that are necessary to anchor the therapy to the world of reality and to make the child aware of his responsibility in the relationship. (p. 73-74).

Axline purposefully ordered the principles to place the therapeutic relationship first and limits last. She emphasized the importance of establishing a relationship with the child and

claimed it was the deciding factor for therapeutic success. Axline (1969) provided examples of how rapport was built in a first session by describing scenarios and how each of her reflections to the child were intimately connected to the kind of warm, accepting relationship she wanted to build. The remaining seven principles supported the relationship by providing the play therapist guidance on what environment was needed for the child to explore themselves without threat from the therapist.

Following Axline's principles, Landreth (2012) expanded the structure of CCPT by presenting the facilitative skills required for play therapists to conduct theoretically-grounded sessions. Landreth summed all therapist communication to the child into what he termed the four healing messages: "I am here. I hear you. I understand. I care" (Landreth, 2012, pp. 209-210). These messages are conveyed to the child through nonverbal behaviors and verbal reflections. Verbal reflections by the therapist vary throughout a session and include tracking, reflections of content, reflections of feeling, self-esteem building responses, returning responsibility, choice-giving, and therapeutic limit setting (Landreth, 2012).

Based on its theoretical foundations in person-centered theory, the primary goal of CCPT is to establish conditions that may free the child's actualizing tendency to provide the child a path towards growth and integration of experience and self-concept (Ray, 2011). However, Landreth (2012) specified 10 CCPT therapeutic objectives to describe what the child's movement towards growth would entail. The objectives address aspects of the child's greater knowledge and trust of self, including self-concept, self-responsibility, self-direction, self-acceptance, self-reliance, self-determination, self-control, self-regulation, and internal locus of control (Landreth, 2012).

Space, Toys and Materials

According to Landreth (2012), the ideal space for CCPT is a room approximately 12 feet by 15 feet or an area of between 150 to 200 square feet. The room should be located away from areas where noise may distract or disturb others. This also helps to insure the confidentiality of the child's session. Additionally to protect privacy, the ideal room should have no windows, neither indoor nor outdoor facing. The floors of the room should be vinyl tile squares and the walls should be painted with an off-white washable enamel. Although he provided a description of this ideal space, Landreth (2012) acknowledged some play therapists may face adversity in creating their playroom and encouraged them to not allow the lack of a fully equipped, ideal space to deter them from providing services. At the time of this review, no empirical research existed on the effect of room size, location, or design as described by Landreth (2012) on outcomes of CCPT.

From a CCPT perspective, toys are equated to words for children and play their language (Ginott, 1960, 1961; Landreth, 2012). Thus, each toy in the playroom is selected for the purpose of providing the child with a medium of expression. Within CCPT literature, the rationale for toy selection and categorization is limited to primarily foundational theoretical texts rather than empirical studies (Axline, 1969; Landreth, 2012; Ray, 2011; Ray, Lee, et al., 2013).

Historically, as a psychoanalytic practitioner and critic of nondirective play therapy, Lebo (1956) questioned the role of toys in play therapy noting that they were originally viewed as an unimportant factor in treatment. He described a trend towards play therapists providing a large selection and variety of toys and stated nondirective play therapists seemed to be placing more importance on what toys were chosen. Lebo (1958, 1979) posited objective criteria for selecting toys and stated toys "should be selected, rather than accumulated" (p. 23). He created

the verbal index, a mathematical formula based on ranking the level of emotionally revealing statements children made when using specific toys (Lebo, 1958, 1979). Lebo (1958, 1979) suggested play therapists could use the verbal index to determine which toys were necessary to the nondirective play therapy process.

Ginott (1960, 1961), a nondirective play therapist and student of Axline, suggested criteria for toy selection in play therapy should be based on contributions to meeting therapeutic goals. Thus, he provided five standards for toys to meet to be included in the playroom: "a) facilitate the establishment of contact with the child, b) evoke and encourage catharsis, c) aid in developing insight, d) furnish opportunities for reality testing, and e) provide media for sublimation" (p. 243). As a part of expanding upon the criteria, Ginott stated children should find toys in the playroom denied to them elsewhere as a way for the play therapist to communicate an attitude of permissiveness and tolerance of children's varied expressions in therapy.

Although Axline (1969) agreed toys granted the child a medium of expression, she did not provide a clear rationale for toy selection. Axline (1969) listed toys she thought were helpful for practicing non-directive play therapy. These suggested materials are listed in Table A.1. Axline (1969) also provided an abbreviated list as shown in Table A.2 for a portable kit or for use if the complete list of suggested materials was unattainable. In order for the child to be able to express their personality fully, Axline believed toys should allow the child to express themselves freely and without direction. Axline cautioned therapists to not use games like checkers for expressive play and to avoid inclusion of mechanical toys because they would likely impede creative play. Both of these kinds of toys would suggest a direction or correct way for the child to use them effectively taking away the child's lead in the therapeutic process. Instead, Axline suggested materials that would lend themselves to the child's creativity and allow the

child to express in a way they wanted, such as sand, dolls, and art supplies.

Table A.1

Axline's (1969) Suggested Materials (p. 54)

- Airplanes
- Baby doll
- Basin
- Broom
- Clay
- Crayons
- Cutting paper
- Di-dee doll
- Doll family
- Doll house with furniture
- Easel
- Empty berry baskets
- Finger paint
- Little cars
- Mop
- Nursing bottles
- Old newspapers
- Paper dolls
- Paper for drawing and paints
- Peg-pound set
- Pictures of people, houses, animals, other objects
- Playhouse materials (table, chairs, cot, doll bed, stove, dishes, pans, spoons, doll clothes, clothesline, clothespins, clothes basket)
- Puppets and theater
- Rags
- Sand
- Shelves
- Table
- Telephone
- Toy animals
- Toy guns
- Toy soldiers with army equipment
- Water
- Wooden mallet

Table A.2

Axline's (1969) Suitcase Play Kit Toys (p. 54)

- Baby doll
- Car
- Clay
- Crayons
- Doll family
- Doll-sized furniture
- Nursing bottles
- Paint or watercolors
- Paper
- Puppets
- Telephone (1)
- Toy gun
- Toy soldiers

Landreth (2012) stated toys were a "significant therapeutic variable" (p. 156), and emphasized selection of toys rather than accumulation. He viewed toy selection as a deliberate process where therapists considered the contribution each item would make toward play therapy objectives and compared the consistency of each item with the rationale of CCPT. He provided eight characteristics any material or toy needed to offer to justify inclusion in the playroom:

1. Facilitate a wide range of creative expression.
2. Facilitate a wide range of emotional expression.
3. Engage children's interest.

4. Facilitate expressive and exploratory play.
5. Allow exploration and expression without verbalization.
6. Allow success without prescribed structure.
7. Allow for noncommittal play.
8. Have sturdy construction for active use. (p.156)

These criteria allowed children the greatest opportunity to express themselves with the toys in a way and timing of their choosing. Beyond these criteria, Landreth (2012) posited toys and materials should facilitate the establishment of a positive therapeutic relationship while allowing the child the freedom of expression and experience within the limits of reality. Further, toys should provide tools for movement towards greater self-esteem, self-understanding, and self-control (Landreth, 2012). Landreth grouped appropriate toys for CCPT into three categories based on the likely behaviors they would naturally elicit from children. The categories were real-life toys such as a dollhouse or cash register, acting-out aggressive-release toys such as a bop bag or toy soldiers, and creative expression and emotional release toys such as sand, water, and paints. Landreth based his categorization on his experience and did not provide empirical research for which toys belonged to which category. Table A.3 lists the toys and materials Landreth suggested for use in the CCPT playroom based on his theorizing and experience with children at the University of North Texas.

Understanding that all play therapists may not have the means or space to obtain the full list of suggested materials and toys, Landreth (2012) provided a shorter list for a portable playroom that included some toys from each of his three categories: real-life toys, acting-out aggressive-release toys, and creative expression/emotional release toys. He theorized as long as some toys from each category were present, CCPT could be facilitated with some measure of success.

Table A.3

Landreth's (2012) Recommended Toys and Material (p. 167-169)

- Balls (large and small)
- Band-aids
- Barbie doll
- Bendable doll family
- Blunt scissors
- Bobo (bop bag)
- Broom, dustpan
- Building blocks (different shapes and sizes
- Cereal boxes
- Chalkboard, chalk
- Colored chalk, eraser
- Construction paper (several colors)
- Crayons, pencils, paper
- Cymbals
- Dart Gun
- Dinosaurs, shark
- Dishes (plastic or tin)
- Dishpan
- Doll bed, clothes, blanket
- Doll furniture (sturdy wood)
- Dollhouse (open-on-floor type that child can lean into)
- Dolls, baby clothes
- Dress-up clothes
- Drum
- Egg cartons
- Empty fruit and vegetable cans
- Erasable nontoxic markers
- Flashlight
- Gumby (bendable nondescript figure)
- Hand puppets (doctor, nurse, police officer, mother, father, sister, brother, baby, alligator, wolf)
- Handcuffs
- Hats: fireman, policeman, tiara, crown
- Lone Ranger-type mask and other masks
- Medical kit
- Medical mask (white dust mask)
- Nursing bottle (plastic)
- Pacifier
- Paints, easel, newsprint, brushes
- Pitcher
- Play camera
- Play money and cash register
- Pots, pan, silverware
- Pounding bench and hammer
- Puppet theater
- Purse and jewelry
- Rags or old towels
- Refrigerator (wood)
- Rope
- Rubber knife
- Rubber snake, alligator
- Sandbox, large spoon, funnel, sieve, pail
- School bus
- Soap, brush, comb
- Spider and other insects
- Sponge, towel
- Stove (wood)
- Stuffed animals (2-3)
- Telephone (2)
- Tinker toys
- Tissues
- Tongue depressors, popsicle sticks
- Toy noise-making gun
- Toy soldiers and army equipment
- Toy watch
- Transparent tape, nontoxic glue
- Truck, car, airplane, tractor, boat, ambulance
- Watercolor paints
- Xylophone
- Zoo animal and farm animal families

Ray (2011) expanded on a CCPT rationale for toy selection to promote purposeful selection of toys to serve a function in the playroom and contribute to what is essential to the therapeutic process. She presented three questions play therapists could ask to determine a toy's therapeutic value and appropriateness for the CCPT playroom. These three questions were: "1. What therapeutic purpose will this serve for children who use this room? 2. How will this help

children express themselves? 3. How will this help me build a relationship with children?" (Ray, 2011, p. 80). Ray suggested the therapist have a clear answer to each response to achieve purposeful toy selection. Ray (2011) categorized toys based on Kottman's (2011) five categories of toys: family/nurturing toys, scary toys, aggressive toys, expressive toys, and pretend/fantasy toys. However, like Landreth (2012), Kottman (2011) categorized toys based on her experience and did not provide empirical research as evidence for her classifications. Ray (2011) hoped providing the categories would support a more globalized approach to toy selection and decrease overwhelmed feelings in beginning play therapists to furnish an entire playroom, especially with limited space or resources.

In addition to general toy selection, child-centered play therapists should provide toys that sensitively reflect the cultures of the children served in the space (Glover & Landreth, 2016). Although play behaviors may not differ, play therapists should provide toys that allow children to bring their culture into the playroom and give them the greatest opportunity to choose to work on the issues most significant to them (Glover & Landreth, 2016). Chang and colleagues (2005) asked 505 play therapists registered with the Association for Play Therapy what kinds of items they added to increase the multicultural aspects of their playrooms. Responses included: ethnic dolls, sandtray figures, puppets, a wider variety of skin tone colors for markers, crayons, and clay, geographically localized foods and dress-up clothes, various cultural icons, and toys focused on different environments such as mountains or deserts (Chang et al., 2005). For work with some children, making the playroom more multiculturally appropriate could mean altering the play space beyond supplying additional toys. Some examples might consist of adding an outdoor play area (Kranz et al., 2005), increasing the number of windows (Kranz et al., 2005), or changing the paint color on the playroom walls (Ji et al., 2008; Kranz et al., 2005).

CCPT Research

Research to support the use of CCPT as an effective mental health intervention for young children exhibiting a range of concerns is well documented in multiple meta-analyses (Bratton et al., 2005; Lin & Bratton, 2015; Ray et al., 2015). In a historical meta-analysis of play therapy effectiveness, Bratton et al. (2005) assessed 93 controlled outcome studies published between 1953 and 2000. Bratton and colleagues concluded a statistically significant large treatment effect size of 0.80 ($p < .001$) for play therapy interventions, with humanistic interventions revealing a statistically significant larger effect size of 0.92 compared to an effect size of 0.71 for nonhumanistic interventions ($p < .03$). Lin and Bratton (2015) conducted a meta-analysis of 52 controlled outcome studies published between 1995 and 2010 that utilized CCPT or nondirective approaches to treatment. Lin and Bratton concluded a statistically significant moderate treatment effect size of 0.47 for CCPT ($p < .001$). They further found a statistically significant ($p = .017$) greater effect size (0.53) for children under 7 years old than for children 8 years and older (0.21) suggesting CCPT could possibly lead to greater benefits for younger children. Ray et al. (2015) focused their research on the effectiveness of CCPT in elementary school settings for outcomes measurements including: externalizing problems, internalizing problems, total problems, self-efficacy, academic, and other behaviors. Across 23 studies, Ray et al. concluded statistically significant ($p < .05$) small to medium effect sizes on all outcome constructs.

Multiple randomized controlled trial studies examined effectiveness of CCPT with children who experienced social-emotional deficits and disruptive behavior problems (Bratton et al., 2013; Cheng & Ray, 2016; Ray, Stulmaker, et al., 2013; Wilson & Ray, 2018). Wilson and Ray (2018) investigated levels of aggression, self-regulation, and empathy according to parent and teacher report in 71 children between 5 and 10 years old referred to therapy for aggression.

They analyzed the differences between the treatment (CCPT) and waitlist control groups utilizing two descriptive discriminant analyses. Wilson and Ray found parents of children who participated in CCPT reported statistically significant (p <.01) improvements compared to control group peers in all three areas. However, teachers did not report statistically significant change for participants. Wilson and Ray posited the lack of teacher-reported change could have reflected challenges with teacher sensitivity to behavioral variation in highly aggressive children or a need for greater classroom resources to provide more individualized attention to students.

Cheng and Ray (2016) also investigated social-emotional assets of young children referred to play therapy for behavioral, emotional, and interpersonal concerns. They randomly assigned 43 children between 5 and 6 years old to the child-centered group play therapy treatment group or a waitlist control group. Cheng and Ray found parents reported a statistically significant (p = .014) improvement in total score on social-emotional competencies as measured by the Social Emotional Assets and Resilience Scales-Parent (SEARS-P). In post hoc analyses, Cheng and Ray reported statistically significant improvements specifically on the Social Competence subscale (p < .05) with a medium effect size and on the Empathy subscale (p < .05) with a medium effect size. They reported a non-statistically significant interaction effect for the Self-regulation/Responsibility subscale. Cheng and Ray also found teachers reported non-statistically significant improvements for participants. They theorized the lack of teacher-reported change could have reflected challenges with teacher sensitivity to behavioral variation in challenging classroom environments.

Bratton and colleagues (2013) also studied kindergarten age children who were referred to therapy for disruptive behaviors in the classroom environment. Participants were assigned to the CCPT treatment group (n = 27) or the active control group (n =27). Teachers were blinded to

the group assignment for participants (CCPT or Reading Mentoring). Bratton et al. found statistically significant ($p < .001$) decreases in teacher-reported disruptive behaviors for children in the treatment group compared to the control group. In post hoc analyses, Bratton et al. additionally found children in the CCPT group had statistically significant ($p = .009$) decreases in attention problems compared to children who received Reading Mentoring.

Ray, Stulmaker, et al. (2013) conducted a two-phase randomized controlled trial to study more generalized impairment in 35 children ages 5 to 8 years old. Participants were assigned to the CCPT treatment group ($n = 17$) or the delayed-start control group ($n = 20$). During Phase 1, children in the treatment group received individual CCPT sessions twice weekly for 8 weeks while children in the control group received no intervention. During Phase 2, children in the treatment group continued to receive individual CCPT sessions at the slower rate of once per week while the delayed-start control group children began also receiving individual CCPT sessions once per week. Children's impairment was measured throughout the study using teacher report on the Impairment Rating Scale (IRS; Fabiano et al., 2006). During Phase 1, Ray and colleagues found a nonstatistically significant ($p = .15$) difference between the two groups. However, a medium effect size ($\eta_p^2 = .06$) suggested children in the CCPT intervention group demonstrated greater improvement compared to the control group. During Phase 2, Ray et al. found statistically significant ($p < .05$) improvement in the treatment group on the Overall Impairment, Academic Progress, and Classroom Problems subscales and found statistically significant ($p < .05$) improvement in the delayed-start control group on the Peer Relationships and Classroom Problems subscales.

Further individual studies explored effectiveness of CCPT with children who experienced symptoms of attention deficit hyperactivity disorder (ADHD) and general attention problems

(Kram, 2019; Muro et al., 2006; Ray et al., 2007; Robinson et al., 2017; Schottelkorb & Ray, 2009). Kram (2019) conducted a randomized controlled trial to explore the effectiveness of CCPT on reducing ADHD symptoms in children who had experienced adverse childhood experiences. Kram randomly assigned 34 children between 5 and 8 years old to the CCPT treatment group (n = 17) or a waitlist control group (n = 17). Children in the treatment group received twice-weekly CCPT sessions for eight weeks. Data was collected utilizing scores on the school version of the Attention Deficit Disorder Evaluation Scale (ADDES-4; McCarney & Arthaud, 2013) and the ADHD subscale of the Direct Observation Form (DOF; Achenbach & Rescorla, 2009). Kram found a statistically significant (p = .02) improvement in teacher-reported inattention with a large effect size ($\eta_p^2 = .18$) and a statistically significant (p = .02) improvement in observed ADHD symptoms with a large effect size ($\eta_p^2 = .16$) for the treatment group when compared to their waitlist peers.

Ray et al. (2007) conducted a randomized controlled trial to explore the effectiveness of CCPT compared to a reading mentoring program on reducing ADHD symptoms in children. Ray et al. randomly assigned 60 children between 5 and 11 years old to the CCPT treatment group (n = 31) or the reading mentoring (RM) treatment group (n = 29). Children received once-weekly CCPT sessions on once-weekly RM for 16 weeks. Teachers were blinded to which group children were assigned. Teachers completed the Index of Teaching Stress (ITS; Abidin et al., 2004) and the Conners Teacher Rating Scale – Revised: Short Form (CTRS-R:S; Conners, 2001) for each child pre- and post-intervention. Ray and colleagues found a statistically significant (p < .01) improvement on the ITS ADHD Domain across both groups over time ($\eta_p^2 = .18$) and a statistically significant (p < .01) improvement on the Conners ADHD Domain across both groups over time ($\eta_p^2 = .18$). On the ITS Student Characteristics domain, they found a

statistically significant ($p < .01$) improvement in children's behaviors with a large effect size ($\eta^2 = .30$) for the CCPT treatment group compared to no statistically significant difference for children in the RM group. On the ITS Emotional Lability/Low Adaptability domain, Ray et al. found a statistically significant ($p < .01$) improvement with a large effect size ($\eta^2 = .21$) for the CCPT treatment group compared to no statistically significant difference for children in the RM group. Finally, on the ITS Anxiety/Withdrawal domain, Ray et al. found a statistically significant ($p < .01$) improvement with a large effect size ($\eta^2 = .38$) for the CCPT treatment group compared to no statistically significant difference for children in the RM group.

In addition to randomized controlled trials, researchers have conducted single-case design studies. Robinson et al. (2017) explored the effects of CCPT on hyperactivity/impulsivity and inattention in 3 first grade children using the DOF. Children participated in three CCPT sessions for six weeks. Robinson and colleagues analyzed data using visual inspection techniques and calculated percentages of nonoverlapping data (PND) and percentages of data exceeding the median (PEM) to evaluate treatment effect. CCPT demonstrated a small effect on ADHD behaviors. Individual participants showed moderate or large effects on increased time on task and decreased total classroom problems, sluggish cognitive tempo, immature/withdrawn behavior, intrusive behavior, and oppositional behavior. One important limitation of the study was a condensed baseline due to how the DOF observations are scored and condensed.

In another single-case design, Schottelkorb and Ray (2009) explored the effectiveness of CCPT and person-centered teacher consultation (PCTC) on four children referred to play therapy for ADHD behaviors. Two children were randomly assigned to receive CCPT and PCTC and two children were randomly assigned to receive reading mentoring and CCPT. Children were assessed three times per week on the DOF. Schottelkorb and Ray found two children

demonstrated clear change when receiving CCPT with effective or very effective results. They found the other two children did not demonstrate clear improvement in ADHD behaviors even though both children showed some positive change and questionable effectiveness of the intervention. Some limitations of the study included identifying children for the study by only teacher assessment, a limited baseline due to the school environment where the study occurred, and possible carry-over effects from multiple interventions.

Muro et al. (2006) utilized a repeated measures design study with 23 children referred for play therapy for behavioral and emotional difficulties. Children received 16 thirty minute CCPT sessions over 10 weeks during a fall school semester and then 16 thirty minute CCPT sessions over 16 weeks in the following spring semester for a total of 32 sessions. Teachers completed the Teacher Report Form (TRF; Achenbach & Rescorla, 2001) and the ITS pre-intervention, after 16 sessions, and after 32 sessions. Muro and colleagues found that children improved steadily over the course of the 32 sessions. For children who completed 32 sessions, teachers reported a statistically significant decrease in Total Problems on the TRF (p = .04, $\eta_p^2 = .26$), a statistically significant decrease in Total Stress on the ITS (p = .04, $\eta_p^2 = .26$), a statistically significant decrease in stress related to ADHD behaviors on the ADHD domain of the ITS (p = .04, $\eta_p^2 = .26$), and a statistically significant decrease in stress related to behaviors on the Student Characteristics domain of the ITS (p = .03, $\eta_p^2 = .27$). Based on the study design without a control group, the effectiveness of CCPT as an intervention compared to no intervention or an alternate intervention cannot be concluded. However, because statistically significant changes occurred for the 23 children, researchers suggested CCPT made an impact in the behaviors teachers reported, including those related to ADHD.

Although an established literature base exists to support CCPT as an effective intervention for a multitude of presenting concerns, researchers have limited study of the toys and materials employed in the therapeutic process of CCPT (Ray, Lee, et al., 2013). Ray, Lee, et al. (2013) conducted the first study solely focused on the use of toys in CCPT. Participants included 26 females and 42 males for a total of 68 children ages three to ten years old. All children participated in CCPT sessions in a playroom with a standardized set of toys based on Landreth's (2012) suggested toys. The toys were sorted into four categories based on condensing Kottman's (2011) five categories into: family/nurturing, expressive, pretend/fantasy, and aggressive/scary. Ray, Lee, et al. (2013) calculated descriptive statistics to create a frequency table detailing how often each toy was used across participants. According to Ray and colleagues, the top five most used toys were the sandbox (72.1%), sand tools (54.4%), arts/crafts (48.5%), paint (41.2%), and water (33.8%). Next, Ray et al. reported the frequency of use of the toys by category. They reported most children used family/nurturing and pretend/fantasy toys with both categories being used by 92.6% of participants. Three-fourths of participants used the aggressive/scary toys and 73.5% of participants used toys in the expressive category. Finally, Ray and colleagues conducted four multiple regression analyses regressing each category's toy use frequency on age and gender. Together, the predictors were statistically significant for frequency of use for aggressive/scary and family/nurturing toys. Upon further inspection, the predictor of gender explained most of the variance in toy use for both categories. Ray et al. concluded toys in all four categories were needed in CCPT. Limitations of this study included participants were limited to one community clinic setting, participants were not racially or ethnically diverse, and the categorization of the toys was based on literature rather than empirical study which could result in disagreement regarding how the individual toys were categorized.

Although this study examined toy use in CCPT, there remains a dearth of empirical literature regarding the selection, categorization, and use of toys for CCPT. Further research is needed to understand what affects children's choice of materials for expression in CCPT.

Nature Benefits

Nature can be found nearly anywhere from indoors with pets and houseplants to outdoors in a remote wilderness area of a national park or a neighbor's well landscaped backyard. Considering its vastness, researchers have found it necessary to operationalize the meaning of nature. Louv (2008) narrowed the definition of nature to mean "natural wildness" (p. 8) which he further described as "related loose parts" (p.8) of biodiversity whether located in a backyard or wilderness area. Maller et al. (2005) defined nature as "an organic environment where the majority of ecosystem processes are present (e.g. birth, death, reproduction, relationships between species)" (p. 46) and also as any of the individual elements within the environment such as dirt, living organisms, and air. Hartig et al. (2014) gave four different objective definitions of nature depending on the intended context of using the word, but also noted a subjectivity in experiencing nature that led to the term being difficult to encapsulate across researchers and populations. In comparison, more recently Reese (2016) operationalized nature to mean "green and blue spaces" (p. 346) which could encompass any environment from a suburban backyard to remote wilderness.

Edward O. Wilson (1993), Frank B. Baird Jr. Professor of Science and curator of entomology at Harvard University, theorized about the existence of biophilia, a hereditary emotional connection humans had to nature. He hypothesized that the complex patterns of behaviors humans demonstrated toward and within the natural world were based on evolutionary experiences of the human species. Wilson further posited that humans' multiple emotional

responses to nature would remain, albeit in an atrophied state, as cultures transitioned away from hunter-gatherer tribes living intimately with other living organisms toward bustling urban cityscapes. Wilson (1993) advocated for psychologists to study biophilia and its effects on human thoughts, behaviors, and emotions. He was especially concerned about learning how humans might be effected by a disappearing natural environment and what the unknown consequences might be on humans losing a defining aspect of their evolution.

Wilson's (1984, 1993) biophilia hypothesis reflected his observations of a cultural trend away from interaction with nature. Between 1981 and 1991, per capita visits to national parks declined at a rate of -1.0% to -1.3% per year (Pergams & Zaradic, 2008). By the mid 2000s, the total decline in visits was -18% to -25% per year (Pergams & Zaradic, 2008). Kareive (2008) noted during the same time frame, park visitations were not the only factor to suggest a culture shift away from nature. He cited rapid urbanization, an absence of educational experiences outdoors and dwindling courses in natural history, and apathetic environmental attitudes as additional indicators that humans were moving away from outdoor nature recreation.

However, as a result of advocacy and growing awareness, research on the effects of nature interaction on humans has grown exponentially within the past 30 years (Bowler et al., 2010; Frumkin et al., 2017; Hartig et al., 2014; Maller et al., 2005; Twohig-Bennett & Jones, 2018). Twohig-Bennett and Jones (2018) calculated 96% of the studies in their systematic review of greenspace exposure and health were published between 2008 and 2018 with no articles found prior to 1984. In 2018, the United States Department of Agriculture (USDA) published a review of the available literature and concluded human relationships to nature were "critical connections to pursue" (p. 18) for the "very survival" (p.18) of people and human well-being. Similarly, in a joint collaboration between the World Health Organization (WHO) and the Secretariat of the

Convention on Biological Diversity (CBD; 2015), they concluded after a review of literature "biodiversity underpins ecosystem functioning and the provision of goods and services that are essential to human health and functioning" (p.1) across various time and space scales.

Benefits to Nature Exposure

Table A.4

Benefits of Nature Exposure for Adults

Postulation	Key References
Physical Functioning	
Increases ability to manage and recover from physiological stress	Lechtzin et al., 2010; Ulrich, 1984; Ulrich et al., 1991
Increases cardiovascular health	Beute & de Kort, 2014; Fong et al., 2018; Haluza et al., 2014; Twohig-Bennett & Jones, 2018
Increases physical activity	Fong et al., 2018; Loureiro & Veloso, 2017; McMorris et al., 2015; Sarkar, 2017
Increases vitality	Ryan et al., 2010
Decreases mortality rates	Crouse et al., 2017; de Keijzer et al., 2017; James et al., 2016; Vienneau et al., 2017
Cognitive Functioning	
Restores mental fatigue	Berman et al., 2008; Hartig et al., 1991; Kaplan, 1995; Lee et al., 2015
Increases memory span	Berman et al., 2012
Social/Emotional Functioning	
Increased overall mental health with increased exposure	Zijlema et al., 2018
Decreased negative affect (anger, depression, anxiety, and fatigue)	Bowler et al., 2010; Dzhambov et al., 2019; Pun et al., 2018
Increased positive affect	Barton et al., 2011; Berman et al., 2012; Sato &Conner, 2013
Increased emotional regulation	Beute & de Kort, 2014; Johnsen, 2011; Kaplan & Berman, 2010
Increased self-esteem	Barton et al., 2011

(table continues)

Postulation	Key References
Moral/Spiritual Functioning	
Increases awe and wonder about nature and its spiritual meanings	Brymer et al., 2010; Kaplan & Talbot, 1983

Researchers have established a multitude of beneficial effects for encounters, observations, and other types of exposure to animals, plants, landscapes, and wilderness (Bowler et al., 2010; Hartig et al., 2014; Maller et al., 2005; Twohig-Bennett & Jones, 2018). Encounters with nature have included both passive and active interactions. Passive interactions include encounters where participants do not focus attention on their environment or nature as part of the study, such as recovery from surgery in a room with a window facing a natural landscape (Ulrich, 1984) or researchers calculating tree canopy coverage around a participant's neighborhood (Dzhambov et al., 2019). In contrast, active interactions include encounters where participants are focused on their environment or nature as part of the study, such as viewing photographs of natural landscapes (Ulrich et al., 1991) or taking an assessment before and after walking through a public park (Berman et al., 2008). Researchers have found both kinds of nature encounters result in improvements in physical, cognitive, social-emotional, and moral/spiritual functioning. A summary of research findings categorized by area of functioning can be found in Table A.4.

Physical Functioning

Nature exposure can affect the human body's response to physiological stress (Lechtzin et al., 2010; Ulrich, 1984; Ulrich et al., 1991). In one of the first historical studies to explore the restorative influence of natural settings on the body, Ulrich (1984) reviewed patient files of 23 matched pairs who were assigned hospital rooms for recovery following a common type of gall bladder surgery. The criteria for matching were sex, age, smoking status, weight, previous

hospitalization records, the year of the surgery, and the floor level of their room. Half of the participants were assigned a room with a window facing a brown brick wall and the other half had rooms facing deciduous trees. The view out of the window was the only difference in the rooms or care the patients received. Ulrich found patients who recovered in a room with a view of trees had shorter postoperative hospital stays, were given fewer negative evaluations on nurses' notes, and consumed fewer potent analgesics for pain management than patients with a view of the brick wall.

Since Ulrich's (1984) formative study, researchers have continued to explore how exposure to natural environments affects ability to manage and recover from physiological stress (Lechtzin et al., 2010; Ulrich et al., 1991). Ulrich et al. (1991) examined physiological responses to viewing a stressful 10-minute movie followed by a recovery 10-minute movie of either a natural or urban setting. Ulrich et al. monitored participants' throughout the experiment with electrocardiogram (EKG) readings which measured heart rate, pulse transit time (PTT) which correlated to blood pressure, spontaneous skin conductance (SCR) which corresponded to activity in sweat glands, and muscle tension (EMG) which is associated with response to stress. They found participants recovered from the stressful scenes faster and more completely when they viewed the nature settings compared to urban ones ($p < .01$ for PTT; $p < .01$ for SCR; $p < .05$ for EMG). More recently, Lechtzin and colleagues (2010) conducted a randomized controlled clinical trial to investigate the effects of viewing nature on patient's perceived pain during a bone marrow aspiration and biopsy procedure. They did not find a statistically significant difference in reported pain level between subjects who viewed a nature scene with accompanying nature sounds, viewed a city scene with city sounds, or received standard care during the operation. However, Lechtzin et al. considered that differing surgeon experience level

across patients may have confounded patients' reported pain because an experienced surgeon might perform the procedure better. When Lechtzin et al. controlled for the surgeons who performed the procedures, the proportion of patients who reported moderate-to-severe pain was lower for patients in the nature group compared to the standard care group at a statistically significant level ($p = .02$).

In addition to influencing stress levels, researchers have examined the relationship between nature exposure and cardiovascular health (Fong et al., 2018; Twohig-Bennett & Jones, 2018). In their meta-analysis of 143 studies, Twohig-Bennett and Jones (2018) found statistically significant differences between groups with the highest and lowest greenspace exposure across several cardiovascular health factors. The group with the highest greenspace exposure had lower salivary cortisol ($p < .001$), lower heart rate ($p = .004$), higher HDL cholesterol ($p = .02$), lower diastolic blood pressure ($p = .009$), better scores on heart rate variability ($p < .001$), and fewer incidences of cardiovascular mortality ($p < .001$). Twohig-Bennett and Jones also found non-statistically significant reductions on other cardiovascular health factors including incidences of hypertension, stroke, and coronary heart disease. In comparison, Haluza et al. (2014) found 12 studies published between 1998 and 2011 that included cardiovascular parameters associated with nature exposure. Haluza et al. concluded studies analyzing blood pressure showed primarily mixed results, studies analyzing heart rate showed primarily positive results, and studies analyzing heart rate variability showed primarily mixed results. In addition, Beute and de Kort (2014) examined heart rate variability and heart rate across two studies where participants completed tasks requiring self-control, were exposed to nature, urban, or control scenes, and then completed another task. In their first study, they found no statically significant differences between groups who viewed different scenes. In their second study, they found a statistically

significant difference for heart rate variability ($p < .05$), but not for heart rate when participants were exposed to different scenes.

Researchers have also explored effects of nature exposure on physical functioning as it relates to benefits of physical activity in outdoor environments (Fong et al., 2018; Loureiro & Veloso, 2017). Sarkar (2017) measured vegetation with high-resolution imaging across the United Kingdom. Among 333,183 adult participants, Sarkar found a one quartile range increase in vegetation around a participant's home was correlated with a 3.9% increase in the likelihood of walking for more than 30 minutes per day. Comparatively, in Canada, McMorris et al. (2015) found participants in the highest quartile of green area were 34% more likely to partake in physical activities as a part of their leisure compared to participants in the lowest quartile. To capture the combined benefits of performing physical activities while in direct contact with nature, Pretty et al. (2003) coined the term "green exercise" (p. 7). Pretty et al. (2005) explored the effects of green exercise by randomly assigning 100 participants to five exercise conditions where participants utilized a treadmill at a light intensity pace while viewing a blank white screen, rural pleasant photos, rural unpleasant photos, urban pleasant photos, or urban unpleasant photos. Participants in the rural pleasant group were the only ones to have a statistically significant difference in blood pressure before and after completing the exercise.

In addition to more specific areas of physical functioning, researchers have examined the relationship between nature exposure, vitality and mortality (Fong et al., 2018; Ryan et al., 2010). Ryan et al. (2010) explored subjective vitality and being outdoors across five individual studies with a total of 537 participants. They found participants experienced statistically significant higher levels of subjective vitality when rating responses to vignettes that asked them to imagine themselves outdoors ($p < .0001$), following a 15-minute walk outside compared to a

15-minute walk indoors ($p < .05$), after observations of natural outdoor scenes compared to building exteriors ($p < .01$), at the end of a day after spending at least 20 minutes outside on that day ($p < .05$), and when exposed to greater numbers of natural elements ($p < .01$). More recently, researchers have explored the connection between nature exposure and mortality rates through several large prospective studies (Crouse et al., 2017; de Keijzer et al., 2017; James et al., 2016; Vienneau et al., 2017). James et al. (2016) analyzed data from 108,630 female nurses in the United States and found for every 0.1 increase in greenness according to the normalized difference vegetation index (NDVI), the mortality rate decreased by 12%. Crouse et al. (2017) analyzed data from approximately 1.3 million Canadians across 30 cities and also found greater greenspace was associated with decreased mortality rates. In the largest study, Vienneau et al. (2017) analyzed data from almost 4.2 million adults in Switzerland and found those living in areas with higher NDVI had lower mortality rates. de Keijzer and colleagues (2017) analyzed data from 44.5 million people in Spain in 2011 and found greenness was only a protective factor for lower mortality rates for people in areas with lower socioeconomic status (SES).

Cognitive Functioning

Nature exposure can affect cognitive functioning in adults (Berman et al., 2008; Berman et al., 2012; Kaplan, 1995). Stephen Kaplan (1995), a psychologist at the University of Michigan, proposed a framework to describe the cognitive restoration characteristics of natural environments. He called his framework Attention Restoration Theory (ART). Kaplan (1995) based many of the attention concepts of ART on the work of William James, a pioneering American psychologist and philosopher who wrote a theory of consciousness and attention among a multitude of other publications. Kaplan proposed that directed attention could be susceptible to fatigue and any prolonged mental effort led to directed attention fatigue. Kaplan

argued directed attention was important for other cognitive functions and emotional regulation. Thus, he was interested in finding ways to restore attention capacity when it was fatigued. Kaplan stated fascination, a term used in exchange for involuntary attention, was the key to restorative experiences. Thus, Kaplan posed nature as an environment replete with opportunities for fascination. He further asserted nature had many soft fascinations such as clouds and sunsets that held involuntary attention while allowing space for reflection on other thoughts.

Hartig et al. (1991) were the first to empirically study the relationship between attention restoration and nature. In their first study, Hartig and colleagues compared proofreading performance pre and post among three groups who went on a vacation in the wilderness, in an urban area, or not at all. Following their vacation, participants in the wilderness group performed statistically significantly better on the proofreading task while participants in the other two group decreased in their performance ($p < .09$). In their second study, Hartig et al. (1991) instructed participants to complete an attention fatiguing task, spend 40 minutes resting, and then complete a proofreading task. Participants were randomly assigned into three kinds of resting categories: a walk in a natural environment, a walk in an urban environment, or listening to soft music and reading magazines. Hartig et al. found participants in the nature group performed better on the proofreading task compared to participants from the other two groups ($p < .01$).

More recently, Berman et al. (2008) explored ART through two experiments involving walking in nature and viewing nature pictures. In their first experiment, Berman et al. asked 38 college students to assess their mood then complete a backwards digit-span task. All participants were then fatigued further with a 35-minute directed-forgetting task. Participants were then randomized into two walking groups – one in the tree-lined Ann Arbor Arboretum and one in traffic-heavy downtown Ann Arbor. Both groups walked an equal length of 2.8 miles in 50-55

minutes. When participants returned from the walk, they reassessed their mood, performed the backwards digit-span task, and answered questions about their walk. After one week, the participants returned and followed the same procedures but walked the opposite path from the one they completed prior. Berman and colleagues found a greater improvement in scores on the backwards digit-span task for participants who walked in nature rather than downtown ($p_{rep} = .95$) with no main effects for the order of the walk environments. Berman et al. concluded from this experiment that improved performance on the backwards digit-span task beyond simple test-retest effects was due to ART. In their second experiment, Berman et al. had 12 college students assess their mood then complete a backwards digit-span task. All participants were then fatigued further with the Attention Network Task (ANT) in which they responded what direction an arrow pointed through 288 trials. Participants were then randomized into two photograph viewing groups – one with nature scenery of Nova Scotia and one with city scenes of Ann Arbor, Detroit, and Chicago. Following the picture viewing, participant completed the first three tasks again. After one week, the participants returned and followed the same procedures but viewed the opposite picture set. Berman and colleagues again found a greater improvement in scores on the backwards digit-span task ($p_{rep} = .96$) and ANT ($p_{rep} = .99$) for participants after being exposed to nature.

Berman et al. (2012) conducted a study similar to the first experiment completed by Berman et al. (2008), but selected only participants who were diagnosed with major depressive disorder under the hypothesis that this population may experience rumination during walks in nature and thereby worsen their memory and mood. Twenty participants assessed their mood and completed the backwards digit-span task. Participants were then randomized into two walking groups – one in the tree-lined Ann Arbor Arboretum and one in traffic-heavy downtown Ann

Arbor. Both groups walked an equal length of 2.8 miles in 50-55 minutes. When participants returned from the walk, they reassessed their mood and performed the backwards digit-span task. After one week, the participants returned and followed the same procedures but walked the opposite path from the one they completed prior. Berman et al. (2012) found participants demonstrated a statistically significant increase in memory span after the nature walk compared to the city walk ($p < .001$, $\eta_p^2 = .53$).

Building on support for ART, Lee et al. (2015) explored the effects of short, 40-second breaks viewing nature on sustained attention with 150 college students. Participants completed the Sustained Attention to Response Task (SART) during which they responded to numbers displayed on a screen. After completing 108 digits on the SART, participants were randomly assigned to view a city scape with a concrete roof or city scape with a green roof covered with tall grass and flowers for 40 seconds. Then, participants completed a second set of 108 digits on the SART. Lee and colleagues found participants who viewed the green roof performed the second half of the SART with statistically significant lower variability in moment-to-moment responding ($p = .012$) and gradual responding ($p = .009$) and statistically significant fewer response errors ($p = .041$).

Social-Emotional Functioning

Nature exposure can affect social-emotional functioning in adults (Pun et al., 2018; Zijlema et al., 2018). Adults who commute almost daily through natural environments as a part of their scheduled routine reported higher levels of mental health than adults who did not, even when the commute was by automobile rather than walking or cycling (Zijlema et al., 2018). Following activities in nature, adults also report reduced anger, sadness, anxiety, and fatigue (Bowler et al., 2010).

Kaplan and Berman (2010) connected self-regulation and ART. They theorized that, similar to executive functioning, directed attention had an effect on self-regulation. Based on a review of available studies, they proposed that as attention depleted, self-regulation decreased, and nature could be one option for restoring attentional capacity and thus increasing self-regulation. Johnsen (2011) also concluded emotional regulation could be connected to ART and offered one conceptual framework for how nature facilitated the process. He proposed that people could use nature as an environmental strategy or modification to upregulate positive emotions and downregulate negative emotions, but that theoretically people could also use nature to achieve the inverse. Johnsen noted although people may have an instinctual inclination to utilize nature to regulate emotions, that further research and knowledge of how nature affected various human functioning was needed to provide evidence for his conceptual framework.

Although not in direct response to Johnsen's (2011) call for more studies, researchers have increasingly explored nature's effects on emotional regulation and functioning (Beute & de Kort, 2014; Sato & Conner, 2013). Beute and de Kort (2014) explored whether 121 participants ages 18 to 32 experienced a difference in mood following an attention depletion task and looking at photographs of nature or cityscapes. They found participants, regardless of depletion task or control group assignment, experienced a statistically significant improvement in mood after viewing nature photographs when compared to those who viewed cityscapes ($p < .05$, $\eta_p^2 = .04$). Sato and Conner (2013) examined the effects of daily time in nature on daily affect for 319 young adults. They found participants who spent more time in nature over the 13-day study period reported a statistically significant higher average positive affect (PA; $p < .001$) and a statistically significant higher average negative affect (NA; $p < .05$) than those who spent less time in nature during the same time period. Sato and Conner further analyzed their results

utilizing hierarchical linear modeling to determine within-person relationships for time spent in nature each day of the study and changes in affect. They found daily time in nature predicted higher daily PA ($p < .01$), but not lower NA ($p = .104$). When they added gender as a predictor, Sato and Conner found gender did not moderate PA, but did effect NA. Women felt a statistically significant lower NA on days their time in nature was higher ($p = .01$).

In an intervention-based study of the effect of nature exposure on mood, Berman et al. (2012) randomized 20 participants diagnosed with major depressive disorder into two walking groups – one in the tree-lined Ann Arbor Arboretum and one in traffic-heavy downtown Ann Arbor. Both groups walked an equal length of 2.8 miles in 50-55 minutes. Participants assessed their mood and performed a cognitive task before and after the walk. After one week, the participants returned and followed the same procedures but walked the opposite path from the one they completed prior. Berman et al. (2012) found participants demonstrated a statistically significant increase in PA after the nature walk compared to the urban walk ($p < .05$, $\eta_p^2 = .29$). In another intervention study, Barton et al. (2011) examined the effects of three health-promoting activities with 53 Mind group members experiencing a range of mental health problems. Mind is a mental health charity in England and Wales and does not label the specific diagnoses of their clients. The three health-promoting intervention activities were green exercise, swimming, and indoor social activities. Barton and colleagues measured self-esteem and overall mood pre- and post- activity completion and found those in the green exercise and swimming groups reported increased self-esteem ($p < .0001$) and all three groups reported increased mood ($p < .0001$). Through post hoc analysis, they found participants in the green exercise group reported greater improvement in overall mood than the other two groups ($p < .05$).

Researchers have also examined the connection between mental health outcomes and

nature exposure (Dzhambov et al., 2019; Pun et al., 2018). In a large sample of 529 university students in Bulgaria, Dzhambov et al. (2019) found that those who lived in areas with greater NDVI or perceived higher levels of greenspace experienced statistically significant fewer anxiety and depression symptoms ($p < .05$). Similarly, Pun et al. (2018) explored neighborhood greenness and mental health symptoms for 4,118 adults ages 57-85 years across the United States. They found higher greenness was significantly associated with lower reported symptoms of anxiety and depression.

Moral/Spiritual Functioning

Although philosophers such as John Muir, Henry David Thoreau, Ralph Waldo Emerson, and Edmund Burke wrote about the way they felt moved by their experiences in nature, researchers have published few studies pertaining to a connection between adults' spiritual functioning and exposure to nature (Brymer et al., 2010; Kaplan & Talbot, 1983). Historically, Kaplan and Talbot (1983) studied the journals of participants who attended the 1976 Outdoor Challenge Program, a wilderness experience research program established at the University of Michigan and funded by multiple sources including the Forest Service and the USDA. Kaplan and Talbot coded the journals participants wrote in throughout the 11-day experience and found 42% of participants reported a sense of awe and wonder about nature. Kaplan and Talbot noted participants wrote about their thoughts on "spiritual meanings and eternal processes" (p. 178), but they did not provide details or examples of what participants wrote. In later years of the Outdoor Challenge Program, participants were asked to maintain a journal for a few days after returning to their daily routines following the wilderness experience. When Kaplan and Talbot coded these journals, they once again found a theme of awe and wonder about nature for 21% of the sample. Some examples from the journals included "close to God through nature" and "sense

of where one fits in the world" (p. 183). Kaplan and Talbot concluded that more evidence needed to be collected, but that their study suggested a spiritual dimension to experiences in nature. More recently Brymer et al. (2010) echoed nature-based experiences connect to all aspects of human wellness, which included a spiritual dimension. However, Brymer and colleagues only presented a theoretical connection and called for researchers to conduct studies to provide clarity on how nature supported spiritual wellness.

Mediators and Moderators for Benefits

Researchers have hypothesized various mediators for the health benefits associated with nature exposure. Although various studies support the existence of health benefits, few researchers have proposed the underlying reasons why nature exposure leads to those outcomes. Some of the postulations include better air quality (Fong et al., 2018; Hartig et al., 2014; Yitshak-Sade et al., 2017), increased physical activity (Hartig et al., 2014), meaningful social contacts (Hartig et al., 2014), and enhanced immune function (Haluza et al., 2014; Kuo, 2015). As researchers discover what mediates the benefits, the information gained can influence the kinds of environments preferred to maximize the related benefits.

In addition to mediators, researchers have identified several moderators for the level of beneficial outcomes to nature exposure. Existing connectedness to nature at the time of exposure is a prominent mediator for beneficial outcomes with greater connectedness correlating to greater outcomes (Berto et al., 2018; Martin et al., 2020). Berto et al. (2018) conducted a study with 524 Italian adults to assess their experiences of various natural settings. They found participants who reported higher levels of nature connectedness also reported higher perceived restorativeness of natural environments. Most recently, Martin et al. (2020) found nature connectedness moderated the relationships between nature contact, wellbeing, and pro-environmental behaviors for the

adult population of England (N = 4,960) where increased connectedness was associated with increased outcome behaviors. Researchers have also studied nature connectedness independently (Capaldi et al., 2014; Ingulli & Lindbloom, 2013). Ingulli and Lindbloom (2013) explored the relationship between nature connectedness and resilience in 150 adults. They found a statistically significant moderate positive correlation (r = .38, p < .01) suggesting greater levels of nature connectedness was associated with greater levels of protection from psychological effects of trauma and stress in their study population. Capaldi et al. (2014) explored the relationship between nature connectedness and happiness in a meta-analysis of 30 studies (N = 8523) and found a statistically significant small effect size (r = .19, p < .001). They suggested participants who experienced greater levels of nature connectedness tended to experience greater levels of happiness as determined by positive affect, vitality, and life satisfaction.

Two other proposed moderators are adults' perceptions of greenspace (Dzhambov et al., 2019) and gender (Sato & Conner, 2013). Dzhambov and colleagues (2019) found that higher NDVI was associated with higher perceived greenspace and significantly correlated to better mental health outcomes (p < .05). Sato and Conner (2013) found gender moderated nature's effect on NA (p = .024). Women in their study felt a statistically significant lower NA on days their time in nature was higher (p = .01) compared to men who demonstrated no relationship between lower NA and greater time spent nature (p = .673).

Consequences of Deficit

Along with an increased interest in understanding what benefits are associated with nature exposure, researchers have also begun considering consequences of deficits in nature exposure (Chalquist, 2009; Engemann et al., 2019; Preuß et al., 2019; Snell et al., 2016). Chalquist (2009) reviewed available literature regarding nature benefits and human

disconnection from natural environments and concluded disconnection resulted in psychological symptoms that could not be attributed entirely to intrapsychic or familial dynamics. More recently, empirical studies have provided some support for Chalquist's (2009) claim. Snell et al. (2016) conducted a study to explore the relationship between nature contact throughout life and depression symptoms in adulthood. They found nature exposure during adulthood was significantly negatively correlated with depression symptoms with a small effect size (r = -.26, p = .002) meaning more nature contact was linked to fewer depression symptoms.

Engemann et al. (2019) studied the relationship between residential greenspace during childhood calculated by NDVI and psychiatric disorders in adulthood for the population of Denmark born between 1985 to 2003 (N = 943,027). They found the risk of developing any psychiatric disorder in adulthood was related to a dose-response relationship in NDVI. Living in areas with the lowest level NDVI correlated with a 15-55% increased risk of various disorders with the exception of intellectual disability and schizoaffective disorder. Preuß et al. (2019) also studied the relationship between nature exposure during childhood and mental health in adulthood for 3,583 European adults. They found participants reported a significant association between low exposure to nature during childhood and lower mental health scores in adulthood (p < .001).

Barriers to Access

Systemic barriers associated with cultural identities exist for adult access to nature (Byrne, 2012; Mitchell et al., 2015). Byrne (2012) conducted focus groups with 23 Latino adults ages 21-65 years to learn about their experiences related to access and use of public parks in Los Angeles, California. He found the participants enjoyed various outdoor recreational activities and visiting parks while holding a range of attitudes toward nature. However, participants shared a

multitude of access-related issues and few thought they had sufficient access. Problems ranged from general nuisances when visiting parks such as litter, crowds, or inherent outdoor risks (e.g. poison oak, sun exposure, etc.) to more substantial concerns that prohibited park visitation. The more substantial barriers participants discussed included fear of crime, sub-standard or unclean park facilities, limited knowledge about the parks and difficulty locating information, inhibitive travel distances especially for those without automobile access, and experiences of racism. When describing experiences of racism in national parks, one participant felt parks were "the territory of Whites" (p. 605) while another worried "I don't belong there" (p. 605). Participants also cited the systemic issue of signage only being in English, excluding all other languages, and limited numbers of bilingual park staff. Although he only focused on the experience of one group of people in one area, Byrne's (2012) study suggests a need for other researchers to explore experiences of different ethno-racial groups' access to nature.

Inequalities to nature access also exist for various socioeconomic groups which can have a direct impact on mental health outcomes (Mitchell et al., 2015). Mitchell and colleagues analyzed data on 21,294 urban residents across Europe to explore the relationships between mental health and SES controlling for various neighborhood characteristics. Mitchell et al. found SES-based inequality in mental health was 40% less among those people who reported the highest levels of access to green areas ($p = .041$). Mitchell et al. concluded further research was needed to determine why nature access provided this buffer for lower SES groups.

Nature Benefits for Children

Over the last century, children have increasingly spent less time outdoors (Chown, 2014; Louv, 2008; Rivkin & Schein, 2014). Increasing indoor-based play, such as video games and television viewing, combined with a shift in children's use of neighborhood greenspace has

transformed childhood outdoor play into being more planned, time-limited, and often adult-controlled or supervised (Clements, 2004; Skår & Krogh, 2009). Further, pressure on teachers and school systems to ensure academic success in young students has led to outdoor recess in public schools being cut from schedules in favor of more time for structured classroom lessons since the 1980s (Rivkin & Schein, 2014). At the same time, public governments and housing associations have restricted children's access to nature through the criminalization of building structures such as forts and treehouses without permits, the closure of lands in attempt to protect nature from human populations, and the limitation of the kinds of nature interactions the public is allowed to have on public property (Louv, 2008). In a culture of fear of litigation, children have received a message that once common free-range play in neighborhoods and communities is less welcome than organized forms of outdoor recreation (Louv, 2008). To describe the cultural shift in childhood away from nature, Louv (2008) coined the term nature-deficit disorder. Louv (2008) did not consider nature-deficit disorder a medical diagnosis but rather defined it as "the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses" (p. 36). Louv (2008) believed nature-deficit disorder could be reversed at the individual, family, and community levels if nature exposure and meaningful interactions increased.

As awareness and concerns increased about children's opportunities to access nature and nature-based activities, some United States (U.S.) state governments adopted proclamations on children's rights to play outdoors (Rivkin & Schein, 2014). Thus far, 15 states have adopted Children's Outdoor Bills of Rights including: California, Colorado, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Maryland, Michigan, New Jersey, New Mexico, Ohio, Oregon, and Tennessee (Outdoors Alliance for Kids, n.d.-a). Rifkin and Schein (2014) stated that although

these Bills of Rights are not considered legal rights in the U.S., they are supported as cultural rights. Activists and organizations, such as Richard Louv and the Outdoors Alliance for Kids, continue to advocate for greater access for children to outdoor experiences. In 2006, Richard Louv co-founded the Children & Nature Network, a nonprofit organization whose mission is to invest in communities to increase equitable access to nature (Louv, 2008). By 2019, the organization championed multiple initiatives including: housing a research database of almost 1,000 studies about the benefits of nature exposure, partnering with the National League of Cities to promote increased nature access through city planning and policymaking in 18 major U.S. cities, and serving over 35,000 families through the Natural Families and Nature Clubs for Families programs (Children & Nature Network, 2020). Similarly, the Outdoors Alliance for Kids was founded in 2010 as a partnership among national organizations to advocate for children and families to have nature-based opportunities. Since 2015, one of the organization's largest initiatives has been the Every Kid Outdoors program, formally named the Every Kid in a Park program (Outdoors Alliance for Kids, n.d.-b). The program provides all fourth graders and their families a pass which allows free entry to national parks across the U.S. between September 1 and August 31 of the following year.

Barriers to Access

Because children are playing outdoors less in recent generations, researchers have studied what barriers exist to prevent children from accessing greenspace. Access is determined by multiple factors (Shaw et al., 2015). According to Shaw and colleagues (2015) three main categories of barriers existed based on parents' reports about their children's outdoor, nature-based experiences. These areas were intrapersonal, interpersonal, and structural barriers. Intrapersonal barriers were defined as constraints experienced at an individual level by the

children. Interpersonal barriers were considered limitations defined in relationship to other people within the child's family. Structural barriers were considered to come from systemic sources such as financial burdens, transportation issues, geographic factors, or other lack of resources related to nature-based activities.

Intrapersonal Barriers

One intrapersonal barrier to outdoor activity for children was caregiver's fear (Shaw et al., 2015). Caregiver's fear primarily focused on fear for health and safety concerns. For instance, Shaw and colleagues (2015) found that some parents were uncomfortable with their children staying outside for extended periods of time due to potentially worsening children's allergies or other health concerns. Safety concerns included fear of traffic and interactions with strangers. According to Rivkin and Schein (2014) traffic was one of the largest barriers to children playing freely outside, even close to home. They proposed that this could be one reason why it became more common for families to drive children to organized activities away from traffic. However, they noted that this additional driving added to the primary concern of traffic congestion and correlated with lower levels of childhood physical activity. Dangers associated with interactions with strangers involve the increased fear of potential kidnapping or other exploitation of children when they were unsupervised in public places (Louv, 2008). Rivkin and Schein (2014) described this as a cautionary restriction that limited independent exploration of nearby outdoor areas both within neighborhoods and local parks. In one study of 830 mothers of children ages 3 to 12 years, 82 percent of mothers cited crime and safety concerns and 61 percent cited fear of direct physical harm to their children as reasons their children did not play outdoors (Clements, 2004).

Another intrapersonal barrier to outdoor activity for children was the child's prior

knowledge and lack of experience of the outdoors (Louv, 2008; Shaw et al., 2015). One example of this was one parent's statement that their child's hesitation to participate in some activities was due to unfamiliarity and uncertainty of how to behave or what to expect when it rained or other natural phenomena occurred (Shaw et al., 2015). Cheng and Monroe (2012) asked 1,423 students a series of questions to determine their attitudes towards nature and analyzed three variables that might influence students' attitudes including experience, nature near the home, and family values towards nature. Students' previous experience in nature had a statistically significant positive influence on their interest in joining nature-based activities (Cheng & Monroe, 2012).

Interpersonal Barriers

Interpersonal barriers for children to access outdoor environments primarily relate to the child's relationship with caregivers. Three main constraints include scheduling conflicts, adult-structured activities, and resistance to participation (Clements, 2004; Shaw et al., 2015; Skar et al., 2016). In a survey of 3,160 parents of children ages 6 to 12 years in Norway, Skar and colleagues (2016) found time to be a larger barrier than physical access. The availability of time related to children being too busy with sports or other activities such as homework to engage in outdoor play and with parents' perceived responsibility to accompany children outdoors and lack of time in their schedules to do so (Skar et al., 2016). In a prior study, Clements (2004) reported children were engaging in more adult-structured activities, requiring parents or other caregivers to be present for outdoor play. Of 830 mothers interviewed, 77% reported inadequate space in their schedules to spend outdoor time with their children. In a separate study, even when scheduling conflicts are were alleviated, some parents identified children's reluctance to participate in nature-based experiences as an interpersonal barrier (Shaw et al., 2015). Children's

resistance to participate was attributed to the differences in leisure activity preferences, such as wanting to spend time with friends indoors rather than with parents outside. However, some parents noticed resistance dissipate once the nature-based activity was underway (Shaw et al., 2015).

Structural Barriers

Structural barriers for children to access outdoor environments relate to systemic factors that act as constraints. Some structural barriers include socioeconomic status (Rigolon & Flohr, 2014; Shaw et al., 2015), racial discrimination (Rigolon, 2017; Strife & Downey, 2009), and geographic inequities (Rivkin & Schein, 2014; Skar et al., 2016). After reviewing the literature regarding childhood access to nature, Strife and Downey (2009) concluded environmental inequalities were complex and interrelated.

Socioeconomic inequalities affect access to parks and other green spaces. Shaw et al. (2015) found that parents reported cost of required resources to participate in outdoor activities was a financial burden and limited engagement and outdoor experiences. Some examples of potential expenses included park entrance fees or equipment rental fees for specific activities such as camping or canoeing. Beyond the cost of specific outdoor activities, some researchers have studied how socioeconomic status correlates with physical access to free greenspaces such as community parks. Rigolon and Flohr (2014) explored correlation between contact with nature and income level for young people in Denver, Colorado. Park access was measured using a weighted network analysis using a geographic information system. They found that children living in low income neighborhoods lacked access to parks and were generally underserved compared to areas with higher income. In a separate study by Rigolon (2017) of the same population, he found low-income children lived slightly closer to parks than their high-income

peers. However, the parks were smaller and lower quality than those closer to high-income neighborhoods. Parks near higher-income neighborhoods had nearly double the amount of acres per child than parks near lower-income neighborhoods. Thus, low-income children experienced overcrowded, smaller spaces with fewer resources in comparison to their higher-income peers.

Racial inequalities also affect children's access to parks and other greenspaces. In their study on youth access to parks in Denver, Colorado, Rigolon and Flohr (2014) also found children in racially diverse neighborhoods experienced less access to parks and had limited mobility to visit quality parks farther away. In his more recent study, Rigolon (2017) examined access to parks based on proximity, acreage, and park quality. Although he found somewhat equitable access for proximity, racial inequalities existed for acreage and park quality. Rigolon (2017) observed majority White areas had nearly three times the acreage per child than areas populated mostly with people of color. Additionally, in regards to the highest quality parks, access to White children was overrepresented while access for Black children was under represented. Further, he found Latino and Black children had lower access to safe parks overall (Rigolon, 2017). Strife and Downey (2009) summarized the few studies historically that examined racial inequalities and nature exposure for children. Based on the empirical evidence they collected, they concluded that both experience in and access to nature likely varied according to race and ethnicity. Strife and Downey (2009) posited Latino and Black families had limited access to and were less likely to use outdoor recreation areas. Some of the barriers they identified included unfamiliarity with natural areas, racial discrimination, language differences between children and those who managed the green spaces, limited transportation, and expenses that posed financial hardships.

Geographic inequities affect children's access to greenspace. Children who live in urban

areas experience less exposure to nature than children living in rural areas as cities expand and more land is required for housing, schools and other man-made structures (Rivkin & Schein, 2014). When Skar and colleagues (2016) asked parents in Norway with children ages 6 to 12 years why their children did not play outdoors, participants living in urban areas reported significantly more barriers to the use of greenspaces than those living in less populated areas. Participants in urban areas more frequently cited concerns about safety, inhibitive distances to access nature, and a variety of values-based differences such as valuing schoolwork over nature experiences or children preferring indoor activities.

Development and Benefits to Nature Exposure

Researchers have established a multitude of beneficial effects children experience as a result of both passive and active interactions with nature (Dankiw et al., 2020; Gill, 2014).

Table A.5

Benefits of Nature Exposure for Children

Postulation	Key References
Physical Development	
Lower levels of blood pressure	Chawla, 2015; Markevych, Thiering et al., 2014
Higher birth weights	Dzhambov et al., 2014
Lower infant mortality rates	Kihal-Talantikite et al., 2013
Decreases likelihood of high Body Mass Index (BMI) ratios and increases likelihood of physical activity	Chawla, 2015; Kimbro et al., 2011; Sando, 2019; Ward et al., 2016
Cognitive Development	
Increases attention, decreases hyperactivity and impulsivity	Berto et al., 2015; Dadvand et al., 2015; Johnson et al., 2019; Mårtensson et al., 2009; Stevenson et al., 2019; Ulset et al., 2017; Wells, 2000
Increased working memory	Dadvand et al., 2015; Torquati et al., 2017
Decreases symptom severity of ADHD	Kuo & Taylor, 2004; Taylor & Kuo, 2011; Taylor et al., 2001; Yang et al., 2019
Social/Emotional Functioning	
Decreases stress	Wells & Evans, 2003

(table continues)

Postulation	Key References
Increases self-regulation	Bakir-Demir et al., 2019; Scott et al., 2018; Weeland et al., 2019
Increases attachment	Scott et al., 2018
Decreases externalizing behaviors	Lee et al., 2019
Decreases likelihood of mental health concerns	Markevych, Tiesler, et al., 2014; Zach et al., 2016
Decreases peer relationship problems	Amoly et al, 2014; Hinkley et al., 2018; van Dijk-Wesselius et al., 2018
Moral/Spiritual Functioning	
Spiritual moments occur during contact with nature	Adam & Savahl, 2017; Robinson, 2019; Schein, 2014

Similar to adult benefits, researchers have identified improvements in physical, cognitive, social-emotional, and moral/spiritual development in children related to nature encounters. A summary of research findings categorized by area of development can be found in Table A.5.

Physical Development

Children undergo major development in physical development between the ages of 3 to 10 years (Gesell Institute, 2011; Ray, 2016). As children grow, they gain both height and weight (Ray, 2016). Gross and fine motor skills develop across these years including increased coordination and control of body movements, increased ability to hold writing utensils from a fist grip to an adult-like grip, and increased hand-eye coordination (Gesell Institute, 2011). Children who are 8-years old and above also begin to experience hormonal activity and may exhibit physical signs of puberty (Ray, 2016).

Nature exposure can affect the children's physical development (McCurdy et al., 2010; Tillmann et al., 2018; Ward et al., 2016). Protective effects begin at birth with higher birth weights for children whose pregnant mothers had higher levels of greenspace near their homes (Dzhambov et al., 2014). Continuing into infancy, Kihal-Talantikite et al. (2013) found infant mortality was inversely associated with level of neighborhood greenery in metropolitan France

such that neighborhoods with higher greenery had lower rates of infant mortality independent of neighborhood SES. Children who live in areas of higher greenspace also exhibit lower levels of blood pressure (Chawla, 2015; Markevych, Thiering, et al., 2014) and parents report higher overall general health (Aggio et al., 2015).

Motivated by increased instances of obesity in childhood, researchers have explored the connection between children's physical activity and nature exposure repeatedly (Chawla, 2015; Kimbro et al., 2011; Sando, 2019; Ward et al., 2016). Kimbro et al. (2011) examined body mass indexes (BMIs) and time spent in outdoor play in 1,822 five-year-olds in the United States. They found for each additional hour of outdoor play, children on average had BMIs approximately half a percentage point lower than the average ($p < .05$). Cleland et al. (2008) examined weight, time spent outdoors, and physical activity of 10- to 12-year-olds. They found for each additional hour of outdoor play, children on average increased physical activity by 27 minutes per week and decreased the prevalence of overweight BMIs between 27 to 41 percent ($p < .05$). Although some researchers have directly correlated increased greenspace with increased physical activity (Ward et al., 2016), Sando (2019) found nature itself was not a predictor of increased physical activity, but the presence of pathways and open areas was during free play outdoors.

Cognitive Development

Children experience vast cognitive development between the ages of 3 to 10 years (Gesell Institute, 2011; Ray, 2016). According to Piaget (1932/1965), children in this age range move from the preoperational stage into the concrete operations stage around the age of 7 years. Children in both stages represent objects through symbols including language and do not have abstract reasoning capabilities yet. During the ages of 3 to 10 years, children develop gains in vocabulary and grammatical accuracy, memory, concentration and focus, and ability to think

logically (Gesell Institute, 2011; Ray, 2016).

Nature exposure can affect cognitive functioning in children (Dadvand et al., 2015; Stevenson et al., 2019; Torquati et al., 2017; Wells, 2000). Wells (2000) conducted a longitudinal study to explore the connection between nature present at a child's home and the child's cognitive functioning. She measured the naturalness of residences and children's cognitive functioning on the ADDES prior to and following children moving homes. She found children moved to new homes with higher levels of naturalness ($p < .01$) and children's post-move ADDES scores were significantly correlated to their pre-move residential naturalness scores ($r = -.528$, $p < .05$). This means that children who moved from residences with lower naturalness to a place with higher naturalness experienced improvement in their cognitive functioning based on their ADDES scores. One limitation of the study was a small sample size of 17 children.

Dadvand et al. (2015) explored exposure to greenspace and children's working memory, superior working memory, and inattentiveness in 2,593 children ages 7 to 10 years in 36 primary schools in Barcelona, Spain. Dadvand and colleagues assessed children four times at three month intervals using computerized tests of memory and attention. They assessed greenspace around the schools the children attended and the children's home through NDVI. They found greenspace around the children's schools was significantly associated with increased working memory, increased superior working memory, and decreased inattentiveness ($p < .05$). Further, for every one increase in interquartile range on total surrounding greenness, children on average demonstrated a 5% increase in working memory, 6% increase in superior working memory, and 1% decrease in inattentiveness. Dadvand et al. did not find a significant association between greenness at children's homes and cognitive development.

Torquati et al. (2017) utilized a within-subjects research design to study children's executive functioning and neuroelectric activity in two different environments – an outdoor area and an indoor room. Torquati et al. collected data on 10 participants ages 6 to 11 years at two assessment points approximately one week apart. The order of the location for assessments was counterbalanced. Torquati et al. found children performed significantly better on a spatial working memory task in the outdoor setting ($p < .001$). They did not find a significant difference in children's performance between environments on attention or inhibitory control tasks. However, two markers for neurological activity were significantly higher for children when they were in the indoor environment compared to the outdoor environment ($p = .02$ for N100; $p = .05$ for P300). Torquati et al. concluded the increased level of activity despite no significant difference in task performance suggested children had to work harder for similar outcomes indoors versus outdoors.

In a recent larger study of 32 children ages 10 to 14 years, Stevenson et al. (2019) utilized a within-subjects research design to compare cognitive performance before and after a 30 minute walk in a built environment or nature. They found children reported the natural environment was more restorative than the built environment ($p = .016$), but did not demonstrate a significant difference in executive attention ($p = .361$) or accuracy ($p = .647$) based on environment. However children had significantly faster reaction times on correct responses following the outdoor walk ($p = .024$). One limitation of the study was Stevenson et al. did not meet the required number of participants for their .90 level of power.

Kaplan's (1995) ART has been applied and studied in the context of childhood (Berto et al., 2015; Johnson et al., 2019; Ulset et al., 2017). Recently, Johnson et al. (2019) studied 60 typically developing children's voluntary and involuntary attention before and after a 30-minute

walk in an urban or natural environment. An equal number of children were randomized into the two intervention groups. Johnson et al. found children demonstrated improved voluntary attention with no change to involuntary attention following the nature walk. In comparison, children in the urban walk group experienced no improvements with voluntary attention actually decreasing.

Berto et al. (2015) explored children's perceptions of the restorative qualities of different environments and their performance on a cognitive task. Berto et al. recruited 48 children ages 9-11 years to participate in a within-subjects study design. Children completed the Perceived Restorativeness Scale-children, Connectedness to Nature Scale-children, and the Continuous Performance Test in three different environments: a classroom following a mindfulness exercise, a school playground following a break time, and an alpine wood. They found children perceived the playground as the least restorative and the woods as the most restorative environment ($p <$ .001). Children consistently reported their connectedness to nature and did not differ by what environment they were in when completing the assessment. Children performed significantly different on the cognitive task based on the environment. Children were most accurate and fast in response time in the wood environment and least accurate and slowest in response time on the playground ($p < .05$, $p < .001$). Berto et al.'s findings suggested children's attention was most restored in the natural environment compared to built environments. Their results supported two previous studies exploring cognitive performance based on built or natural environments. van der Berg and van der Berg (2010) found children with ADHD performed better on cognitive tasks in a wooded area compared to a built setting ($p = .07$, $\eta_p^2 = .21$). Similarly, Taylor and Kuo (2009) found children with ADHD performed better on a concentration task after a walk in a natural area compared to a walk in a downtown built space ($p = .0229$, $d = .52$) or a walk in a built

neighborhood area ($p = .0072$, $d = .77$).

Researchers have explored the relationship between nature exposure and cognitive development in younger, preschool age children as well (Mårtensson et al., 2009; Ulset et al., 2017). Mårtensson et al. (2009) collected data for 198 children ages 4.5 to 6.5 years on level of greenness in their preschool play environment and teacher-reported inattentive, hyperactive, and impulsive behaviors. They found children who had access to greater levels of greenness had significantly fewer inattentive behaviors ($p < .05$). After removing data for children who attended preschools that stayed outdoors all day, children with higher levels of greenspace access also had significantly fewer hyperactive/impulse behaviors reported ($p < .05$). In a longitudinal study, Ulset et al. (2017) followed 562 Norwegian preschoolers for four years. They found a significant positive relationship between time children spent outdoors and performance on a cognitive, digit span task ($p < .01$). They also found children who spent more time outdoors exhibited fewer teacher-reported inattention/hyperactivity behaviors at ages 4, 5, 6, and 7 when controlling for several confounding variables ($p < .05$).

Because of a high prevalence of ADHD diagnoses for children, some researchers have focused on how nature exposure specifically affects cognitive performance in children with an official ADD or ADHD diagnosis (Kuo & Taylor, 2004; Taylor & Kuo, 2011; Taylor et al., 2001; Yang et al., 2019). Taylor et al. (2001) surveyed parents of 96 children ages 7 to 12 years about children's ADD/ADHD symptoms and nature exposure. They found parents reported their children's attentional functioning was significantly better following green outdoor activities compared to indoor activities such as video games ($p < .001$) or built outdoor activities such rollerblading ($p < .001$). Taylor et al. also found parents reported less severity in ADD/ADHD symptoms the greener their child's everyday play environment ($p < .01$). Kuo and Taylor (2004)

conducted a similar study with a larger sample from across to U.S. with a total of 452 parents of children ages 5 to 18 years. They found parents reported their children's attentional functioning was significantly better following green outdoor activities whether the activity was solitary ($p <$ .0001) or in a large group ($p = .0002$). Kuo and Taylor found parents reported significantly reduced ADD/ADHD symptoms following green outdoor activities with consistency across genders, ages, income levels, community type, U.S. region, and children without a comorbid diagnosis of oppositional defiant disorder. More recently, Taylor and Kuo (2011) surveyed 421 parents across the U.S. with children ages 5 to 18 years diagnosed with ADHD about their children's symptoms and usual play settings. They found children who played more in built environments experienced more severe symptoms than children who played in more natural environments ($p < .001$). Most recently, Yang and colleagues (2019) explored the relationship between school-based greenness and ADHD for 59,754 children ages 2 to 17 years in northeastern China. They found a significant negative correlation ($p < .001$) between greenness exposure and likelihood of children having ADHD symptoms.

Social-Emotional Development

Children experience important changes in social-emotional development between the ages of 3 to 10 years (Gesell Institute, 2011; Ray, 2016). In Erikson's (1963) model of psychosocial development, children between the ages of 3 to 5 years work through the Initiative versus Guilt stage during which the child resolves the need to do for the sake of doing rather than to do for the need to accomplish. Then, children between the ages of 6 to 10 years are working through the Industry versus Inferiority stage during which the child resolves the need to master activities and feel competent. Greenspan (1993, 1997) built his theory of emotional development from the work of Erikson and Piaget. In his model, children across all ages and stages work on

four milestones of emotional growth: self-regulation, relationships, reality and fantasy, and communication. At each stage, children work on mastery over a different aspect of the four milestones.

Nature exposure can affect social-emotional development in children (Flouri et al., 2014; Scott et al., 2018; Weeland et al., 2019; Zach et al., 2016). Children who live in areas with greater nearby nature experience lower levels of general stress whether they live in urban (Corraliza et al., 2012) or rural areas (Wells & Evans, 2003). According to Weeland et al. (2019) meta-analyses of both correlational and quasi-experimental studies showed children with higher levels of exposure to nature also exhibit small, but significant positive associations with self-regulation ($r = .10$, $p < .001$ and $d = .15$, $p < .01$ respectively).

Recently, Bakir-Demir et al. (2019) explored the relationship between residential greenness and self-regulation for 299 children ages 8 to 11 years. They found levels of nature connectedness mediated outcomes for both emotional and cognitive self-regulation. Residential greenness was positively correlated with nature connectedness ($p = .037$) and nature connectedness was positively correlated with emotional regulation ($p < .001$). Nature connectedness was negatively correlated with cognitive regulation problems ($p = .029$).

Scott et al. (2018) explored the effect of nature exposure on social-emotional and behavioral functioning in 1,551 children ages 4 to 5 years. They found children on average improved 2.8 points in attachment for every 10% decrease in manmade surface materials surrounding the child's school ($p < .01$). Children on average improved 1.8 points in self-regulation for every 10% increase in tree canopy around their homes ($p < .01$) and improved 1.4 points on average in self-regulation for every 10% increase in tree canopy around their school ($p < .05$). For behavioral concerns reported by teachers, children on average improved 1.9 points for

every 10% increase in tree canopy around their homes ($p < .01$) and improved 1.6 points on average for every 10% increase in tree canopy around their school ($p < .01$).

Regarding mental health outcomes, increased access to greenspace has been associated with lower externalizing behaviors (Lee et al., 2019). In comparison, absence of greenspace has been associated with higher reported borderline or abnormal scores on the Strengths and Difficulties Questionnaire (SDQ; Markevych, Tiesler, et al., 2014; Zach et al., 2016). Zach et al. (2016) explored the prevalence of mental health concerns for preschool children in Bavaria. Of the 5,117 children in the study, 11% exhibited mental health concerns. Children who lived in areas without access to greenspace had a 13% higher prevalence of borderline or abnormal scores on the SDQ ($p = .0001$).

Flouri et al. (2014) studied the effects of green space on general emotional resilience for a cohort of 6,384 children when they were 3, 5, and 7 years old. They found park and playground use significantly predicted children's conduct problems ($p < .01$), hyperactivity ($p < .01$), and peer problems ($p < .01$) with more park and playground use associated with lower problem behaviors. Further, they found greater greenspace predicted more emotional resilience for poor children through age 5. After age 5, they no longer observed the protective effect.

In addition to emotional development, researchers have explored exposure to nature on children's social development (Amoly et al, 2014; Hinkley et al., 2018; van Dijk-Wesselius et al., 2018). Amoly et al. (2014) explored the effect of play in green and blue spaces on children's behavioral development for 2,111 children ages 7 to 10 years in Spain. They found increased play in greenspace and annual beach attendance was associated with decreased peer relationship problems ($p < .05$). Hinkley et al. (2018) found a similar outcome when they studied the effect of play outdoors on children's social development for 575 children ages 2 to 5 years in Italy. They

found outdoor play was positively associated with compliance, or cooperation in peer relationships ($p = .002$), and with expression, or openness to join play in peer relationships ($p = .004$). In a longitudinal study, van Dijk-Wesselius et al. (2018) studied the impact of adding greenery to schoolyards on children's social-emotional well-being for 2,031 students ages 7 to 11 years across nine schools. They found at their first and second follow-up after the intervention, children self-reported improved social support and decreased peer problems ($p < .05$).

Moral/Spiritual Development

Children experience moral/spiritual development between the ages of 3 to 10 years (Gesell Institute, 2011; Ray, 2016). Kohlberg (1987) developed a model for children's development of moral reasoning. In his model, children of preschool and school age work through three stages where they move from following rules out of self-interest to maintaining rules so they are seen as good in individual relationships to taking on society's rules and trying to do what is right from a group-based perspective.

Similar to studies regarding adults' spiritual functioning and exposure to nature, researchers have published few studies pertaining to the connection between children's moral or spiritual development and experiences in nature (Kellert, 2002). Schein (2014) conducted a qualitative research study to define and create a framework to assist children's spiritual development. She found that many of the spiritual moments described were times when children were in contact with nature. Robinson (2019) also conducted a qualitative study to how educators promoted spiritual development in early childhood. She found educators voiced instances of spiritual connection that involved nature such as pelicans, water and trees. However, she found the educators did not often provide nature opportunities for children.

Harris (2016) presented a theoretical article suggesting outdoor spaces promoted spiritual

development in children. She provided several activities including family celebrations in nature and pretend play in nature as examples of how adults could foster children's spiritual development in the outdoors. Adam and Savahl (2017) interviewed children ages 12 to 14 years about how they created meaning for their engagement with nature. Participants discussed concerns about safety and the degradation of the environment, but they also talked about appreciating natural spaces and how they felt freedom and happiness in nature. One participant shared "when you are in nature; it is like heaven on earth there is nothing stopping you" (p. 440).

Nature Benefits and Engagement in Play

Gill (2014) conducted a systematic review of literature to examine benefits of nature exposure for children under 12 years old and the relationship between benefits and the child's style of engagement with the environment. Gill (2014) included a total of 61 empirical studies deemed of appropriate quality and divided them into six categories of benefits: health (physical, emotional, and mental), well-being, cognitive, social, emotional/behavioral, and ethical/attitudinal. Gill (2014) concluded improvements in physical, emotional, and mental health had the greatest degree of support across literature, with other categories having some support. Further, Gill (2014) concluded more playful engagement styles with the natural environment such as free play or child-initiated learning were associated with greater health benefits and positive environmental attitudes. Limitations of the study included a lack of an in-depth search of academic databases for studies to include, no report of descriptive statistics of included studies, no independent checks of methodological quality of included studies, and no review of the quality of measurements used in included studies.

Dankiw et al. (2020) conducted a systematic review of literature to examine the impacts of unstructured nature play on a variety of health outcomes including physical activity, motor

development, cognitive development, social development, and emotional regulation. From the 16 included studies, there were 711 participants, ages 2-9 years old, from eight countries within Western Europe and North America. Dankiw et al. (2020) concluded unstructured nature play had a positive impact on physical, cognitive, and emotional development while results regarding social development were inconsistent or poorly reported across studies. Limitations of the study included the methodological quality of the included studies, ambiguous definitions of nature play, and lack of comparable outcome measurements across studies.

Nature as Medicine

Due to concerns about the effects of an increased sedentary lifestyle indoors during early childhood on children's mental and physical health, medical doctors have begun prescribing nature as part of pediatric treatment plans (Coffey & Gauderer, 2016; Crnic & Kondo, 2019; Seltenrich, 2015). Although once popular in the late nineteenth and early twentieth centuries, nature-based therapeutic programs are once again finding favor in the pediatric medical community because of the increased evidence base for the benefits of childhood nature exposure (Crnic & Kondo, 2019). In one recent study where doctors gave park-prescriptions redeemable as a free day pass to state parks in their area, overall patient redemption rate was 13% (Coffey & Gauderer, 2016). Coffey and Gauderer (2016) could not compare the rate to any known previous literature because of the novelty of the intervention. However, they noted unseasonal inclement weather and a short span of time for valid redemption could have negatively impacted redemption rates.

Nature Benefits for Children in CCPT

Mental health interventions involving the use of nature as a therapeutic factor are categorized under the generalized term ecotherapy (Hasbach, 2012; Jordan, 2015). The term

ecotherapy was first used by Clinebell (1996) to describe his therapeutic approach that involved a holistic relationship with nature. Now, however, horticultural therapy (Messer Diehl, 2009), wilderness therapy (Greenway, 2009), outdoor walk and talk therapy (Doucette, 2004), and animal-assisted therapy (Hinds & Ranger, 2016) are examples of therapeutic modalities considered a form of ecotherapy because of the inclusion of an element of nature as a critical part of the therapeutic process. Additional ecotherapy interventions include the extension of nature elements into traditional indoor spaces such as high-quality nature photographs, live plants, found nature objects for art materials or metaphor creation, mindfulness meditations with nature imagery, and nature-based homework assignments (Kamitsis & Simmonds, 2017).

Researchers have explored some ecotherapy interventions with children (Berger 2006, Chown, 2014; Doucette, 2004; Swank & Shin, 2015a, 2015b). Ecotherapy interventions with children have ranged in type of nature exposure, but all have involved active interactions with some aspect of nature. Doucette (2004) conducted an eight week Walk and Talk intervention with eight children ages 9 to 13 years at a middle school in Alberta, Canada. Doucette interviewed the children during the first and last weeks of the intervention period and facilitated 30 to 45-minute individual sessions once per week during the middle six weeks. She concluded the children benefited from the physical as well as verbal aspects of the intervention. Doucette stated she believed participants benefited from the outdoor component of the intervention, but only discussed two participant's response to the outdoors. She observed the two participants had increased awareness of the other living beings around them on the walks such as birds and tress and the participants actively sought interaction with them.

Berger (2006) explored an outdoor intervention with seven children ages 8 to 10 years in northern Israel. The group-based intervention was split into three phases over the course of 10

months. During the first phase, the group met indoors and created a routine for sessions involving movement, song, and observing nature through a window. During the second phase, the group started sessions indoors and moved outdoors to designated spaces in a courtyard area. Over the course of the second phase, group members would start in the designated outdoor spaces and move away from the group to explore the outdoor area further. During the final phase, group members focused on the transition associated with group termination while spending sessions fully outdoors. Berger interviewed the group facilitators and found one of the strongest nature influences on the group was the changing seasons over the course of the intervention. Facilitators reported changing seasons allowed participants to explore coping with uncontrollable and unexpected circumstances. Facilitators also reported the challenges they faced working outdoors and a need for them to allow flexibility in the dynamic environment. One facilitator specifically reported group members' behavior shifted when outside and "emotions which were hardly expressed in the classroom were frequently expressed in nature: caring for each other, a sense of belonging, curiosity, and personal and group responsibility" (Berger, 2006, p. 142). One limitation of this study was the facilitators of the group were a teacher and dance movement therapist and their experience as mental health providers or play therapists was not described despite the intervention being called a therapeutic program.

Swank and Shin (2015a) provided a gardening counseling group for 33 children with emotional and behavioral problems at a school. Participants' ages ranged from 5 to 12 years. The gardening counseling intervention consisted of groups of five to six children meeting for 30-45 minute sessions twice per week for six weeks following a gardening group curriculum developed by Swank and Swank (2013). Swank and Shin assessed children's self-esteem pre- and post-intervention on the Piers-Harris Children's Self-Concept Scale, Second Edition (PHCSCS-2;

Piers et al., 2002). They found a significant main effect for time on children's self-esteem ($p < .05$, $\eta_p^2 = .26$). One limitation of the study was without a control group, maturation effects could not be ruled out for the children's change in self-esteem over time.

Table A.6

Chown's (2014) Toys and Materials for Outdoor Use (p. 183)

• Old towel • Plastic tent pegs and small mallet • Set of tent awning extensions poles • Small digital camera • Thick plastic groundsheet • Trowel, scoop, small spade • Two plastic trays for carrying resources	• Variously sized waterproof trousers, jackets and jumpers (hats and sunscreen for summer) • Various ropes and lengths of thick string • Small first aid kit, mobile phone, penknife (therapist use only)

In the United Kingdom, Alison Chown (2014) provided a model of outdoor play therapy. In her approach, therapists begin play therapy with children in a traditional indoor space with a variety of toys. Then, as sessions progress and the therapeutic alliance between therapist and child strengthen, therapists allow the child to transition to an outdoor area. For Chown, her outdoor space was located at the school where she was a therapist. In her outdoor space, she had access to both an open field area with a tree line and a playground with climbing equipment. Chown allowed children to bring toys from the indoor room outside. Chown suggested a list of additional toys and materials for outdoor use. These materials can be found in Table A.6. At the time of this review, researchers had not conducted any empirical studies exploring the effectiveness of Chown's approach.

Simultaneously to the development of Chown's approach, Swank and Shin (2015b) developed an approach called nature-based child-centered play therapy (NBCCPT) in the United States. In their approach, Swank and Shin emphasized CCPT principles and added a focus on the child's relationship with nature. Therapists using NBCCPT begin sessions with children in an

outdoor space that has natural (trees) or manmade (fencing) physical boundaries with a limited amount of natural toys and materials. Materials and toys appropriate for NBCCPT can be found in Table A.7. Swank and Shin noted the absence of real life and aggressive toys, and stated children continued to engage in pretend or aggressive play with alternative natural materials.

Table A.7

Swank and Shin's (2015b) Materials Used in NBCCPT

• Chalk	• Plants/Flowers
• Clay	• Shells
• Dirt	• Sticks
• Garden Seed	• Tarp or Blanket
• Garden Tools	• Tree Cookies
• Leaves	• Water

Swank et al. (2015) conducted a single-case design study to explore the effects of NBCCPT with four elementary-aged children in kindergarten and first grade exhibiting behavioral concerns. Data was collected weekly on children's on/off task behaviors using the DOF (McConaughy & Achenbach, 2009). Following a three week baseline, children received 30-minute individual NBCCPT sessions twice per week for seven weeks. After the intervention, data was collected for three additional weeks. Swank and Shin found mixed results. Two children demonstrated decreased total problems and one child demonstrated increased on-task behavior. An important limitation of the study was unstable baselines for participants, meaning internal validity of the study was threatened.

Swank and Smith-Adcock (2018) conducted a similar single-case design study to explore the effects of NBCCPT or CCPT for eight children in kindergarten through third grade with a reported ADHD diagnosis. The children were randomly assigned to the NBCCPT intervention, CCPT intervention, or a waitlist control. Children in the two intervention groups received 30-minute individual sessions of the intervention twice per week for six weeks. Data was collected

weekly on the DOF (McConaughy & Achenbach, 2009). They found children in both the CCPT and NBCCPT groups improved on on-task behaviors compared to the children in the waitlist control group. Swank and Smith-Adcock concluded the CCPT intervention effectiveness ranged from debatable to effective while the NBCCPT intervention effectiveness ranged from debatable to very effective. However, it was unclear what analysis was conducted to support this conclusion. Another limitation of the study was the lack of a follow-up post-intervention.

Swank et al. (2017) expanded NBCCPT interventions to include group sessions consisting of three children. They named the expanded approach nature-based child-centered group play therapy (NBCCGPT). Swank and colleagues conducted a single-case design study with five children in kindergarten and first grade. The children were randomly assigned to the NBCCGPT intervention or a waitlist control. Children in the intervention group received 30-minute group sessions twice per week for six weeks. Data was collected weekly on the DOF, with a three week baseline period and three week post-intervention period (McConaughy & Achenbach, 2009). Swank et al. calculated a relative success rate (RSR) to compare the two groups. They found children in the NBCCGPT group were 2.03 times more likely to improve on on-task behaviors during the intervention period than waitlist peers and 2.59 times more likely to maintain improvements in the three weeks post-intervention. A primary limitation of the study was an unstable baseline for participants making it difficult to draw comparisons for change occurring.

Most recently, Swank et al. (2020) encouraged play therapists who may be unable to provide services outdoors, like NBCCPT, to employ strategies to bring nature into traditional indoor play therapy spaces. Some suggestions included integrating a natural view with an outdoor-facing window, selecting more natural toys and materials, and including living things

such as plants or small animals in the playroom. Swank et al. cautioned play therapists to consider how natural materials being present in the playroom could affect what kinds of limit setting situations occurred during therapy and how the therapist's conditional attitudes may be affected by increased potential of messiness.

Conclusion

Many researchers have focused on questions of whether CCPT is an effective intervention across populations and presenting concerns (Bratton et al., 2005; Lin & Bratton, 2015; Ray et al., 2015). However, few researchers have shared insights into how the physical parts of CCPT, such as the toys and playroom, work in the therapeutic process (Landreth, 2012; Ray et al., 2013). Further, although the research regarding the benefits of exposure to nature for adults and children is growing (Dankiw et al., 2020; Gill, 2014; Greenleaf et al., 2014; Maller et al., 2005; Wilson et al., 2008), research for the inclusion of nature or nature materials into CCPT is limited (Swank et al., 2015; Swank et al., 2017; Swank et al., accepted).

APPENDIX B

DETAILED METHODOLOGY

In this section, I will address the methodology for this study including the research question, operational definitions, participants, instruments, procedures, and analysis of data. This study focused on integrating nature exposure and CCPT through the use of an outdoor play room. The study utilized a single group, repeated-measures analysis of variance (ANOVA) to analyze outcomes on attentional and social-emotional competencies. Due to the exploratory nature of the study's intervention, I chose a single-group design in accordance with accepted steps to pilot exploratory interventions to discern feasibility of large-scale implementation and potential effects on outcomes of the intervention (Lynskey & Sussman, 2001; O'Reilly et al., 2013). I chose to use repeated-measures as a way to increase the rigor and strength of the study. Repeated-measures designs are an effective way to investigate individual's growth over time, particularly when looking at changes over time in clinical populations (Lix & Keselman, 2019).

Research Question

The purpose of this study was to further research on CCPT and the therapeutic benefits of exposure to nature for children experiencing attentional and social-emotional problems according to parent report. This study sought to answer the research question: What is the impact of CCPT in an outdoor playroom on improving executive functioning/attention and social-emotional competencies in children 5-10 years old?

Operational Definitions

Several definitions are provided to clarify the constructs involved in this study. Each definition is accompanied by an operationalization measure. Below are the definitions of CCPT, outdoors, outdoor playroom, attention deficit, and social-emotional competencies.

Child-Centered Play Therapy (CCPT)

CCPT in this study was defined based on Landreth's (2012) definition:

> …play therapy is defined as a dynamic interpersonal relationship between a child (or person of any age) and a therapist trained in play therapy procedures who provides selected play materials and facilitates the development of a safe relationship for the child (or person of any age) to fully express and explore self (feelings, thoughts, experiences, and behaviors) through play, the child's natural medium of communication, for optimal growth and development (p. 11).

Additionally, Ray (2011) created a CCPT treatment manual. For the purpose of this study, the CCPT treatment manual was utilized to define CCPT skills (Ray, 2011).

Outdoors

Outdoors was defined by combining two historically used definitions of nature (Louv, 2008; Maller et al., 2005). For the purpose of this study, outdoors was any space which includes nature and any of the related, organic, loose parts of biodiversity collectively representing the majority of ecosystem processes (e.g. birth, death, reproduction, relationships between species). In alignment with this definition, natural materials were any of the individual parts of nature (such as dirt, living organisms, and shells).

Outdoor Playroom

An outdoor playroom was defined as an outdoors area set up with play materials following a modified list of Landreth's (2012) suggested toys and materials list and equipped with additional natural materials. A full list of included toys and materials in the outdoor playroom can be found in Appendix E. The outdoor playroom was contained under a 10'x10' canopy with a clear vinyl roof and cloth panels on three of four sides of the canopy frame.

Executive Functioning/Attention

Executive functioning/attention was defined based on the Brown Executive

Function/Attention Scales (Brown EF/A Scales; Brown, 2019). According to Brown (2019), executive functions are "cognitive functions that activate, integrate, and control other functions of the mind" (p. 1). Brown further defined executive function/attention by describing six clusters of functions that attribute to impairment. The clusters are activation, focus, effort, emotion, memory, and action.

Social-emotional Competencies

Social-emotional competencies were defined based on the Social Emotional Assets and Resilience Scales (SEARS; Merrell, 2011). According to Merrell (2011):

> social and emotional assets and resiliencies can be broadly defined as a set of adaptive characteristics that are important for success at school, with peers, and in the outside world. They include such facets as friendship skills, empathy, interpersonal skills, social support, problem solving, emotional competence, social maturity, self-concept, self-management, social independence, cognitive strategies, and resilience (p. 3).

Participants

Participants were recruited for the study through a university center focused on play therapy services in the southern United States in the context of the 2020 COVID-19 pandemic. Therapists typically do not provide direct play therapy services at the center, but do conduct play therapy sessions in local Title I elementary schools as a part of the center's partnership with a local school district. When the center is contacted by someone interested in accessing play therapy services, if therapists are not available in the client's school, therapists provide referrals to community agencies As a consequence of the pandemic, in-person services had been terminated. The center served as a referral bank to help caretakers identify play therapy services. Once the outdoor playroom was established and COVID-19 procedures were in place, the center offered the opportunity for participation in the current study which included free play therapy services to caretakers interested in on-site services.. Therapists at the center are licensed

professional counselor interns and licensed professional counselors.

To be eligible for participation, participants had to: a) be between the ages of 5-10 years, b) experience attentional or self-regulation concerns in home or school settings as reported by parents, c) score in the Moderately or Markedly Atypical range on the total composite score of the Brown EF/A Scales or score in the At Risk or High Risk range on the total score of the Social Emotional Assets and Resilience Scales, d) and) and be comfortable with in-person services in an outdoor environment. A total of 21 participants were required as calculated by G*Power for an alpha of 0.05, medium effect size of 0.25, and power of 0.8. However, due to restrictions following Covid-19 precautionary procedures, only a total of 15 participants could be served.

Parents identified participant demographics. Participants' ages ranged from 5 to 10 years, with a mean age of 8.0. When asked about race, parents reported participants' racial identities were 13% Black (n = 2), 13% Latinx (n = 2), 7% Turkish (n = 1), and 67% White (n = 10). When asked about ethnicity, parents reported participants identified as 7% African (n = 1), 7% Black (n = 1), 52% Caucasian (n = 8), 27% Hispanic (n = 4), and 7% Turkish (n = 1). When asked about sex and gender separately, each parent reported the same answer for both demographic questions. Parents reported participants identified 60% male (n = 9) and 40% female (n = 6).

Instruments

This study utilized three instruments to collect data from participants. One instrument was created by the primary researcher and two were standardized assessments. Each instrument is described in greater detail below.

Demographic Questionnaire

Each participant's guardian completed a demographic questionnaire containing multiple

choice and open-ended questions. The demographic questionnaire asked the following: child's age, sex, gender, race, ethnicity, average number of hours spent outdoors on a weekday, average number of hours spent outdoors on a weekend day, average number of hours of screen time on a weekday, and average number of hours of screen time on a weekend day. The demographic questionnaire can be found in full in Appendix E. The four questions asked regarding outdoor time and screen time were asked during the intake and following the participant's final session.

Brown Executive Function/Attention Scales

The Brown Executive Function/Attention Scales (Brown EF/A Scales) are a set of assessments measuring executive functions related to attention-deficit/hyperactivity disorder (ADHD) in people ages 3 years and older (Brown, 2019). The Brown EF/A Scales measure attention as a group of executive functions and potential impairments. The Brown EF/A Scales contain three primary rating scales that cover four age levels including Parent, Teacher, and Self-Report Forms. For the purpose of this study, the Brown EF/A Scales Parent Form - Early Childhood and the Brown EF/A Scales Parent Form - Child were utilized.

The Brown EF/A Scales Parent Form is designed to be completed by parents, guardians, or other home-based caregivers of children. The Early Childhood form is designed to be completed for children ages 3 to 7 years and the Child form is designed to be completed for children ages 8 to 12 years. The Brown EF/A Scales Parent Form - Early Childhood consists of 56 items and the Brown EF/A Scales Parent Form – Child consists of 58 items. All items are grouped into six clusters: activation, focus, effort, emotion, memory, and action. Items are rated on a 4-point scale ranging from No Problem (0), Little Problem (1), Medium Problem (2), or Big Problem (3). Parents are asked to rate a series of statements based on the child's behaviors in the past 6 months.

The Brown EF/A Scales Parent Forms were scored using computer scoring software. Raw scores were calculated and converted to T-scores, confidence intervals, percentiles, and classifications. Qualitative descriptions of the classifications and their t-score range are provided in Table B.1.

Table B.1

Qualitative Classification Descriptions for the Brown EF/A Scales Parent Forms

Classification	Qualitative Description	T-score range
Typical	Unlikely significant problem	54 and below
Somewhat atypical	Possibly significant problem	55-59
Moderately atypical	Significant problem	60-69
Markedly atypical	Very significant problem	70 and above

Brown (2019) standardized the Brown EF/A Scales Parent Forms with parents of children ages 3 to 18 years. Normative samples were selected to be representative of the U.S. population as defined by the U.S. Census Bureau for age, sex, ethnicity, education level of the parent(s), and geographic region. To be included in the normative sample, raters also had to be fluent in English and able to read at a third-grade level.

Table B.2

Reliability Estimates for the Brown EF/A Scales Parent Form by Age Group

Scale	Cronbach's Alpha (α)	Test-retest (r)
Ages 3-7 (Early Childhood)		
Activation	.90	.88
Focus	.91	.90
Effort	.84	.86
Emotion	.77	.81
Memory	.87	.88
Action	.86	.91
Total Composite score	.97	.92

(table continues)

Scale	Cronbach's Alpha (α)	Test-retest (r)
Ages 8-12 (Child)		
Activation	.79	.81
Focus	.87	.78
Effort	.79	.75
Emotion	.79	.83
Memory	.80	.77
Action	.85	.71
Total Composite score	.95	.79

Reliability estimates for the Brown EF/A Scales Parent Forms were considered strong with internal consistency ranging from .77 to .97. Test-Retest reliability estimates at an interval of 7-28 days between ratings were strong and ranged from .71 to .92. The Cronbach's alpha estimates and test-retest reliabilities for the Brown EF/A Scales Parent Forms are reported in Table B.2. Regarding validity, assessment creators conducted factor analytic studies, studies of intercorrelations among the Brown EF/A Scales Parent Forms cluster subscales, and studies of correlations with other measures (Brown, 2019).

Social Emotional Assets and Resilience Scales (SEARS)

The Social Emotional Assets and Resilience Scales (SEARS) is a strength-based assessment measuring social-emotional competencies of children and adolescents ages 5 to 18 years from multiple perspectives (Merrell, 2011). The SEARS measures adaptive characteristics important for a child's success at school, with peers, and in other environments from a strength-based perspective. The SEARS contains four primary rating scales with companion short forms focused on specific rater and context including the SEARS-Child, SEARS-Adolescent, SEARS-Teacher, and SEARS-Parent. For the purpose of this study, the SEARS-P was utilized.

The SEARS-P is designed to be completed by parents, guardians, or other home-based caregivers of children ages 5 to 18 years. The SEARS-P consists of 39 items across three scales:

Self-Regulation/Responsibility, Social Competence, and Empathy. Items are rated on a 4-point scale ranging from *never* (0), *sometimes* (1), *often* (2), or *always* (3). Parents are asked to rate a series of statements based on the child's behaviors in the past 6 months. Parents are also given a space to record any additional information they wish to include.

The SEARS-P was scored using computer scoring software. Raw scores were calculated and converted to T-scores, percentiles, and tiers. Qualitative descriptions of the tiers and their percentages for children in Kindergarten through sixth grades are provided in Table B.3.

Table B.3

Qualitative Tier Descriptions for the SEARS-P for Children in Grades K-6

Tier Range	Qualitative Description	T-score range	Percentiles
Tier 1	Average to High Functioning	42 and above	21-100%
Tier 2	At Risk	35-41	6-20%
Tier 3	High Risk	34 and below	1-5%

Merrell (2011) standardized the SEARS-P with parents of children in Grades K to 12. The normative sample included 649 parents of children ages 5 to 12 years (M = 8.71 years, SD = 2.18 years). Normative samples were selected to be representative of the U.S. population as defined by the U.S. Census Bureau for age, gender, and ethnicity. Data for the normative sample was collected in multiple regions across the United States.

Reliability estimates for the SEARS-P were considered strong with internal consistency ranging from .87 to .96. Test-Retest reliability estimates at a 2 week interval were strong and ranged from .88 to .93. The Cronbach's alpha estimates and test-retest reliabilities for the SEARS-P are reported in Table B.4. Regarding validity, Merrell (2011) conducted factor analytic studies and studies of intercorrelations among the SEARS subscales.

Table B.4

Reliability Estimates for the SEARS-P

Scale	Cronbach's Alpha (α)	Test-retest (r)
Self-Regulation/Responsibility	.95	.92
Social Competence	.89	.88
Empathy	.87	.90
Total score	.96	.93

Procedures

First, I obtained human subjects approval from the University of North Texas Institutional Review Board. . In addition to recruitment through the center, participants were recruited with convenience sampling via a flyer posted on social media pages and sent to all elementary school counselors in a local school district (see Appendix E).Participants contacted the center to schedule an intake appointment with me. After receiving informed consent from participant guardians at the beginning of the intake session, guardians completed the demographic questionnaire, the age-appropriate Brown EF/A Scales, and the SEARS-P. At the end of the appointment, I scored the Brown EF/A Scales and the SEARS-P. If the child met inclusion criteria, I scheduled play therapy sessions for the participant with an available play therapist.

Play therapists provided the play therapy intervention with participants in the outdoor playroom. Participants received two 30-minute play therapy sessions per week for eight weeks or until as close to a total of 16 play therapy sessions were completed. Guardians completed the Brown EF/A Scales and the SEARS-P during sessions four, eight, twelve, and sixteen. They completed the four questions regarding outdoor time and screen time during session 16. Thus,

five total points of measurement were completed over the course of the study with approximately two weeks between each measurement point.

Due to compliance with Covid-19 precautionary measures, the outdoor room was closed on Thanksgiving and did not reopen for the last two weeks of the fall semester. Thus, some participants were unable to complete 16 sessions. Of the 15 participants, 10 participants completed all 16 sessions, 3 participants completed 15 sessions, one participant completed 13 sessions, and one participant completed 12 sessions. The guardians of the 3 participants who completed 15 sessions filled out the final round of assessments during what would have been the sixteenth session even though their child was unable to be seen on that day due to the restriction of the room already being closed. Thus, a total of 13 participants completed all five measurements points.

Intervention

Four play therapists who provided services to participants as a part of this study met the minimum requirements to be a doctoral level student enrolled in their second year of study or greater in a Council for Accreditation of Counseling & Related Educational Programs (CACREP) accredited program and completion of two CCPT courses with at least one semester of supervised experience in CCPT. One play therapist was a White female counselor educator. The second play therapist was a White female who was a fourth year doctoral student. The third play therapist was an East Asian female who was a second year doctoral student. The fourth play therapist was a Chinese female who was a second year doctoral student.

Prior to implementing services for the purpose of this study, all play therapists attended a one hour orientation. The orientation reviewed CCPT philosophy and skills, introduced the structural components of the outdoor playroom and the natural materials that were added into the

playrooms, and addressed implications of the space and adding new toys such as limit-setting concerns. The orientation also included information on procedures related to the Covid-19 safety plan including protocols for disinfecting toys and equipment, use of face masks, social distancing practices, and hand sanitizing. See Appendix E for the full listing of Covid-19 protocols. All play therapists were required to follow a CCPT protocol (Ray, 2011) for the duration of the study and recorded all of their sessions with participants through session 16 or termination of therapy services, whichever occurred first. General categories of verbal responses along with their definitions followed the CCPT treatment manual (Ray, 2011).

Before I analyzed data, one play therapy session per participant was randomly selected to be reviewed by an outside auditor to ensure the play therapists adhered to the CCPT protocol with each participant. The auditor was a Masters level student in a CACREP-accredited counseling program who had taken at least two play therapy courses and received one semester of supervised CCPT supervision. Further, the auditor was trained in fidelity procedures and had previous experience completing the fidelity analysis. The auditor utilized Ray et al.'s (2017) CCPT – Research Integrity Checklist to tabulate therapist responses according to the categories listed with particular attention to non-CCPT responses. I calculated the integrity percentage after the audit was completed. A 98.9% agreement among all sessions for following the CCPT protocol was met.

Data Analysis

In order to understand more about the sample, demographic data was entered into Microsoft Excel. Paired samples t-tests were conducted to understand participants' time spent outdoors and screen time at the time of intake and last session. A total of four paired samples t-

tests were completed: time outdoors on weekdays, time outdoors on weekend days, screen time on weekdays, and screen time on weekend days.

In order to answer this study's research question, the Brown EF/A Scales and the SEAR-P were scored using manualized procedures and scoring software designed for the respective assessments after data collection was completed. The data results for all measurement points were entered into IBM SPSS Statistics 27. I planned two repeated measures ANOVAs for the purpose of answering this study's research question. Prior to running the analyses, the dataset was examined to determine if the assumptions for a repeated measures ANOVA were met. The basic assumptions for a repeated measures ANOVA include: normal distribution and homogeneity of variance (Lix & Keselman, 2019; Pallant, 2016). Because G*Power indicated a necessary sample size of 21 participants, post power analysis was run on each ANOVA to address credible effects.

The first analysis conducted was a single group, repeated measures ANOVA on participants Total Composite Score on the Brown EF/A Scales. The independent variable was time and the dependent variable was Total Composite Score on the Brown EF/A Scales. The purpose of this analysis was to determine whether children's attention changed over the course of the outdoor CCPT intervention. The second analysis conducted was a single group, repeated measures ANOVA on participants Total Score on the SEARS-P. The independent variable was time and the dependent variable was Total Score on the SEARS-P. The purpose of this analysis was to determine whether children's social-emotional competencies changed over the course of the outdoor CCPT intervention. If the analyses were found to be statistically significant, post hoc analyses were examined to determine between which time points change occurred.

For the purpose of this study, statistical significance was determined by a p-value less than 0.05. After running the repeated measures ANOVA analysis in SPSS, the output was examined to determine if there was statistically significant difference across time. I completed post hoc pairwise comparison analyses to determine between which points of measurement significant changes occurred. To test for practical significance, I calculated Cohen's *d* effect sizes for the dependent variable to determine the magnitude of the differences between the measurement points. I interpreted effect sizes of .2 to represent a small effect, .5 a medium effect, and .8 a large effect (Cohen, 1988). I examined clinical significance results by noting the change in clinical categories among participants between measurements.

APPENDIX C

UNABRIDGED RESULTS

Descriptive Variables

The following results are intended to better understand the sample's characteristics regarding time spent outdoors and screen time at time of intake and last session. Four separate paired samples t-tests were completed: time outdoors on weekdays, time outdoors on weekend days, screen time on weekdays, and screen time on weekend days. Group means, standard deviations, and ranges are reported in Table C.1.

Table C.1

Mean Scores of Each Demographic Characteristic in Hours

		M	*SD*	Range
Time Outdoors on Weekdays (n = 14)	Intake	2.16	1.99	.5-8
	Last Session	2.11	1.46	.5-6
Time Outdoors on Weekend Days (n = 13)	Intake	3.00	1.47	1-6
	Last Session	3.77	2.50	2-8
Screen Time on Weekdays (n = 14)	Intake	3.25	2.69	.75-10
	Last Session	3.46	3.86	.5-15
Screen Time on Weekend Days (n = 14)	Intake	4.77	2.24	2-10
	Last Session	4.61	3.39	1-15

All paired samples t-tests were not statistically significant. There was no statistically significant difference in time outdoors on weekdays t (13) = .099, p = .922 (two-tailed). There was no statistically significant difference in time outdoors on weekend days t (12) = 1.242, p = .238 (two-tailed). There was no statistically significant difference in screen time on weekdays t (13) = 0.175, p = .864 (two-tailed). There was no statistically significant difference in screen time on weekend days t (13) = 0.174, p = .865 (two-tailed).

Primary Research Question Results

The following results are intended to answer the primary research question: What is the

impact of CCPT in an outdoor playroom on improving executive functioning/attention and social-emotional competencies in children 5-10 years old? I will present results of the data analyses, including report of statistical, practical, and clinical significance.

In order to address the primary research question, separate repeated measures ANOVAs were conducted for each dependent variable to evaluate the impact of CCPT in an outdoor playroom across five points of measure. Dependent variables were Brown EF/A Scales Total Composite and SEARS-P Total Score. A reduction in scores on the Brown EF/A Scales and an increase in scores on the SEARS indicate improvement. Time served as the independent variable, including points of measure at the intake session and during sessions 4, 8, 12, and 16.

Table C.2

Mean Scores of Each Dependent Variable Across Time (N=13)

		M	*SD*	Range
Brown EF/A Scales Total Composite Score	Intake	67.77	7.30	55-81
	Session 4	63.54	9.61	49-78
	Session 8	62.23	9.05	49-79
	Session 12	58.23	8.60	47-74
	Session 16	56.92	7.90	46-70
SEARS-P Total Score	Intake	38.31	6.13	31-50
	Session 4	41.92	7.16	30-52
	Session 8	42.46	7.15	31-55
	Session 12	45.23	7.38	32-55
	Session 16	44.62	7.16	33-56

Note. A decrease in mean scores on the Brown EF/A Scales indicates improvement in executive functioning/ attention symptoms. An increase in mean scores on the SEARS-P indicates improvement in social-emotional competencies.

Group means, standard deviations, and range of scores are reported in Table C.2. The ranges indicate a large spread of data across participants at each data point, indicating that some participants scored higher or lower than other participants on the same assessment at the same

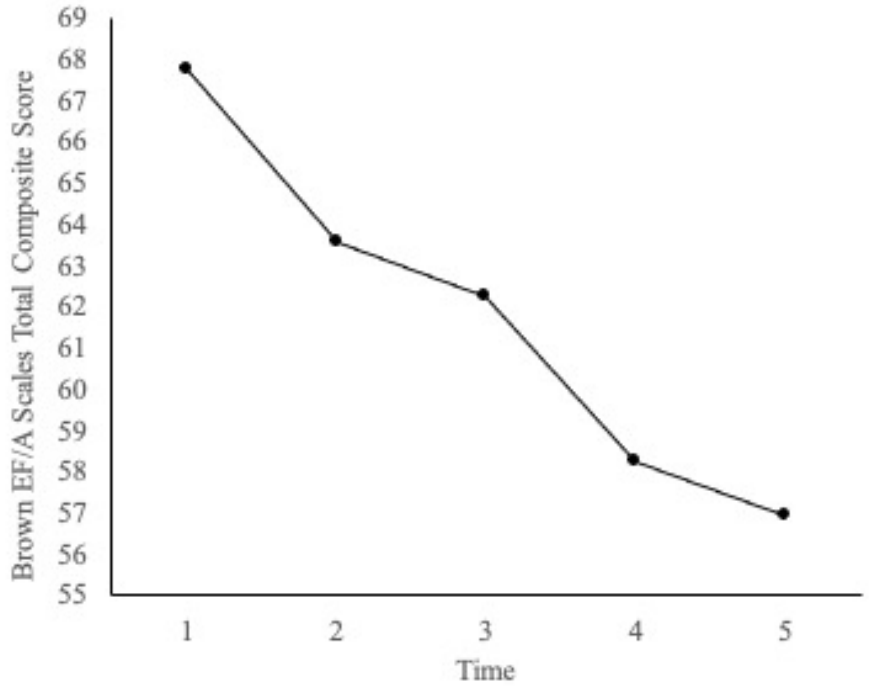
data point. Mean scores are impacted by large variations between individual scores as indicated by range values.

Brown EF/A Scales Total Composite

The first repeated measures ANOVA assessed the impact of outdoor CCPT on participants' executive functioning/ attention scores on the Brown EF/A Scales across time as reported by parents. The assumptions for level of measurement, independent observations, and normal distribution were all reasonably met. When examining the means of participants over time (see Figure C.1), observation indicates a decrease in the average Brown EF/A Total Composite scores from intake to session 16, marking overall improvement in children's executive functioning/ attention.

Figure C.1

Means over Time on Brown EF/A Scales Total Composite



There was a statistically significant effect for time, Wilks' Lambda = .21, F (4, 9) = 8.447, p = .004, observed power = .96. Thus, a statistically significant decrease in Total Composite scores across the five points of measurement was found. Because a statistically significant result was obtained, a Pairwise Comparisons analysis utilizing the Bonferroni method was completed to determine where the difference in scores occurred (see Table C.3). Cohen's d was calculated for each statistically significant difference. Statistically significant differences were found between time points 1 and 3 with a medium effect (p = .043, d = .674), 1 and 4 with a large effect (p < .001, d = 1.196), 1 and 5 with a large effect (p < .001, d = 1.427), 3 and 4 with an approaching medium effect (p =.031, d = .453), and 3 and 5 with a medium effect (p = .025, d = .625). In summary, there was a statistically significant difference in Total Composite scores between the first and last points of measure with a large effect.

Table C.3

Pairwise Comparisons for Brown EF/A Scales Total Composite Scores (N=13)

Time (I)	Time (J)	Mean Difference (I-J)	Std. Error	Sig.
1	2	4.231	1.691	.278
	3	5.538	1.580	.043*
	4	9.538	1.509	< .001*
	5	10.846	1.702	< .001*
2	1	-4.231	1.691	.278
	3	1.308	1.677	1.000
	4	5.308	1.845	.1139
	5	6.615	1.966	.056
3	1	-5.538	1.580	.043*
	2	-1.308	1.677	1.000
	4	4.000	1.086	.031*
	5	5.308	1.398	.025*

(table continues)

Time (I)	Time (J)	Mean Difference (I-J)	Std. Error	Sig.
4	1	-9.538	1.509	< .001*
	2	-5.308	1.845	.1139
	3	-4.000	1.086	.031*
	5	1.308	.559	.375
5	1	-10.846	1.702	< .001*
	2	-6.615	1.966	.056
	3	-5.308	1.398	.025*
	4	-1.308	.559	.375

Note. * indicates significance at $p < .05$.

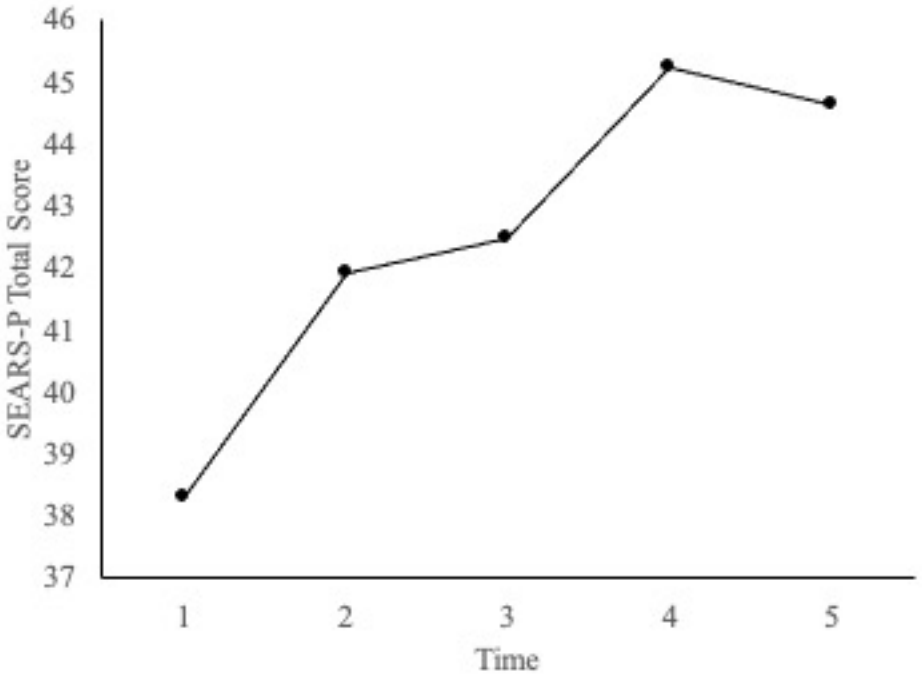
When examining the means of participants over time, results indicate clinically significant change in executive functioning/ attention. On average, children's scores at the first time measurement ($M = 67.77$) were in the Moderately Atypical range signifying a significant problem with attention-related behaviors. At the final time measurement, children's scores had improved ($M = 56.92$) and were in the Somewhat Atypical range signifying a possible significant problem with attention-related behaviors. This decrease in scores represented a one-tier decrease in classification of clinical severity of symptoms as reported by parents.

SEARS-P Total Score

The second repeated measures ANOVA assessed the impact of outdoor CCPT on participants' social-emotional competencies scores on the SEARS-P across time as reported by parents. The assumptions for level of measurement, independent observations, and normal distribution were all reasonably met. When examining the means of participants over time (see Figure C.2), observation indicates an increase in the average SEARS-P Total Scores from intake to session 16, marking overall improvement in children's social-emotional competencies.

Figure C.2

Means over Time on SEARS-P Total Score



There was a statistically significant effect for time, Wilks' Lambda = .16, F (4, 9) = 11.809, p = .001, observed power = .99. Thus, a statistically significant decrease in Total Scores across the five points of measurement was found. Because a statistically significant result was obtained, a Pairwise Comparisons analysis was completed to determine where the difference in scores occurred (see Table C.4). Cohen's d was calculated for each statistically significant difference. Statistically significant differences were found between time points 1 and 3 with a medium effect (p = .016, d = .623), 1 and 4 with a large effect (p = .011, d = 1.020), 1 and 5 with a large effect (p < .001, d = .947), and 3 and 5 with a small effect (p = .007, d = .302). In summary, there was a statistically significant difference in Total Scores between the first and last points of measure with a large effect.

Table C.4

Pairwise Comparisons for SEARS-P Total Scores (N=13)

Time (I)	Time (J)	Mean Difference (I-J)	Std. Error	Sig.
1	2	-3.615	1.107	.067
	3	-4.154	1.024	.016*
	4	-6.923	1.623	.011*
	5	-6.308	.943	< .001*
2	1	3.615	1.107	.067
	3	-.538	.685	1.000
	4	-3.308	1.595	.603
	5	-2.692	.858	.085
3	1	4.154	1.024	.016*
	2	.538	.685	1.000
	4	-2.769	1.557	1.000
	5	-2.154	.478	.007*
4	1	6.923	1.623	.011*
	2	3.308	1.595	.603
	3	2.769	1.557	1.000
	5	.615	1.461	1.000
5	1	6.308	.943	< .001*
	2	2.692	.858	.085
	3	2.154	.478	.007*
	4	-.615	1.461	1.000

Note. * indicates significance at $p < .05$.

When examining the means of participants over time, results indicate clinically significant change in social-emotional competencies. On average, children's scores at the first time measurement ($M = 38.31$) were in the Tier 2 range signifying they were at risk for emerging deficits in social-emotional competencies (Merrell, 2011). At the final time measurement, children's scores had improved ($M = 44.62$) and were in the Tier 1 range signifying average to

excellent social emotional competencies (Merrell, 2011). This decrease in scores represented a one-tier decrease in classification of clinical severity of symptoms as reported by parents.

APPENDIX D

EXTENDED DISCUSSION

I sought to investigate the impact of CCPT in an outdoor playroom on improving executive functioning/attention and social-emotional competencies in children ages 5 to 10 years old. Specifically, I examined whether change occurred in participants' scores on the Brown EF/A Scales and SEARS-P across five points of measure throughout their participation in CCPT sessions in the outdoor playroom. Parents reported statistically, practically, and clinically significant results indicating that they observed decreases in attention-related problem behaviors and increases in the social-emotional competencies of their children following participation in CCPT in an outdoor environment.

Impact of CCPT in Outdoor Playroom with Attention

The results of the current study indicate that CCPT in an outdoor playroom may be a potential treatment modality to use when improving attention in children. Previous research on the effects of exposure to nature indicate children who are diagnosed with attention disorders, specifically ADD and ADHD, benefit from increased exposure to the natural world outdoors (Kuo & Taylor, 2004; Taylor & Kuo, 2011; Taylor et al., 2001; Yang et al., 2019). In Kaplan's (1995) Attention Restoration Theory (ART), he proposed that exposure to nature provided neurological rest by providing an environment with ample opportunities for fascination or involuntary attention. Taylor and colleagues (2001) expanded ART to its application with children and found parents reported less severity in ADD/ADHD symptoms the greener their child's everyday play environment. Further, Kuo and Taylor (2004) found parents reported significantly reduced ADD/ADHD symptoms following green outdoor activities. Thus, the outdoor aspect of this study's intervention served to further explore the effects of therapy in an outdoor environment, resulting in consistent findings with previous researchers that exposure to nature may have contributed to the significant improvement in participants' attention and

executive functioning.

The focus of the current study was to contextualize CCPT within an outdoor playroom, thereby utilizing principles of CCPT as the primary therapeutic process. Consistent with previous research (Kram, 2019; Muro et al., 2006; Ray et al., 2007; Robinson et al., 2017; Schottelkorb & Ray, 2009), findings from the current study affirm CCPT as a treatment for children with attention disorders with overall positive results. In Kram's (2019) randomized controlled trial to explore the effectiveness of CCPT on reducing ADHD symptoms in children who had experienced adverse childhood experiences, she found improvement in teacher-reported inattention and improvement in observed ADHD symptoms for the CCPT treatment group when compared to their waitlist peers. Ray et al. (2007) also found CCPT was effective in reducing ADHD symptoms in children when children received 16 once-weekly CCPT sessions. Therefore, results of the current study on reducing executive functioning/attention problems are supported by previous randomized controlled trial studies where participants also demonstrated improvement after receiving CCPT in a traditional setting.

Further, the current study sought to ground CCPT in the outdoors to capitalize on the therapeutic benefits of both. Consistent with previous research (Swank & Shin, 2015b; Swank & Smith-Adcock, 2018), findings from the current study affirm the establishment of CCPT in outdoor settings with children struggling with attention. When Swank et al. (2015) explored the implementation of NBCCPT with children exhibiting behavioral concerns related to attention, they found children demonstrated decreased total problems and increased on-task behavior following the integrated intervention. Further, Swank and Smith-Adcock (2018) found NBCCPT improved on-task behaviors for children with reported ADHD diagnoses. Although the current study did not follow NBCCPT, it does share the quality of providing CCPT grounded in an

outdoor environment. Placing CCPT in an outdoor playroom allowed participants to cope with their attention deficits through an accepting, understanding relationship with a play therapist while in an environment where they could also experience fewer cognitive demands on attention.

For example, one participant's parent reported during intake that her son struggled to pay attention to her limit-setting at home. During his first two play therapy sessions, the play therapist needed to set limits with the participant when he tried to call his sisters over from the parking lot to play with him in the outdoor room and for him to wear goggles when choosing to use the hammer or mallet. The play therapist followed CCPT limit-setting and had to repeat the same limits a couple of times each session. The participant would respond by following the limit when it was first set, but returned to his previous behavior a few minutes later prompting the play therapist to reset the limit. By session 8, the counselor would begin to set a limit, such as needing to use the goggles with the hammer, and the participant would remember the limit and put the goggles on before the therapist finished stating the limit. The therapeutic relationship in CCPT allowed the child to feel that his desires were understood and that the therapist believed him capable of self-regulation regardless of how many times she needed to repeat the limit. The restorative effects of nature exposure on attention may have assisted him in remembering the limits from prior sessions during later ones because he was able to more fully attend to the therapist in an environment where other factors were not requiring the same level of directed attention from him. Thus, this participant's improvement in attention and the current study's similar positive results on improving attention across participants supports the continued exploration of the integration of nature with CCPT.

Impact of CCPT in Outdoor Playroom with Social-Emotional Competencies

The results of the current study indicate that CCPT in an outdoor playroom may be a

potential treatment modality to use when improving social-emotional competencies in children. Previous research on the effects of exposure to nature indicate children experience social-emotional benefits from increased exposure to the natural world outdoors, including increased emotional self-regulation (Bakir-Demir et al., 2019; Scott et al., 2018; Weeland et al., 2019) and decreased peer relationship problems (Amoly et al., 2014; Hinkley et al., 2018; van Dijk-Wesselius et al., 2018). Thus, the outdoor aspect of this study's intervention may have contributed to the significant improvement in participants' overall social-emotional competencies which included self-regulation, social competence, and empathy.

Consistent with historical research (Bratton et al., 2013; Cheng & Ray, 2016; Ray, Stulmaker, et al., 2013; Wilson & Ray, 2018), findings from the current study affirm the effectiveness of CCPT as a treatment for children who experience social-emotional deficits with overall positive results. In Wilson and Ray's (2018) study on the impact of CCPT on levels of aggression, self-regulation, and empathy, they found parents reported significant improvements in all three areas for children who participated in CCPT. Similarly, Cheng and Ray (2016) found social-emotional assets of young children significantly improved following participation in CCPT when compared to waitlist control group peers. Therefore, results of the current study are supported by previous research demonstrating the impact of CCPT in a traditional setting on improving children's overall social-emotional competencies including self-regulation, social competency, and empathy.

Although Swank and Shin (2015b) first explored implementing CCPT outdoors to simultaneously mobilize the separate therapeutic benefits of nature exposure and play therapy, researchers have not investigated the impact of NBCCPT on social-emotional competencies in children. To date, no quantitative studies examining the effect of an intervention based on CCPT

principles in an outdoor environment have been conducted. Thus, the results of the current study provide novel insight into possible improvement in children's social-emotional competencies through continued exploration of nature integration with foundationally CCPT interventions. Placing CCPT in an outdoor playroom allowed participants to strengthen their social-emotional competencies through an accepting relationship with a play therapist who conveyed empathic understanding while in an environment where they could explore the edges of those competencies through relationships with other living beings. For example, when birds interrupted a session with loud calls in neighboring trees, children were able to explore empathy towards the birds and regulate themselves during the perceived conflict. Simultaneously, the play therapist conveyed acceptance of the children regardless of their level of empathy toward the birds and reflected the children's emotions and process.

Time Effects Across Course of Intervention

The current study is the first to examine the impact of providing a CCPT intervention (Ray, 2011) in a defined outdoor space utilizing a mixture of Landreth's (2012) suggested toys and additional natural materials on executive functioning/attention and social-emotional competencies in children. Results indicated a significant decrease in scores on the Brown EF/A Scales with a large effect size between participants' intake and last play session. Therefore, parents observed significant improvements in attention behaviors between when their children started and finished the intervention. Further, results indicated a significant increase in scores on the SEARS-P with a large effect size between participants' intake and last play sessions. Therefore, parents observed significant improvements in social-emotional competencies such as self-regulation, social competency, and empathy between when their children started and finished the intervention.

By utilizing a repeated measures design, I was able to further investigate when change occurred among the five measurement points, and thus, was able to discern when participants' improvements emerged over time. Results indicated the first time statistically significant change occurred was between time 1 and time 3, or between the intake session and session 8 of the intervention for both attention and social-emotional competencies. These results suggest that children needed some time in the intervention before parents reported observable changes. Previous research supports this finding that participants require some time in CCPT before parents observe behavioral changes (Ray, 2008). In Ray's (2008) study, she found parents reported significant improvement after children had participated in at least 11 CCPT sessions. For one participant, parents reported a distinct shift in scores between intake and midway through the study. In a parent consultation, parents shared how they noticed their child enjoyed coming to play therapy even though the child did not share with her parents what she did in sessions. However, they believed it was helping her because they had seen big improvements in how she was functioning at school. At the time of intake, the participant was struggling to engage in learning activities in her classroom and was experiencing bullying from a peer in her classroom. The classroom teacher had implemented a system of checking in with the child and offering breaks if the child asked for them. By session eight, when the teacher would check in with the child, she would confidently respond that she did not need a break and demonstrated greater attention to learning activities. Further, the child had identified that she no longer wanted to be friends with someone who was mean to her and chose to sit away from the child bullying her.

Results of the current study indicated another significant change for participants' executive functioning/ attention and social-emotional competencies between time 3 and time 5,

or between sessions 8 and 16. This second significant improvement in attention and social-emotional competencies suggested that parents continued to observe positive behavioral changes as children maintained participation in CCPT outdoors. For one participant, a significant shift in therapy first occurred during session three when he moved from making little to no contact with the therapist to engaging her in fantasy role play. Then, in session 13 the child demonstrated another significant relational shift that provided evidence of his growing empathy skills. The child had engaged the therapist in sword play where he was using a thick stick and the therapist was using a pool noodle. On one swing, the child missed the pool noodle and hit the therapist's thumb with the stick instead. The child immediately asked if the therapist was okay and wanted to see her hand. Then, the child decided that he and the therapist should play the sword game with only pool noodles for a little while to avoid her being hurt again. At termination, the child continued to demonstrate empathy within the therapeutic relationship and his parent reported similar improvement in his relationships with his siblings.

Theoretical Integration of CCPT and Nature

Although the research regarding the benefits of exposure to nature for children is growing (Dankiw et al., 2020; Gill, 2014; Greenleaf et al., 2014; Maller et al., 2005; Wilson et al., 2008), research for the inclusion of nature or nature materials into CCPT is limited (Swank et al., 2015; Swank et al., 2017; Swank et al., 2020). In Swank and Shin's (2015b) NBCCPT, they followed the relational tenets of CCPT. However, they presented all of nature as a playroom and the natural materials inherently present as the toys. Further, they highlighted that a child's relationship with nature is an additional focus within NBCCPT. From this perspective, Swank and Shin (2015b) grounded CCPT in nature where nature was the larger context within which CCPT was practiced. For the current study, I approached integrating CCPT and nature from the

reversed perspective of grounding nature in CCPT where a larger focus was on inviting nature into the more traditional context of CCPT. Thus, I chose to include many of the same materials present in NBCCPT, but the overall intervention of the current study did not qualify as NBCCPT.

From this perspective of grounding nature in CCPT, I took an additive approach to combine the therapeutic benefits of both while limiting the dilution of the numerous factors comprising either one. Because research supported the effectiveness of both traditional CCPT (Cheng & Ray, 2016; Kram, 2019; Ray et al., 2007; Wilson & Ray, 2018) and NBCCPT (Swank & Smith-Adcock, 2018; Swank et al., 2015), I wanted to combine the kinds of spaces and toys utilized in both. Thus, the outdoor playroom had both a covered area and a free nature space for play. In the outdoor playroom, children were also offered a combination of traditional CCPT toys defined by Landreth (2012) and natural toys including some of the ones suggested by Swank and Shin (2015b). As I endeavored toward greater theoretical integration and actively practiced play therapy from this lens throughout the study, two challenges for further consideration developed. One challenge involved a need to clarify the goals of play therapy from an integrated lens and the second challenge was to assess the present relationships with nature and determine the appropriate degree of interaction with them during sessions.

The first challenge of clarifying the goals of outdoor CCPT arose from pondering how to address limit-setting around harmful interactions with living other-than-human organisms and why it mattered. When reviewing Landreth's (2012) general therapeutic objectives of CCPT, all ten focused on developing the child's understanding of self, including qualities such as self-concept, self-responsibility, and self-directing. However, returning to person-centered theory which CCPT was adapted from, Rogers (1951, 1957) discussed therapy in broader terms as a

way to resolve breaks in self-concept. Breaks resulted from a person having a significant degree of incongruence between their experience and self-concept. Incongruencies accumulate as experiences that meet conditions of worth get accurately perceived into awareness and experiences that contradict conditions of worth are perceived partly through distortion, ignored, or denied as a means of defense (Rogers, 1959). Rogers (1957) described the six conditions that he believed were both necessary and sufficient for therapy to be effective in resolving incongruencies. The third through fifth conditions require the therapist to be congruent within the relationship, experience unconditional positive regard for the client, and communicate an empathic understanding of the client's experience. The last condition is that the client, to some degree, senses the therapist's empathic understanding and unconditional positive regard.

Considering Rogers' (1957) six conditions as the goals of person-centered therapy, and by extension as the goals for CCPT, the purpose of including nature in therapy starts to become clearer. First, the play therapist can increase their own congruence in the therapeutic relationship by recognizing congruence exists at many levels including as consistency between self, experience, and the world, also known as organismic integration (Cornelius-White, 2007). Organismic integration highlights that congruence exists for persons from the cellular to ecological level (Cornelius-White, 2007). Therefore, the inclusion of nature allows the therapist to convey a higher level of congruence because they are practicing at the organismic integration level. Second, the play therapist can increase their communication of empathic understanding of the child's experience because they are attending to an additional aspect of that experience – the child's experience of nature and the natural world.

The second challenge of theoretically integrating CCPT and nature was how to assess the present relationships with nature and determine the appropriate degree of interaction with them

during sessions. From an ecotherapy perspective, nature serves as another therapeutic agent and as an input of nonverbal communication. For the current study, level of therapist awareness of this role of nature varied across play therapists. Further, when the play therapist noticed a source of communication from nature, she had to decide what to bring to the child's awareness versus save for her own observations. For example, in one session a child was processing grief from a family pet dying. As the child somberly sifted sand to create a grave scene, a butterfly flew into the canopy and rested on the canopy frame. When the child shifted his play to a happier crafting activity, the butterfly left the canopy and did not return. Although the therapist was aware of how the butterfly sat with the child throughout his processing of grief, the therapist chose not to bring the child's attention to how the insect had found the playroom and the child's grief safe to rest with because the therapist did not think it matched the child's experience of the moment. In comparison, when a child pointed out a moth sitting on the ground of the playroom, the therapist reflected the child had noticed the insect. Then, the moth flew away and the child took a plastic butterfly and mimicked the moth's flight pattern from the ground to past the edge of the canopy frame. The therapist reflected how the child liked how the moth flew so much that he wanted to try to fly the same way.

Greater theoretical integration of CCPT and nature will require play therapists to continue accruing experience of play therapy from this lens. The two challenges described above continue to lack clear resolution. Thus, future play therapists should continue to examine the theoretical implications of what true integration would encompass.

Influence of COVID-19 on Processes and Outcomes

The current study was conducted within the context of the COVID-19 pandemic. When the study was proposed and IRB approval sought, the pandemic had been active within the

United States for several months. Therefore, an additional step of requesting approval to conduct in-person sessions with children and have facilities open was required at the university level. The approval of the outdoor playroom to be open was contingent on the implementation and maintenance of additional safety and preventative measures. A full listing of the COVID-19 procedures can be found in Appendix E.

Based on prior research on benefits of nature exposure and the effectiveness of CCPT, as well as based on the results of the current study, CCPT in an outdoor playroom may be an appropriate intervention for children with attention and social-emotional deficits. Further, given the circumstances caused by the pandemic where many indoor services became unsafe to engage in with children, outdoor playrooms may provide a creative, flexible solution for children to safely receive mental health services during pandemic conditions. The outdoor room allowed for efficient air ventilation and plenty of space to maintain social distancing of six feet.

Over the duration of the study, participants adapted to the COVID-19 protocols. Therapists normalized mask wearing and hand sanitizer use at the beginning and ends of sessions by engaging actively in the same procedures participants had to follow. Parents answered COVID-19 screening questions over the phone prior to each play session to make sure no one who may have been exposed to the virus or experiencing symptoms entered the playroom. Only two of 15 participants experienced disruptions in their treatment due to potential virus exposure and needing to cancel sessions for two weeks following the date of potential contact out of an abundance of caution.

Limitations

Although this study's intervention was exploratory in nature and a repeated-measures design improved credibility and rigor, there were limitations that impacted interpretation of

results. The primary limitation was the use of a single group design. Given the exploratory nature of the study and a lack of a control group, maturational effects cannot be completely ruled out. Without a control group, I am unable to determine if participants' improvement in attention and social-emotional competencies is primarily due to the outdoor CCPT intervention or other extraneous variables the participants may have shared.

Furthermore, the study consisted of a small sample size (n = 13). When calculating suggested sample size with G*Power prior to data collection, a total of 21 participants were suggested to meet an alpha of 0.05, medium effect size of 0.25, and power of 0.8. Although I was unable to meet the suggested size, my observed power for both repeated measures ANOVAs was .96 and .99. This level of observed power suggests a high probability that the tests correctly rejected the null hypothesis and I avoided making a type II error in interpreting the results, indicating that positive change over time in CCPT actually occurred.

Implications

This study yielded many implications for both current clinical practice and future research in child-centered play therapy. Few researchers have demonstrated the integration of therapeutic benefits of exposure to nature with the therapeutic benefits of CCPT. This study provides evidence that CCPT can be integrated in outdoor spaces and potentially have positive effects on children's attention and social-emotional competencies. Furthermore, this study can help expand the development of creative and theoretically grounded interventions, specifically those that demonstrate the flexible application of CCPT principles within novel therapeutic contexts.

Implications for Clinical Practice

This study provided insight into some further considerations required of play therapists

who decide to apply CCPT in an outdoor environment where the play therapist has less control over the space itself and may be confronted with unexpected changes in the environment. Additional considerations ranged from expanding CCPT theoretical rationale for various therapist responses during session to overcoming obstacles related to concrete consequences of being exposed to various weather conditions. Conducting this exploratory intervention with a single-group, repeated measures design allowed me to discern feasibility of large-scale clinical implementation of the intervention and how to address common difficulties as they arose.

CCPT Theoretical Considerations

One primary element of moving the playroom outdoors was the room was set up in a shared space with nature. Unlike an indoor room that the play therapist has ownership over and can create the space to their own clinical preferences, an outdoor room is a shared space with plants and animals that also have an investment in what occurs in and to the environment. For example, when we selected the physical space to set up the canopy, bamboo shoots were already growing along one side of the area and birds frequently visited the shaded area. Further, various small insects like ants, flies, and moths traversed the space regularly. Because a part of integrating nature into CCPT includes respecting the environment and maintaining empathy at a more general organismic level, I adjusted some aspects of CCPT such as introducing the therapeutic space and limit-setting to reflect these expanded values.

To communicate from the beginning of the play therapy relationship that the outdoor room was a shared space with nature, I chose to slightly alter how I introduced the therapeutic space to the child. Landreth (2012) suggests saying to a child when entering a playroom for the first time, "[Child's name], this is our playroom, and this is a place where you can play with the toys in a lot of the ways you would like to" (p. 184). However, I found this introduction to the

room did not provide a beginning structure for the acknowledgement of nature's presence in the space and did not provide a rationale for later in therapy when limits needed to be set around the living organisms in the space. An alternate introduction to the outdoor room was "[Child's name], this is our special space where you can play with all of the toys in a lot of the ways you would like. We share this space with things that may already live here such as trees and insects." This altered initial structuring phrase continues to allow the child to be self-directing while raising the child's awareness to their exposure to nature while in the outdoor playroom. For some children, this new structuring phrase was met with concrete reactions such as one participant who upon hearing this introduction to the space asked if there were worms in the dirt/garden container and proceeded to dig in the dirt to see if she would find any. For other participants, the additional sentence regarding sharing the space did not appear to influence how they directed their play immediately afterwards.

By including nature in the initial structuring statement, therapists consequently prepared children for the possibility of limit-setting around behaviors that directly involved living plants, animals, or insects. Limit-setting considerations were expanded in the outdoor space in regards to nature. Ray (2011) provided four questions to help guide play therapists in deciding what limits needed to be set. The four questions were: "Is the child's behavior physically hurting self, therapist or others? … Will the behavior interfere with the provision of play therapy? … Will the behavior harm the continued use of the playroom for other clients? … How will the child's behavior affect the relationship between therapist and child?" (Ray, 2011, pp. 92-95). Although these four questions were still used to guide limit-setting in the outdoor space, the interpretation of some of the questions differed from how a play therapist might interpret them indoors. For example, the first question regarding limits around a child hurting self, therapist or others was

interpreted to include living plants, animals, and insects as others who may experience harm. Thus, when a child saw an ant near them and tried to strike the ant with a hammer, the therapist would set a limit on killing the insect (e.g. I know you are annoyed the ant is near you, but the ant is not for hurting. You can hit the ground to scare it away or choose to move away from it.). The third question was also expanded to not only apply to continued use of the space by other clients, but also by the creatures living in the natural environment. One example of this consideration was the mixture of living and dead, but still standing, stalks of bamboo that created one side boundary of the outdoor area. Although pulling up the dead bamboo stalks would not harm the bamboo, it would have a direct effect on birds being able to continue using the bamboo area for shelter and nesting. Thus, a limit was set when children wanted to unroot bamboo stalks (e.g. You are excited to use that in your game, but the bamboo is not for pulling out of the ground. You can choose to use some of the bamboo pieces already on the ground or use the sticks in the bucket.).

Therapists also experienced changes in limit-setting considerations compared to an indoor room based on new freedoms the outdoor space provided. Whereas in an indoor room therapists may set a limit about splattering paint because it would inhibit the continued use of the playroom for other clients, splattering mud in the outdoor playroom might not require a limit because the mud itself is already a natural aspect of the playroom. Another example of freedoms provided by an outdoor space that affect limit-setting is purposeful spilling or throwing of materials like sand, dirt, and water. In an indoor playroom, a therapist might set a limit on water being poured on the floor due to safety considerations or impact of continued use of the space by other clients depending on the floor's surfacing. In an outdoor playroom, such a limit is unnecessary because spilt water tends to be absorbed by the ground. Similarly, a limit may not be

set on the act of tossing sand or dirt, but rather on how much sand or dirt can be tossed and in what directions depending on how easily the materials can be restocked after the session is over. After all, the ground of the playroom is already made up of sand, dirt, and grass so the addition of more of these materials to the ground from the child spilling or throwing them typically does not affect the continued use of the space.

Considerations for an Outdoor Playroom

Two main areas of consideration emerged over the course of the study as therapists addressed or prepared for the effects of conducting sessions in an outdoor playroom. The two areas were physical changes to the space as consequences of being exposed to natural weather conditions and unexpected occurrences that arose out of being outdoors in a less controlled environment. As therapists were confronted with new obstacles related to these two areas, I helped to create solutions that would maintain the theoretical integrity of CCPT while honoring the integration of nature into therapeutic practice.

Physical changes to the outdoor space over the course of the study included changes to the ground under the canopy, wet and cold weather, and a time change from daylight savings time to standard time. When sessions started in September, the ground where the canopy was set up was covered with grass. By October, most of the grass had died leaving patches of green on a mostly dirt surface. Participants did not seem to notice this change, or if they did, they did not verbalize or otherwise communicate it having an effect on them. However, from the perspective of wanting to promote contact with the natural environment and maintaining an attitude of sharing rather than owning the space, the killing of the grass by the continual presence of clients and therapists posed a theoretical obstacle. Although I was unable to provide a solution during the study, I learned that future use of the space would either require planting hardier grass

varieties where the canopy stood or finding a second space and rotating between setting up in the two spaces to give the grass more frequent breaks from being trod on by participants. The ground changed further as the weather shifted from summer to fall. In September, the dirt under the grass was compact and solid. After a rainy week in October, the ground softened and became muddy. However, after it dried out the following week, the top layer of soil was cracked and fractured in some areas of the room. Unlike the dying grass, participants were directly affected by the ground's texture changes over the weeks. Some children responded with disgust when the room was at its muddiest and wettest state. At the same time, other children seemed to experience increased freedom to create mess and dug holes into the ground or splashed in the water and mud. One observation providing further evidence to support their potentially increased sense of freedom during the muddiest time was that the same children did not continue their digging play behaviors when the ground once again dried out.

Another physical change to the outdoor playroom in response to changing weather conditions was how the equipment and toys were set up. The standard set up of the toy shelves and other items involved some toys being outside of the covered canopy frame. On rainy days, the set up needed to be adjusted to ensure toys stayed mostly dry and consistently available for participants. Although most participants were vocal about their observation of how the objects within the space moved, participants continued with their play despite the change. The implication of this adjustment based on weather is that the therapist is able to communicate that even when the space may change over time, the therapeutic relationship provides a consistent therapeutic container. Another physical change to the outdoor playroom occurred on cold days when a propane heater was added to provide additional comfort. One implication of adding this piece of equipment was that it also introduced a new limit-setting consideration. One therapist

and child learned together that toys should be placed at least one foot away from the heater and that toys not touching the heater was not a strong enough limit when they accidentally melted a sand bucket on the second day the heater was in the space.

Further, therapists and participants had to adjust how they prepared for sessions based on changes in weather and time of day, something that would typically not occur for sessions held indoors. Therapists, children, and caregivers had to be mindful of the weather forecasted and experienced during sessions. Weather determined what kind of clothing participants needed to wear to feel comfortable and less distracted by discomfort related to the outdoor temperature. Whereas some therapists may set limits around bringing drinks to sessions indoors, children were allowed to bring water bottles to the outdoor room as another way to help regulate their body's needs in hotter weather. Further, parents were encouraged to consider sun protection (e.g. sunscreen, hats, etc.) and bug protection (e.g. bug spray) for children. Weather also affected how long therapists needed to set up the room at the beginning of the day. During colder weather, the clear vinyl roof took more effort to attach to the canopy. Therefore on colder days room set up was scheduled to start earlier. Similarly, when it was raining set up took longer and adjustments to the schedule were made to accommodate the additional time.

In addition to weather, the time changed from daylight savings time to standard time during the middle of the study. The time change affected the last scheduled sessions each day of the week. Participants whose sessions began at 5:30 pm started the study with sessions occurring in full daylight. When the time changed, participants' sessions began as the sun was setting. Thus, therapists who saw clients in that time slot added three hanging LED lanterns in three corners of the canopy's frame. These lanterns provided enough light for participants to continue their play as the sun set and darkness fell. Children had varied reactions to the time changing and

having their sessions in increasing darkness. One child seemed unaffected by the change as evidenced by no changes in his play behaviors. Another child who had not used the flashlight in prior sessions decided to turn the flashlight on and with some assistance from the therapist hung it from the overhead canopy frame. He then proceeded to use the flashlight's light as a spotlight and danced underneath. A third child used one of the lantern's light to discover how much the sand sparkled when the light hit it and proceeded to share with the therapist facts she knew about other shiny objects.

In addition to physical changes to the space, the second theme of outdoor considerations involved unexpected occurrences that arose out of being in a less controlled environment. One of the most frequent occurrences outside of the therapists' control was noise including sounds such as birdsong, bird screeches, cars and large buses passing on a nearby street, roofing repair of nearby apartment buildings, students from the neighboring building creating art outdoors by sawing into a concrete mold, and monthly weather warning siren tests. Whenever loud sounds occurred unexpectedly, therapists followed the child's lead in responding while also mentally observing how the child responded. One example of this across different participants was with bird sounds. Birds became more active and vocal in the trees on the boundary of the space during later afternoon sessions. One participant responded to the loud bird noises by commenting about them to the counselor and continuing with her play despite the distraction. Although she expressed frustration, she also demonstrated a high tolerance level. Later in the session, she shared that she thought the birds were having a meeting about something which demonstrated a level of empathy she was able to hold for other living creatures sharing the space with her. Another participant verbally expressed frustration at the loud sounds followed by taking the mallet and banging it on the trees at his eye level. This action caused the birds to stop and the

child expressed satisfaction in his problem-solving. In both situations, the therapists were able to gain some insight into how both children approached conflict resolution in the moment.

Loud, unexpected noises also can affect the therapist. Therapists who work outdoors may want to consider what sounds distract or annoy them to plan how to regulate themselves when these sounds occur. Further, therapists may consider at a deeper level how sounds affect their psychological contact and presence with their clients and be mindful of how their own tolerance levels affect the therapeutic relationship.

A second unexpected occurrence during outdoor sessions was needing to protect the space from other people interrupting the session or breaching the confidential playroom. During the intake session, I prepared participants' parents during the informed consent process that sessions outdoors have a higher probability of people walking by to potentially walk closer to the canopy and overhear their child before the therapist intervened. Parents appeared to be understanding of this added risk and no participants chose to opt out of services due to this information. Further, the outdoor space itself was prepared to discourage anyone from entering the space without permission from the therapist. Signs were placed approximately 10 feet away from the canopy on all three sides open to a parking lot or tree line. The signs stated that no more than two people should be within the perimeter at any time without the therapist's verbal consent. Even with planning in place, one therapist did have to respond to a person interrupting a session. The therapist took on an active role, stood up, and placed herself between her client and the third person. The therapist communicated a limit to the third person and they left the space. During the interaction, the client continued their play and the therapist immediately returned to attending to the client following the interruption.

Other unexpected occurrences in the outdoor room included deciding how to deal with

trash the child created, needing to create a second therapist's chair for the nature half of the playroom, and learning which toys needed to be replaced frequently specifically because of being outdoors. When children had trash, they would leave the canopy area and use a garbage bin that was a permanent feature near the parking lot. For future outdoor rooms, therapists may consider using an empty bucket where children can place trash so that the therapist can then sort out items that are recyclable such as unused paper and items that need to be destroyed such as confidential art creations. As therapists served more children in the playroom, another issue developed around the need for a second therapist's chair. When children were playing in the canopied area, therapists could easily see and respond to them. However, when children played in the shaded nature area beside the canopy, therapists needed to move into that space to maintain contact with the child. A log was selected to serve the function of a second chair while maintaining a more nature-based environment outside of the canopy.

Lastly, as children utilized the toys and materials available to them, it became evident that being outside directly affected how often some toys and materials had to be replaced. Crayons would melt on hotter temperature days and would have to be traded for new ones between sessions. Sand and dirt could not be separated after being mixed together nor be recovered when poured on the ground. Thus, approximately one bucket full of sand was added to the sandbox weekly and one planting pot of dirt added to the garden box weekly to replace what had been used. Paper seed packets also had to be replaced at a faster pace than the seeds within them were planted because younger children tended to tear the paper packets all the way open to get the seeds out with greater ease. Therapists who plan to implement outdoor playrooms should budget for these extra expenses in addition to what they would normally budget to replace broken or worn toys.

Implications for Future Research

While this study begins to explore the viability and impact of providing CCPT in an outdoor playroom, future studies need to be conducted to further understand the potential outcomes of integrating nature into CCPT treatment. First and foremost, a randomized controlled trial needs to be conducted to examine attention and social-emotional competencies in children and make comparisons between children receiving the same intervention as this study and a waitlist control group. This can help provide evidence of treatment versus maturational effects in participant outcomes. Further, a second randomized controlled trial should be conducted to compare attention and social-emotional competencies in children who receive traditional, indoor CCPT and children who receive CCPT in the outdoor playroom. This design would isolate the outdoor variable of the intervention and help provide evidence of any differences between treatment effects when nature is included or excluded.

Additionally, randomized controlled trials would require a larger sample size and thus increase the generalizability of findings. Due to COVID-19, a larger sample size was unattainable for the current study. However, many of the interested participants who participated in the intake session met inclusion criteria for scores on the Brown EF/A Scales and SEARS-P. Therefore, future researchers would likely be able to attain a greater sample size when not inhibited by preventative safety procedures specifically related to conducting the current study during the COVID-19 pandemic.

Conclusion

The current study illustrates the possible benefits of theoretically integrating CCPT and nature and the clinical impacts this approach could have on children's attention and social-emotional competencies. Through the use of a repeated measures design, I was able to

investigate when change emerged for participants over five measurement points. The current study affirms that children receiving CCPT need at least 8 sessions for parents to begin reporting significant improvements, but parents tend to report continued progress as children maintain participation play therapy.

Whereas a previous method of combining CCPT and nature focused on nature as the larger context within which CCPT was practiced (Swank & Shin, 2015b), the current study approached integration from the reversed perspective of grounding nature in CCPT. For this approach, I placed a larger focus on inviting nature into the more traditional context of CCPT. Thus, the outdoor playroom offered a combination of traditional CCPT and a more nature-based approach in both the available toys and the space itself. Future play therapists who utilize this model may continue to illuminate the theoretical implications of the intervention, which for the current study included clarifying the goals of play therapy from an integrated lens and assessing the present relationships with nature and determining the appropriate degree of interaction with them during sessions.

Further, the current study provides insight into the viability of providing an outdoor CCPT intervention at a larger scale and some problems that may arise in the process of creating and maintaining an outdoor playroom. Play therapists who decide to apply CCPT in outdoor playrooms may be confronted with unexpected occurrences in the less controlled environment of nature. Although play therapist can prepare for some obstacles such as natural weather conditions and other people trying to enter the space during sessions, they may need to spend time reflecting on how they will respond to potential distractions and how they will inform their clients of additional considerations to therapy outdoors.

Future research may attend to the limitations of the current study. First and foremost, a randomized controlled trial needs to be conducted to make comparisons between children receiving the same intervention as this study and a waitlist control group. A second randomized controlled trial should be conducted to compare outcomes in children who receive traditional, indoor CCPT and children who receive CCPT in an outdoor playroom. These two designs could help provide evidence for the effectiveness of the treatment and the outdoor variable. Additionally, randomized controlled trials would require a larger sample size and thus increase the generalizability of findings.

Through CCPT in an outdoor playroom, children were able to change and reduce problematic symptoms affecting their daily functioning, but also to explore what it was like to be understood holistically as an individual interconnected with the other-than-human world around them. It is this experience of self that allows children to actualize their potentials and apply what they learn about themselves through play therapy to their daily lives after treatment ends. The current study's overall positive outcomes provide a starting foundation for future research into this kind of integrated intervention.

APPENDIX E

ADDITIONAL MATERIAL

UNT
EST. 1890

THE OFFICE OF RESEARCH INTEGRITY AND COMPLIANCE
Research and Innovation

July 8, 2020

PI: Deanne Ray
Study Title: Outdoor Child-Centered Play Therapy and Attention in Children
IRB # IRB-20-322

Dear Dr. Deanne Ray:

As permitted by federal law and regulations governing the use of human subjects in research projects (45 CFR 46), the UNT Institutional Review Board has reviewed your proposed project titled “Outdoor Child-Centered Play Therapy and Attention in Children." The submitted protocol is hereby approved for the use of human subjects in this study.

Your informed consent document can be found in the Study Details section under the Attachments tab in Cayuse IRB. Please store them in a secure location and use the approved copy for your study subjects.

Any and all changes to an approved research study must be submitted for review and approval prior to implementing the change(s) into the research study.

Please contact the Office of Research Integrity and Compliance at 940-565-4643, if you wish to make changes or need additional information.

COVID-19 is having an impact on normal operations and procedures at UNT. Please follow all UNT rules and procedures regarding your human research studies, including cessation of face-to-face interactions with participants, during this time.

Note: Please do not reply to this email. Please direct all questions to untirb@unt.edu

Sincerely,

8/21/2020

Dr. Deanne Ray IRB-20-322 - Outdoor Child-Centered Play Therapy and Attention in Children

RE: "Permission to Proceed with IRB Submission" Form

Dear Dr. Deanne Ray

The IRB has reviewed your request to perform in-person human subjects research during the University's COVID-19 reopening and you were granted permission to proceed on 7/8/2020. Please continue to monitor our website during your study conduct.

Please direct all questions to Research Integrity and Compliance at untirb@unt.edu.

Sincerely,

Gabe Ignatow, Ph.D.
Professor
Chair, Institutional Review Board

UNIVERSITY OF NORTH TEXAS®
1155 Union Circle #310979 Denton, Texas 76203-5017
940.369.4643 940.369.7486 fax www.researchunt.edu

UNIVERSITY OF NORTH TEXAS

Informed Consent for Parents with Minor Children

TITLE OF RESEARCH STUDY: Outdoor Child-Centered Play Therapy and Attention in Children

RESEARCH TEAM: Kimberly Walker, University of North Texas Department of Counseling and Higher Education, (940) 565-3864, Kim.Walker@unt.edu. This project is part of a student dissertation being conducted under the supervision of Dr. Dee Ray, University of North Texas Department of Counseling and Higher Education, (940) 565-3864, Dee.Ray@unt.edu.

Your child is being asked to participate in a research study. Taking part in this study is voluntary. The investigators will explain the study to you and will any answer any questions you might have. It is your choice whether or not you allow your child to take part in this study. If you agree to have your child participate, and then choose to withdraw your child from the study, that is your right, and your decision will not be held against you.

Your child is being asked to take part in a research study about play therapy in an outdoor play therapy room and effects on attention.

Participation in this research study involves your child attending two play therapy sessions per week for 8 weeks or until 16 sessions are completed. You will be asked to complete two assessments which require approximately 10-12 minutes each to complete. The assessments will need to completed at five points in the study. More details will be provided in the next section.

You might want to participate in this study if you want to support the use of outdoor spaces in play therapy for children. However, you might not want to participate in this study if you do not have time to attend sessions twice per week for 8 weeks.

You may choose to participate in this research study if your child is 5 to 10 years old and meets the qualification for possible problems with attention or self-regulation behaviors.

The reasonable foreseeable risks or discomforts to your child if you choose to allow him/her to take part is: discomfort when sharing feelings or personal experiences in the playroom which you can compare to the possible benefit of increased awareness of their own and others' feelings, thoughts, and needs Your child will not receive compensation for participation. Instead of your child being in this research study, other choices may include receiving standard play therapy services.

DETAILED INFORMATION ABOUT THIS RESEARCH STUDY: The following is more detailed information about this study, in addition to the information listed above.

PURPOSE OF THE STUDY: Given the interruption of traditional play therapy services due to the COVID-19 pandemic, counselors are seeking alternative methods to provide mental health services for children. You are being asked to allow your child to participate in a research study which involves determining if play therapy in an outdoor space is effective in helping improve attention and the way they act, feel, and interact with others.

TIME COMMITMENT: The total duration of the research study will be 14 weeks from the time of the first meeting to the follow-up meeting. Your child will participate in two play therapy sessions per week for 8 weeks or 16 total sessions. You will be asked to complete two assessments once per week for 3 weeks before play therapy sessions start with your child, once after your child's 16th session, and once 3 weeks after your child's 16th session. The two assessments should take between 20-25 minutes to complete.

STUDY PROCEDURES: Allowing your child to participate in this research study will include this list of actions that will we will ask you and your child to consider before engaging in the research:

1. Please read carefully the parental informed consent and child assent, and be sure to contact the research team with any questions or concerns you may have.
2. If you grant permission for your child's participation, you will be asked by the student researcher to complete two brief assessments once weekly for three weeks before play therapy sessions begin.
3. The student researcher will schedule twice-weekly, 30-minute play therapy sessions with your child for eight weeks.
4. You will be asked by the student researcher to complete two brief assessments during your child's sixteenth play therapy session.
5. The student researcher will schedule a follow-up session with you for 3 weeks after your child's last session. You will be asked by the student researcher to complete two brief assessments. At that time, you will also be provided referrals for continued play therapy services if you desire your child to continue therapy.

All parts of this study will take place at the Center for Play Therapy. Your and your child's participation is completely voluntary. You may discontinue participation at any time.

AUDIO/VIDEO/PHOTOGRAPHY:

☐ **I agree** to have my child video recorded during the research study.

☐ **I agree** that the video recording can be used in publications or presentations.

☐ **I do not agree** that the video recording can be used in publications or presentations.

☐ **I do not agree** to have my child video recorded during the research study.

You may not participate in the study if you do not agree to be video recorded. The research team will observe the recordings to ensure the quality of play therapy services and the integrity of the study. The recordings will be kept with other electronic data in a secure UNT OneDrive account for the duration of the study.

POSSIBLE BENEFITS: We expect that children participating in play therapy will be increasingly aware of their own and others' feelings, thoughts, and needs; learn to interact in an accepting and supportive way; increase ability to develop self-responsibility and self-regulation; form and maintain relationships; and exhibit less interpersonal difficulties. These possible positive outcomes may contribute to their healthy functioning. The results of this study may further provide play therapists across the nation with knowledge regarding alternative methods for providing mental health services to children given the limitations of traditional play therapy spaces during and after the COVID-19 pandemic.

POSSIBLE RISKS/DISCOMFORTS: Your child might experience discomfort when sharing feelings or personal experiences in the playroom during this research study. Play therapy is designed for children to express themselves in their natural way of playing with toys. Some elementary-age children have difficulty working through problems with words, so play therapy can help facilitate the process by providing a play environment from which they can work through those issues with a trained play therapist. Your child decides what materials to play with and what to discuss in play therapy. Your child will not be asked any questions that are not intended to facilitate his/her growth. Your child will not be forced to play.

Your child might also experience discomfort when outside during this research study. Weather appropriate clothing and skin protectants such as sunscreen and bug spray can reduce potential discomfort. Any contact with the natural environment is contained within the boundaries of the outdoor play therapy room and is comparable to common childhood activities such as visiting a playground or walking in a park. Remember that you and your child have the right to withdraw any study procedures at any time without penalty, and may do so by informing the research team.

Participating in research may involve a loss of privacy and the potential for a breach in confidentiality. Study data will be physically and electronically secured by the research team. As with any use of electronic means to store data, there is a risk of breach of data security.

If you experience excessive discomfort when completing the research activity, you may choose to stop participating at any time without penalty. The researchers will try to prevent any problem that could happen, but the study may involve risks to the participant, which are currently unforeseeable. UNT does not provide medical services, or financial assistance for emotional distress or injuries that might happen from participating in this research. If you need to discuss your discomfort further, please contact a mental health provider, or you may contact

the researcher who will refer you to appropriate services. If your need is urgent, helpful resources include Denton County MHMR 24 hour crisis hotline at 940-387-5555.

COMPENSATION: No compensation will be offered for participation in this study. However, the play therapy services will be offered free of charge in exchange for participation. If you choose to discontinue at any point, you will not be asked to pay for any of the services rendered up to that point in time. There are no alternative activities offered for this study.

CONFIDENTIALITY: Efforts will be made by the research team to keep [you and] your child's personal information private, including research study records, and disclosure will be limited to people who have a need to review this information. All paper and electronic data collected from this study will be stored in a secure location on the UNT campus and/or a secure UNT server for at least three (3) years past the end of this research in a locked cabinet at the Center for Play Therapy of the Counseling Program at the University of North Texas. Research records will be labeled with a code and the master key linking names with codes will be maintained in a separate and secure location.

The results of this study may be published and/or presented without naming you as a participant. The data collected about your child for this study may be used for future research studies that are not described in this consent form. If that occurs, an IRB would first evaluate the use of any information that is identifiable to you, and confidentiality protection would be maintained. The play sessions will be video-recorded and a member of the research team will watch the recordings to look at the quality of play therapy services provided to your child. At the end of this study, the videos may possibly be shown in professional presentations for educational purposes. Identity information such as name, place of living, and other specific information will not be revealed when video recordings are shown in educational settings and will be destroyed through digital deletion after 5 years. Although we will not use identifying information when video recordings are shown in educational settings, your child's face can be seen which means we cannot guarantee anonymity. Pseudonyms that have no sound similarity to your child's name will be selected in place of your child's name. You may choose to withdraw your consent at any time and your child's video recordings will not be used.

While absolute confidentiality cannot be guaranteed, the research team will make every effort to protect the confidentiality of your records, as described here and to the extent permitted by law. In addition to the research team, the following entities may have access to your records, but only on a need-to-know basis: the U.S. Department of Health and Human Services, the FDA (federal regulating agencies), the reviewing IRB, and sponsors of the study.

CONTACT INFORMATION FOR QUESTIONS ABOUT THE STUDY: If you have any questions about the study you may contact Kimberly Walker, (940) 565-3864 or Dr. Dee Ray, (940) 565-3864. Any questions you have regarding your rights as a research subject, or complaints about the research may be directed to the Office of Research Integrity and Compliance at 940-565-4643, or by email at untirb@unt.edu.

CONSENT:

- Your signature below indicates that you have read, or have had read to you all of the above.
- You confirm that you have been told the possible benefits, risks, and/or discomforts of the study.
- You understand that your child does not have to take part in this study, and your refusal to allow participation, or your decision to withdraw will involve no penalty or loss of rights or benefits.
- You understand your child's rights as a research participant and you voluntarily consent to allow your child to participate in this study; you also understand that the study personnel may choose to stop your child's participation at any time.
- By signing, you are not waiving any of [you and] your child's legal rights.

Please sign below if you are at least 18 years of age and voluntarily agree to participate in this study.

SIGNATURE OF PARTICIPANT **DATE**

***If you agree to participate, please provide a signed copy of this form to the researcher team. They will provide you with a copy to keep for your records.**

UNT

UNIVERSITY OF NORTH TEXAS

Informed Consent for Parents with Minor Children

ASSENT FOR CHILD PARTICIPATION – Ages 12 and Under

My name is Kimberly Walker.

I am doing a research study, and would like to ask you to be a part of my study. Research studies help us to learn and test new ideas. I am going to give you a paper to read that will tell you all about our research study. You can ask us questions at any time.

We want to include you in this research study because we are trying to learn more about if play therapy outside is helpful to you. You can decide if you want to be part of this research study. I will tell you more to help you to decide.

If you say yes to be included in this study you will come to an outdoor playroom by yourself and a counselor will ask you to play with the toys in lots of the ways you like. You will be asked to come to play therapy two times a week for 8 weeks.

Sometimes, it may be hard for you to share feelings with words and it helps to play with toys to show how you feel. You may learn new things about yourself during our time together. Sometimes, it may be hot outside or you might see a bug. You can put on sunscreen or bug spray to help you feel better.

Please talk with your parents about your decision. We will also check with them to see if it is okay for you to be included in this study. Even if your parents say yes, you can still at any time decide not to be included.

If you decide not to be in this study, you do not have to. Being in this study is up to you and no one will be mad or upset even if you choose later not to continue and stop before you are finished. That is okay.

You can ask me questions that you have about the study now. If you have a question later that you did not ask now, you or your parents can call or email me, or you can ask me when I see you next time.

Verbally ask the child: Would you like to be in this research study? If you say "yes" then you agree to be in this study.

If you would like to be part of this study, please sign your name below.

_____
Printed Name of Child

_____ _____
Signature of Child Date

_____ _____
Signature of Investigator Date

UNIVERSITY OF NORTH TEXAS

The UNT
Department of Counseling & Higher Education
Is Conducting a Research Study on

Nature-Based Child-Centered Play Therapy & Attention in Children

At the Center for Play Therapy

If you are the parent of a child between the ages of 5 and 10, and are concerned about inattentive or self-regulation behaviors, your child may qualify to participate in a research study examining the effects of play therapy in an outdoor play room on attention.

Eligible subjects will receive 2 play therapy sessions per week for a total of 8 weeks or 16 sessions. Parents will be asked to complete 2 assessments at 6 time points throughout the study that will take approximately 20-25 minutes to complete each time.

Subjects will receive no special compensation. However, the 16 play therapy sessions will be at no cost.

Principal Investigator: Kim Walker, MS, NCC, LPC-Intern
For more information, please contact (940) 565-3864 or cpt@unt.edu

Participant Demographic Form

Please provide the following information for the purpose of helping our research team and counselors understand our participants better and use the most respectful language when addressing your child.

Child's Name _____

Child's Date of Birth _____/_____/_____

Child's Sex Assigned at Birth:

Female Male Intersex Prefer to Not Answer

Child's Gender _____

Child's Race _____

Child's Ethnicity _____

Child's Preferred Spoken/Written Language _____

On average, how many hours does your child spend using technology (e.g. TV, tablet, phone, etc.) on a weekday? _____

On average, how many hours does your child spend using technology (e.g. TV, tablet, phone, etc.) on a weekend day?_____

On average, how many hours does your child spend outside on a weekday? _____

On average, how many hours does your child spend outside on a weekend day?_____

Table E.1

Outdoor Playroom Toys and Materials

- Ball
- Bamboo sticks
- Bamboo windchimes
- Binoculars, magnifier
- Blunt scissors
- Butterfly net, plastic tweezers
- Colored and white chalk
- Compass
- Conch, abalone, seashells, starfish
- Construction paper (3 colors)
- Crayons, color pencils
- Dart Gun
- Dinosaurs (one large with open mouth and two small)
- Dirt (in rolling planter box)
- Dishes, pots, pan, utensils (stainless steel)
- Egg cartons
- Empty cardboard food boxes
- Empty nut butter jar
- Feathers
- Flashlight
- Handheld gardening tools (trowel, transplanter, cultivator, weeder)
- Kitchen table (wood with stainless steel sink)
- Lockbox with first aid kit, lanterns, and cleaning supplies
- Peat pots
- Picnic Table (wooden)
- Pinecones, Pine needles
- Pitcher with water
- Pool noodles
- Pounding log, hammer, mallet, nails, crowbar
- Rocks (differing sizes and shapes)
- Rope (cotton)
- Rubber frog, turtles, lizards
- Rubber knife
- Rubber snake (small and large)
- Sandbox, sand shovel, funnel, sieve, pail
- School bus (wooden)
- Seeds
- Spider, bee, butterfly, ladybug
- Stone People in various skin tones
- Therapist chair, Sitting log
- Transparent tape, nontoxic glue
- Tree bark
- Tree branches, sticks
- Tree seed pods (magnolia, gumball)
- Truck, ambulance (wooden)
- Turtle shells (one large, two small)
- Zoo animal and farm animal families

Fall 2020 COVID-19 Reopening Plan

As colleges and academic units prepare to reopen spaces for fall 2020, they are expected to develop a reopening plan that will promote a safe and healthy environment for students, faculty and staff. It is important to ensure plans are consistent with UNT System Response Guidelines and can be properly supported by UNT. All plans must be reviewed by the Academic Affairs Advisory Restart Group and the Safety and Incident Management Group prior to obtaining approval to reopen. Use this document to prepare the college/academic unit reopening plan for all student-facing spaces (Primarily 210 and 220 spaces) and office spaces. Please submit plans to Brenda Kihl at Brenda.kihl@unt.edu for distribution to committees. Allow approximately 2 weeks for the review and approval process.

As you prepare the reopening plan and prior to opening spaces:

- ✓ Review UNT System COVID Response Guidelines and incorporate them into all reopening plans https://www.untsystem.edu/covid-response-guidelines
- ✓ All employees will be expected to complete the UNT COVID Safety Training module offer via UNT Bridge
- ✓ Determine whether any additional training will be needed for your specific work environment.
- ✓ Ensure there are adequate supplies on hand to accommodate the planned sanitation protocols
- ✓ Prepare to train staff and faculty on any special procedures for using the space
- ✓ Request UNT signs to communicate common COVID-19 safety practices (Contact Luke Taylor at Luke.Taylor@unt.edu)

Unit Information

Department/Unit: Center for Play Therapy

Contact for COVID-19 Restart Plan: Dr. Dee C. Ray, Professor, Counseling Program; Director, Center for Play Therapy; dee.ray@unt.edu

Fall Plan for Reopening Spaces

Please provide a response for each type of space. Spaces requiring similar safety procedures can be described collectively as a space type, such as biology labs, computer labs, dean's office, instructional classrooms, advising office, etc. If the unit has more than 4 space types, use additional forms.

Outdoor Play Therapy Space
See attached proposal for more detailed information

Description of Space: Outdoor Play Therapy room contained within 10x10 ft. covered pop-up canopy, setup and taken down daily, materials stored in the Center for Play Therapy when not in use

Building(s) Impacted: Outdoor space near Welch Bldg 2
First Day to Access: August 10, 2020
Days/Hours of Operation: MWF/week, by client appointment only within the hours of 9:30 am to 6:30 pm

A. **Describe how social distancing and sanitation protocols will be communicated to users of the spaces.** (Examples: announcements, signage, training, information in syllabi, at check-in, user agreements, etc.)

For Play Therapists:

Any play therapist who will provide services in the space must attend a one-hour training. Included in the training will be a verbal orientation to the social distancing and sanitation protocols. Play therapists will also receive a written handout for them to keep to review the protocols as needed.

If protocols are updated after the initial training, all updates will be communicated via email immediately and during the next verbal check-in with the play therapist prior to continued services with clients.

As a part of the protocol for being in the space, play therapists must contact the Center for Play Therapy prior to arriving to campus each day they are scheduled to see clients to verbally confirm they are self-monitoring at home and not experiencing symptoms. Play therapists will not come to campus if symptomatic.

For Clients:

First contact with parents to set up an initial meeting will include a verbal communication of protocols. If parent does not agree to protocols, their child will not be eligible for play therapy services in this space and referrals will be given.

During initial meeting, play therapist will review protocols again with parent and provide written handout for them to keep. If protocols are updated after the initial meeting, all updates will be communicated via phone call before next scheduled appointment.

Upon arrival to the parking lot waiting area, parents will call the Center for Play Therapy and speak with their assigned play therapist. The play therapist and parent will verbally complete the counseling clinic COVID-19 screening questionnaire attesting that the child's temperature has been checked and that the child demonstrates no symptoms (see attached). If the parent reports that the child's or parent's temperature was not taken within 8 hours or the child or parent exhibits any symptoms, the child and parent will be sent home. Play therapist will document client's questionnaire responses in client's case file. The Center for Play Therapy runs as a clinical facility that is HIPAA-compliant regarding client files.

Once screening questionnaire is completed over the phone, play therapist will meet client in parking lot to proceed to playroom.

For General Public who may unintentionally interact with space:

Signs will be posted 10 feet away from playroom entrance stating space is in use and should not be entered without play therapist approval or before calling the Center for Play Therapy. Signs will also include maximum occupancy number.

Signs will be posted at all times playroom is setup.

B. List any physical modifications necessary to make the space compliant with UNT's COVID Response Guidelines. If applicable, list the type of physical barriers that will be requested from facilities and if they need to be transparent. (floor markings, arrangement of furniture, restricting access, physical barriers, etc.)

The playroom is located outdoors under a pop-up canopy with partially open sides to allow maximum air ventilation of space.

The playroom will have pool noodles as a visual cue for children to remain 6 feet from therapist. The play therapist will set limits regarding use of pool noodle as a distance measure. "You want to be close to me but the pool noodle is for telling how far apart we can be."

Hand sanitizer will be at entrance of the playroom. Child and therapist must use sanitizer going in and leaving the playroom.

Children will not be allowed to use their mouth or nose for any toys. Toys that would require this kind of play (e.g. whistle/harmonica) will not be present in the playroom.

Further, no soft materials will be used in the playroom.

C. Describe new procedures and changes to the utilization of the space to ensure social distancing. If spacing is less than 6 feet, include a diagram of the proposed space configuration. (Examples: staggered schedules, limit maximum occupancy, by appointment only, virtual appointments, hybrid course delivery, telecommuting, etc.)

The maximum occupancy of the space is two people of any age.

Only individual play therapy will be conducted to allow for proper spacing and follow maximum occupancy protocol.

Therapy sessions are by appointment only. Sessions are scheduled by the play therapist on a client-by-client basis via telephone. When play therapists schedule a time for sessions, they must add their session to the space's scheduling document. This insures all therapists are aware of when the playroom is in use and do not overlap scheduled appointments.

Once a client is scheduled, their allotted appointment time cannot change without 24 hours advanced notice of their next session.

Therapy sessions will be spaced out with 30 minutes in between to allow for proper disinfecting of area and materials. This also decreases the likelihood of clients overlapping between arrival and departure to parking lot waiting area.

If a child needs to go to the restroom while on campus, the play therapist will lead the child to the restroom located in the Counseling and Human Development Center (CHDC) which has approval to be open and is equipped with a child restroom that is a single occupancy. The outdoor playroom is directly adjacent to the CHDC. The child and therapist will not cross a street but a small parking lot to the CHDC. While in the restroom, the therapist will stand outside the door and ensure that child washes hands for at least 20 seconds with soap prior to leaving the restroom.

D. **Describe in detail the planned protective equipment and sanitation procedures that will be used to meet UNT and CDC guidelines. Include a list of supplies that still need to be procured.** (Examples: regular cleaning, face coverings, gloves, disposable alternatives, limited utilization, etc.)

Play therapist will wear a mask. Child will be provided mask if they do not have one. Play therapist will set limits with child regarding the requirement of wearing a mask. "You don't like your mask but your mask is for keeping on."

Hand sanitizer will be at entrance of the playroom. Child and therapist must use sanitizer going in and leaving the playroom.

Each material in the playroom will be sanitized in between sessions with either disinfectant spray or wipes depending on the material's surface.

All materials will be thoroughly sanitized each morning when set up and each evening when taken down with either disinfectant spray or wipes depending on the material's surface.

All large equipment (such as the pop-up canopy) will receive an additional deep cleaning with a bleach-based solution weekly after the end of the last scheduled session for that week.

All cleaning supplies will be accessible to play therapists yet out of reach for children in a locked container just to the outside of the playroom.

Extra cleaning supplies, hand sanitizer, and masks (adult and child sizes) will be stored in the Center for Play Therapy.

E. **Describe administrative oversight and monitoring protocols to ensure students and employees abide by the procedures outlined in the reopening plan for the space.**

The person responsible for monitoring protocols to ensure procedure compliance will be Kimberly Walker, assistant director at the Center for Play Therapy. Ms. Walker is supervised by Dr. Dee Ray, Director, Center for Play Therapy, who takes full responsibility for ensuring that Ms. Walker and staff will follow all protocols and guidelines. The following will be included in the monitoring process:

1) Dr. Ray and Ms. Walker will provide initial training to orient play therapists to procedures for space.
2) Ms. Walker will have first contact with clients and provide verbal and written orientation to procedures.

3) Play therapists must contact Ms. Walker prior to arriving to campus each day they are scheduled to see clients to verbally confirm they are self-monitoring and not experiencing symptoms.
4) Ms. Walker will check client files daily to insure play therapist's proper documentation of client confirmation of following self-monitoring procedures.
5) Ms. Walker will be present at the open and close of the room each day and assist in performing the opening and closing cleaning procedures.
6) Ms. Walker will keep an inventory of cleaning supplies and protective equipment and notify the office administrator of the Center for Play Therapy when items need to be ordered to maintain an adequate supply.
7) Dr. Ray will meet with Ms. Walker twice weekly to ensure that all protocols are being followed.

Should Ms. Walker be unable to monitor procedures due to illness or other absence, a member of the Center for Play Therapy staff will be trained to serve in the role temporarily.

F. Describe any other relevant information required for the safe and healthy operation of the space.

Please see attached proposal

Outdoor Play Therapy
Covid-19 Procedures

If protocols are updated after providing this information, all updates will be communicated via phone call before next scheduled appointment.

Upon arrival to the parking lot waiting area, parents will call the Center for Play Therapy and speak with their assigned play therapist. The play therapist and parent will verbally complete the counseling clinic COVID-19 screening questionnaire. Play therapist will document client's questionnaire responses in client's case file.

Once screening questionnaire is completed over the phone, play therapist will meet client in parking lot to proceed to playroom.

Play therapist will wear a mask. Child will be provided mask if they do not have one.

Hand sanitizer will be at entrance of the playroom. Child and therapist must use sanitizer going in and leaving the playroom.

Children will not be allowed to use their mouth or nose for any toys. Toys that would require this kind of play (e.g. whistle/harmonica) will not be present in the playroom.

The maximum occupancy of the space is two people of any age. Only individual play therapy will be conducted to allow for proper spacing and follow maximum occupancy protocol.

Therapy sessions are by appointment only. Once a client is scheduled, their allotted appointment time cannot change without 24 hours advanced notice of their next session.

Therapy sessions will be spaced out with 30 minutes in between to allow for proper disinfecting of area and materials. This also decreases the likelihood of clients overlapping between arrival and departure to parking lot waiting area.

If a child needs to go to the restroom during session, the play therapist will lead the child to the restroom located in the Counseling and Human Development Center (CHDC) which has approval to be open and is equipped with a child restroom that is a single occupancy. The outdoor playroom is directly adjacent to the CHDC. While in the restroom, the therapist will stand outside the door and ensure that child washes hands for at least 20 seconds with soap prior to leaving.

If you have any questions regarding these procedures, please contact Kim Walker, 940-565-3864, Kim.Walker@unt.edu.

COMPREHENSIVE REFERENCE LIST

Adams, S., & Savahl, S. (2017). Children's discourses of natural spaces: Considerations for children's subjective well-being. *Child Indicators Research, 10,* 423-446. https://doi.org/10.1007/s12187-016-9374-2

Aggio, D., Smith, L., Fisher, A., & Hamer, M. (2015). Mothers' perceived proximity to green space is associated with TV viewing time in children: The growing up in Scotland study. *Preventative Medicine, 70,* 46-49. https://doi.org/10.1016/j.ypmed.2014.11.018

Amoly, E., Dadvand, P., Forns, J., López-Vicente, M., Basagaña, X., Julvez, J., Alvarez-Pedrerol, M., Nieuwenhuijsen, M. J., & Sunyer, J. (2014). Green and blue spaces and behavioral development in Barcelona schoolchildren: The BREATHE project. *Environmental Health Perspectives, 122*(12), 1351-1358. https://doi.org//10.1289/ehp.1408215

Axline, V. M. (1969). *Play therapy*. Ballantine.

Bakir-Demir, T., Berument, S. K., & Sahin-Acar, B. (2019). The relationship between greenery and self-regulation of children: The mediation role of nature connectedness. *Journal of Environmental Psychology, 65*. https://doi.org/10.1016/j.jenvp.2019.101327

Barton, J., Griffin, M., & Pretty, J. (2011). Exercise-, nature- and socially interactive-based initiatives improve mood and self-esteem in the clinical population. *Perspectives in Public Health, 132*(2), 89-96. https://doi.org/10.1177/1757913910393862

Berger, R. (2006). Using contact with nature, creativity and rituals as a therapeutic medium with children with learning difficulties: a case study. *Emotional and Behavioural Difficulties, 11*(2), 135-146. https://doi.org/10.1080/13632750600619430

Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science, 19*(12), 1207-1212. https://doi.org/10.1111/j.1467-9280.2008.02225.x

Berman, M. G., Kross, E., Krpan, K. M., Askren, M. K., Burson, A., Deldin, P. J., Kaplan, S., Sherdell, L., Gotlib, I. H., & Jonides, J. (2012). Interacting with nature improves cognition and affect for individuals with depression. *Journal of Affective Disorders, 140*, 300-305. https://doi.org/10.1016/j.jad.2012.03.012

Berto, R., Barbiero, G., Barbiero, P., & Senes, G. (2018). An individual's connection to nature can affect perceived restorativeness of natural environments: Some observations about biophilia. *Behavioral Sciences, 8*(34), 1-18. https://doi.org/10.3390/bs8030034

Berto, R., Pasini, M., & Barbiero, G. (2015). How does psychological restoration work in children? An exploratory study. *Journal of Child & Adolescent Behavior, 3*(3), 1000200. https://doi.org/10.4172/2375-4494.1000200

Beute, F., & de Kort, Y. A. W. (2014). Natural resistance: Exposure to nature and self-regulation, mood, and physiology after ego-depletion. *Journal of Environmental Psychology, 40*, 167-178. https://doi.org/10.1016/j.jenvp.2014.06.004

Bowler, D. E., Buyung-Ali, L. M., Knight, T. M., & Pullin, A. S. (2010). A systematic review of evidence for the added benefits to health of exposure to natural environments. *BMC Public Health, 10*, 456. https://doi.org/10.1186/1471-2458-10-456

Bratton, S. C., Ceballos, P. L., Sheely-Moore, A. I., Meany-Walen, K., Pronchenko, Y., & Jones, L. D. (2013). Head start early mental health intervention: Effects of child-centered play therapy on disruptive behaviors. *International Journal of Play Therapy, 22*(1), 28-42. https://doi.org/10.1037/a0030318

Bratton, S. C., Ray, D., Rhine, T., & Jones, L. (2005). The efficacy of play therapy with children: A meta-analytic review of treatment outcomes. *Profession Psychology: Research and Practice, 36*(4), 376-390. https://doi.org/10.1037/0735-7028.36.4.376

Brown, T. E. (2019). *Brown executive functioning/attention scales.* Pearson.

Brymer, E., Cuddihy, T. F., & Sharma-Brymer, V. (2010). The role of nature-based experiences in the development and maintenance of wellness. *Asia-Pacific Journal of Health, Sport and Physical Education, 1*(2), 21-27. https://doi.org/10.1080/18377122.2010.9730328

Byrne, J. (2012). When green is White: The cultural politics of race, nature and social exclusion in a Los Angeles urban national park. *Geoforum, 43,* 595-611. https://doi.org/10.1016/j.geoforum.2011.10.002

Capaldi, C. A., Dopko, R. L., & Zelenski, J. M. (2014). The relationship between nature connectedness and happiness: a meta-analysis. *Frontiers in Psychology, 5*(976), 1-15. https://doi.org/10.3389/fpsyg.2014.00976

Chalquist, C. (2009). A look at the ecotherapy research evidence. *Ecopsychology, 1*(2), 1-11. https://doi.org/10.1089/eco.2009.0003

Chang, C. Y., Ritter, K. B., & Hays, D. G. (2005). Multicultural trends and toys in play therapy. *International Journal of Play Therapy, 14*(2), 69-85. https://doi.org/10.1037/h0088903

Chawla, L. (2015). Benefits of nature contact for children. *Journal of Planning Literature, 30*(4), 433-452, https://doi.org/10.1177/0885412215595441

Cheng, J. C., & Monroe, M. C. (2012). Connection to nature: Children's affective attitude toward nature. *Environment and Behavior, 44*(1), 31-49. https://doi.org/10.1177/0013916510385082

Cheng, Y., & Ray, D. C. (2016). Child-centered group play therapy: Impact on social-emotional assets of kindergarten children. *The Journal for Specialists in Group Work, 41*(3), 209-237. https://doi.org/10.1080/01933922.2016.1197350

Children & Nature Network. (2020). *2019 annual report.* https://www.childrenandnature.org/annual-reports/2019-annual-report/

Chown, A. (2014). *Play therapy in the outdoors: Taking play therapy out of the playroom and into natural environments.* Jessica Kingsley Publishers.

Cleland, V., Crawford, D., Baur, L. A., Hume, C., Timperio, A., & Salmon, J. (2008). A prospective examination of children's time spent outdoors, objectively measured physical activity and overweight. *International Journal of Obesity, 32,* 1685-1693. https://doi.org/10.1038/ijo.2008.171

Clements, R. (2004). An investigation of the status of outdoor play. *Contemporary Issues in Early Childhood, 5*(1), 68-80. https://doi.org/10.2304/ciec.2004.5.1.10

Clinebell, H. (1996). *Ecotherapy: Healing ourselves, healing the earth: A guide to ecologically grounded personality theory, spirituality, therapy and education*. Fortress.

Cohen, J. W. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Coffey, J. S., & Gauderer, L. (2016). When pediatric primary care providers prescribe nature engagement at a state park, do children "fill" the prescription? *Ecopsychology, 8*(4), 207-214. https://doi.org/10.1089/eco.2016.0019

Cornelius-White, J. H. D. (2011). Congruence: An integrative five-dimension model. *Person-Centered & Experiential Psychotherapies, 6*(4), 229-239. https://doi.org/10.1080/14779757.2007.9688444

Corraliza, J. A., Collado, S., & Bethelmy, L. (2012). Nature as a moderator of stress in urban children. *Procedia - Social and Behavioral Sciences, 38,* 253-263. https://doi.org/10.1016/j.sbspro.2012.03.347

Crnic, M. & Kondo, M. C. (2019). Nature rx: Reemergence of pediatric nature-based therapeutic programs from the late 19th and early 20th centuries. *American Journal of Public Health, 109*(10), 1371-1378. https://doi.org/10.2105/AJPH.2019.305204

Crouse, D. L., Pinault, L., Balram, A., Hystad, P., Peters, P. A., Chen, H., van Donkelaar, A., Martin, R. V., Ménard, R., Robichaud, A., & Villeneuve, P. J. (2017). Urban greenness and mortality in Canada's largest cities: A national cohort study. *The Lancet Planetary Health, 1*(7), e289-e297. https://doi.org/10.1016/S2542-5196(17)30118-3

Dadvand, P., Nieuwenhuijsen, M. J., Esnaola, M., Forns, J., Basagaña, X., Alvarez-Pedrerol, M., Rivas, I., López-Vincente, M., Pascual, M. D. C., Su, J., Jerrett, M., Querol, X., & Sunyer, J. (2015). Green spaces and cognitive development in primary schoolchildren. *Proceedings of the National Academy of Sciences of the United States of America, 112*(26), 7937-7942. https://doi.org/10.1073/pnas.1503402112

Dankiw, K. A., Tsiros, M. D., Baldock, K. L., Kumar, S. (2020). The impacts of unstructured nature play on health in early childhood development: A systematic review. *PLoS ONE 15*(2), e0229006. https://doi.org/10.1371/journal.pone.0229006

de Keijzer, C., Agis, D., Ambrós, A., Arévalo, G., Baldasano, J. M., Bande, S., Barrera-Gómez, J., Benach, J., Cirach, M., Dadvand, P., Ghigo, S., Martinez-Solanas, É., Nieuwenhuijsen, M., Cadum, E., & Basagaña, X. (2017). The association of air pollution and greenness with mortality and life expectancy in Spain: A small-area study. *Environment International, 99,* 170-176. https://doi.org/10.1016/j.envint.2016.11.009

Doucette, P. A. (2004). Walk and talk: An intervention for behaviorally challenged youths. *Adolescence, 39*(154), 373-388. https://doi.org/10.1177/10534512040390030401

Dzhambov, A. M., Dimitrova, D. D., & Dimitrakova, E. D. (2014). Association between residential greenness and birth weight: Systematic review and meta-analysis. *Urban Forestry & Urban Greening, 13*(4), 621-629. https://doi.org/10.1016/j.ufug.2014.09.004

Dzhambov, A. M., Hartig, T., Tilov, B., Atanasova, V., Makakova, D. R., & Dimitrova, D. D. (2019). Residential greenspace is associated with mental health via intertwined capacity-building and capacity-restoring pathways. *Environmental Research, 178,* 108708. https://doi.org/10.1016/j.envres.2019.108708

Engemann, K., Pedersen, C. B., Arge, L., Tsirogiannis, C., Mortensen, P. B., & Svenning, J. (2019). Residential green space in childhood is associated with lower risk of psychiatric disorders from adolescence into adulthood. *Proceedings of the National Academy of Sciences of the United States of America, 116*(11), 5188-5193. https://doi.org/10.1073/pnas.1807504116

Erikson, E. (1963). *Childhood and society.* Norton.

Flouri, E., Midouhas, E., & Joshi, H. (2014). The role of urban neighborhood green space in children's emotional and behavioural resilience. *Journal of Environmental Psychology, 40*, 179-186. https://doi.org/10.1016/j.jenvp.2014.06.007

Fong, K., Hart, J. E., & James, P. (2018). A review of epidemiologic studies on greenness and health: Updated literature through 2017. *Current Environmental Health, 5*(1), 77-87. https://doi.org/10.1007/s40572-018-0179-y

Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Kahn, P. H., Jr., & Lawler, J. J. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives, 125*(7), 75001. https://doi.org/10.1289/ehp1663

Gesell Institute. (2011). *Gesell developmental observation- revised: Examiner's Manual.* Gesell Institute of Child Development.

Gill, T. (2014). The benefits of children's engagement with nature: A systematic literature review. *Children, Youth and Environments, 24*(2), 10-34.

Ginott, H. G. (1960). A rationale for selecting toys in play therapy. *Journal of Consulting Psychology, 24*(3), 243-246.

Ginott, H. G. (1961). *Group psychotherapy with children: The theory and practice of play therapy.* McGraw-Hill.

Glover, G., & Landreth, G. L. (2016). Child-centered play therapy. In K. J. O'Connor, C. E. Schaefer, & L. D. Braverman (Eds), *Handbook of Play Therapy* (2nd ed., pp. 93-118). Wiley. https://doi.org/10.1002/9781119140467.ch5

Greenleaf, A. T., Bryant, R. M., & Pollock, J. B. (2014). Nature-based counseling: Integrating the healing benefits of nature into practice. *International Journal of Advanced Counseling, 36*, 162-174. https://doi.org/10.1007/s10447-013-9198-4

Greenspan, S. (1993). *Playground politics: Understanding the emotional life of your school-age child.* Addison-Wesley.

Greenspan, S. (1997). *The growth of the mind and the endangered origins of intelligence.* Perseus.

Greenway, R. (2009). The wilderness experience as therapy: We've been here before. In L. Buzzell & C. Chalquist (Eds.), *Ecotherapy: Healing with nature in mind* (132-139). Counterpoint.

Haluza, D., Schönbauer, R., & Cervinka, R. (2014). Green perspectives for public health: A narrative review on the physiological effects of experiencing outdoor nature. *International Journal of Environmental Research and Public Health, 11*, 5445-5461. https://doi.org/10.3390/ijerph110505445

Harris, K. I. (2016). Let's play at the park! Family pathways promoting spiritual resources to inspire nature, pretend play, storytelling, intergenerational play and celebrations. *International Journal of Children's Spirituality, 21*(2), 90-103. https://doi.org/10.1080/1364436X.2016.1164669

Hartig, T., Mang, M., & Evans, G. W. (1991). Restorative effects of natural environment experiences. *Environment and Behavior, 23*(1), 3-26. https://doi.org/10.1177/0013916591231001

Hartig, T., Mitchell, R., de Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health, 35*, 207-228. https://doi.org/10.1146/annurev-publhealth-032013-182443

Hasbach, P. H. (2012). Ecotherapy. In P. H. Kahn, Jr. & P. H. Hasbach (Eds.), *Ecopsychology: Science, totems, and the technological species* (pp. 115-139). The MIT Press.

Hinds, J. & Ranger, L. (2016). Equine-assisted therapy: Developing theoretical context. In M. Jordan & J. Hinds (Eds.), *Ecotherapy: Theory, research & practice* (pp. 187-198). Palgrave.

Hinkley, T., Brown, H., Carson, V., & Teychenne, M. (2018). Cross sectional associations of screen time and outdoor play with social skills in preschool children. *PLoS ONE, 13*(4), e0193700. https://doi.org/10.1371/journal.pone.0193700

Ingulli, K., & Lindbloom, G. (2013). Connection to nature and psychological resilience. *Ecopsychology, 5*(1), 52-55. https://doi.org/10.1089/eco.2012.0042

James, P., Hart, J. E., Banay, R. F., & Laden, F. (2016). Exposure to greenness and mortality in a nationwide prospective cohort study of women. *Environmental Health Perspectives, 124*(9), 1344-1352. https://doi.org/10.1289/ehp.1510363

Ji, Y., Ramirez, S. V., & Kranz, P. L. (2008). Physical settings and materials recommended for play therapy with Japanese children. *Journal of Instructional Psychology, 34*(4).

Johnsen, S. A. K. (2011). The use of nature for emotion regulation: Toward a conceptual framework. *Ecopsychology, 3*(3), 175-185. https://doi.org/10.1089/eco.2011.006

Johnson, S. A., Snow, S., Lawrence, M. A., & Rainham, D. G. C. (2019). Quasi-randomized trial of contact with nature and effects on attention in children. *Frontiers in Psychology, 10,* 2652. https://doi.org/10.3389/fpsyg.2019.02652

Jordan, M. (2015). *Nature and therapy: Understanding counselling and psychotherapy in outdoor spaces.* Routledge.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology, 15*, 169-182. https://doi.org/10.1016/0272-4944(95)90001-2

Kaplan, S., & Berman, M. G. (2010). Directed attention as a common resource for executive functioning and self-regulation. *Perspectives on Psychological Science, 5*(1), 43-57. https://doi.org/10.1177/1745691609356784

Kaplan, S., & Talbot, J. F. (1983). Psychological benefits of a wilderness experience. In I. Altman & J. Wohlwill (Eds.), *Behavior and the natural environment* (pp. 163-203). Plenum Press. https://doi.org/10.1007/978-1-4613-3539-9

Kareiva, P. (2008). Ominous trends in nature recreation. *Proceedings of the National Academy of Sciences of the United States of America, 105*(8), 2757-2758. https://doi.org/10.1073/pnas.0800474105

Kamitsis, I., & Simmonds, J. G. (2017). Using resources of nature in the counselling room: Qualitative research into ecotherapy practice. *International Journal for the Advancement of Counselling, 39*, 229-248. https://doi.org/10.1007/s10447-017-9294-y

Kellert, S. R. (2002). Experiencing nature: Affective, cognitive, and evaluative development in children. In P. H. Kahn, Jr. & S. R. Kellert (Eds.), *Children and nature: Psycholgical, sociocultural, and evolutionary investigations* (pp. 117-151). The MIT Press.

Kihal-Talantikite, W., Padilla, C. M., Lalloué, B., Gelormini, M., Zmirou-Navier, D., & Deguen, S. (2013). Green space, social inequalities and neonatal mortality in France. *BMC Pregnancy and Childbirth, 13*(1), 191. https://doi.org/10.1186/1471-2393-13-191

Kimbro, R. T., Brooks-Gunn, J., & McLanahan, S. (2011). Young children in urban areas: Links among neighborhood characteristics, weight status, outdoor play, and television watching. *Social Science & Medicine, 72*, 668-676. https://doi.org/10.1016/j.socscimed.2010.12.015

Kohlberg, L. (1987). *Child psychology and childhood education: A cognitive-development view.* Longman.

Kottman, T. (2011). *Play therapy: Basics and beyond* (2nd ed.). American Counseling Association.

Kram, K. (2019). *Child centered play therapy and adverse childhood experiences: Effectiveness on impulsivity and inattention* [University of North Texas]. ProQuest Dissertations & Theses Global. https://www.proquest.com/docview/2317707884?accountid=7113

Kranz, P. L., Ramirez, S. Z., Flores-Torres, L., Steele, R., & Lund, N. L. (2005). Physical settings, materials, and related Spanish terminology recommended for play therapy with first-generation Mexican-American children. *Education, 126*(1), 93-99.

Kuo, F. E., & Taylor, A. F. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health, 94*(9), 1580-1586. https://doi.org/10.2105/AJPH.94.9.1580

Kuo, M. (2015). How might contact with nature promote human health? Promising mechanisms and a possible central pathway. *Frontiers in Psychology, 6,* 1093. https://doi.org/10.3389/fpsyg.2015.01093

Landreth, G. L. (2012). *Play therapy: The art of the relationship*. Routledge.

Lebo, D. (1956). The question of toys in play therapy: An international problem. *Journal of Education and Psychology, 14*, 66-73.

Lebo, D. (1958). A formula for selecting toys for nondirective play therapy. *The Journal of Genetic Psychology: Research and Theory on Human Development, 92,* 23–34. https://doi.org/10.1080/00221325.1958.10532371

Lebo, D. (1979). Toys for nondirective play therapy. In C. Schaefer (Ed.), *Therapeutic use of child's play* (pp. 435–448). Jason Aronson.

Lechtzin, N., Busse, A. M., Smith, M. T., Grossman, S., Nesbit, S., & Diette, G. B. (2010). A randomized trial of nature scenery and sounds versus urban scenery and sounds to reduce pain in adults undergoing bone marrow aspirate and biopsy. *The Journal of Alternative and Complementary Medicine, 16*(9), 965-972. https://doi.org/10.1089/acm.2009.0531

Lee, K. E., Williams, K. J. H., Sargent, L. D., Williams, N. S. G., & Johnson, K. A. (2015). 40-second green roof views sustain attention: The role of micro-breaks in attention restoration. *Journal of Environmental Psychology, 42,* 182-189. https://doi.org/10.1016/j.jenvp.2015.04.003

Lee, M., Kim, S., & Ha, M. (2019). Community greenness and neurobehavioral health in children and adolescents. *Science of the Total Environment, 672,* 381-388. https://doi.org/10.1016/j.scitotenv.2019.03.454

Lin, Y. W., & Bratton, S. C. (2015). A meta-analytic review of child-centered play therapy approaches. *Journal of Counseling & Development, 93*, 45-58. https://doi.org/10.1002/j.1556-6676.2015.00180.x

Lix, L. M., & Keselman, H. J. (2019). Analysis of variance: Repeated-measures designs. In G. R. Hancock, L. M. Stapleton, & R. O. Mueller (Eds.), *The reviewer's guide to quantitative methods in the social sciences* (2nd ed., pp.15-28). Routledge.

Loureiro, A., & Veloso, S. (2017). Green exercise, health and well-being. In G. Fleury-Bahi, E. Pol, & O. Navarro (Eds.), *Handbook of environmental psychology and quality of life research* (pp. 127-148). Springer. https://doi.org/10.1007/978-3-319-31416-7_8

Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder.* Algonquin Books of Chapel Hill.

Lynskey, M. & Sussman, S. (2001). Pilot studies. In Sussman, S. (Ed.), *Handbook of program development for health behavior research and practice* (pp. 391-421). Sage. https://doi.org/10.4135/9781412991445

Maller, C. M., Townsend, M., Pryor, A., Brown, P., & St Leger, L. (2005). Healthy nature healthy people: 'Contact with nature' as an upstream health promotion intervention for populations. *Health Promotion International, 21*(1), 45–54. https://doi.org/10.1093/heapro/dai032

Markevych, I., Thiering, E., Fuertes, E., Sugiri, D., Berdel, D., Koletzko, S., von Berg, A., Bauer, C., & Heinrich, J. (2014). A cross-sectional analysis of the effects of residential greenness on blood pressure in 10-year old children: Results from the GINIplus and LISAplus studies. *BMC Public Health, 14,* 477. https://doi.org/10.1186/1471-2458-14-477

Markevych, I., Tiesler, C. M. T., Fuertes, E., Romanos, M., Dadvand, P., Nieuwenhuijsen, M. J., Berdel, D., Koletzko, S., & Heinrich, J. (2014). Access to urban green spaces and behavioural problems in children: Results from the GINIplus and LISAplus studies. *Environment International, 71,* 29-35. https://doi.org/10.1016/j.envint.2014.06.002

Mårtensson, F., Boldemann, C., Söderström, M., Blennow, M., Englund, J. E., & Grahn, P. (2009). Outdoor environmental assessment of attention promoting settings for preschool children. *Health & Place, 15,* 1149-1157. https://doi.org/10.1016/j.healthplace.2009.07.002

Martin, L., White, M. P., Hunt, A., Richardson, M., Pahl, S., & Burt, J. (2020). Nature contact, nature connectedness and associations with health, wellbeing and pro-environmental behaviours. *Journal of Environmental Psychology*. https://doi.org/10.1016/j.jenvp.2020.101389

McConaughy, S. H., & Achenbach, T. M. (2009). *Manual for the ASEBA Direct Observation Form*. University of Vermont, Research Center for Children, Youth, & Families.

McCurdy, L. E., Winterbottom, K. E., Mehta, S. S., & Roberts, J. R. (2010). Using nature and outdoor activity to improve children's health. *Current Problems in Pediatric Health Care, 5*, 102-117. https://doi.org/10.1016/j.cppeds.2010.02.003

McMorris, O., Villeneuve, P. J., Su, J., & Jerrett, M. (2015). Urban greenness and physical activity in a national survey of Canadians. *Environmental Research, 137,* 94-100. https://doi.org/10.1016/j.envres.2014.11.010

Merrell, K. W. (2011). *Social emotional assets and resilience scales: Professional manual.* PAR.

Messer Diehl, E. R. (2009). Gardens that heal. In L. Buzzell & C. Chalquist (Eds.), *Ecotherapy: Healing with nature in mind* (166-173). Counterpoint.

Mitchell, R. J., Richardson, E. A., Shortt, N. K., & Pearce, J. R. (2015). Neighborhood environments and socioeconomic inequalities in mental well-being. *American Journal of Preventative Medicine, 49*(1), 80-84. https://doi.org/10.1016/j.amepre.2015.01.017

Muro, J., Ray, D., Schottelkorb, A., Smith, M. R., & Blanco, P. J. (2006). Quantitative analysis of long-term child-centered play therapy. *International Journal of Play Therapy, 15*(2), 35-58. https://doi.org/10.1037/h0088914

O'Reilly, M., Ronzoni, P. & Dogra, N. (2013). Choosing a method for your research. In *Research with children* (pp. 158-176). Sage. https://doi.org/10.4135/978152648

Outdoors Alliance for Kids. (n.d.-a). *Children's outdoor bill of rights.* https://outdoorsallianceforkids.org/childrens-outdoor-bill-of-rights/

Outdoors Alliance for Kids. (n.d.-b). *Every kid outdoors.* https://outdoorsallianceforkids.org/every-kid-outdoors/

Pallant, J. (2016). *SPSS survival manual* (6th ed.). McGraw Hill Education.

Pergams, O. R. W., & Zaradic, P. A. (2008). Evidence for a fundamental and pervasive shift away from nature-based recreation. *Proceedings of the National Academy of Sciences of the United States of America, 105*(7), 2295-2300. https://doi.org/10.1073/pnas.0709893105

Piaget, J. (1932/1965). *The moral judgment of the child* (M. Gabain, trans.). Free Press.

Piers, E. V., Harris, D. B., & Herzberg, D. S. (2002). *Piers-Harris children's self-concept scale* (2nd ed.). Western Psychological Services.

Pretty, J., Griffin, M., Sellens, M., & Pretty, C. J. (2003). Green exercise: Complementary roles of nature, exercise and diet in physical and emotional well-being and implications for public health policy. *CES Occasional Paper 2003-1.* Colchester: University of Essex.

Pretty, J., Peacock, J., Sellens, M., & Griffin, M. (2005). The mental and physical helath outcomes of green exercise. *International Journal of Environmental Health Research, 15*(5), 319-337. https://doi.org/10.1080/09603120500155963

Preuß, M., Niewenhuijsen, M., Marquez, S., Cirach, M., Dadvand, P., Triguero-Mas, M., Gidlow, C., Grazuleviciene, R., Kruize, H., & Zijlema, W. (2019). Low childhood nature exposure is associated with worse mental health in adulthood. *International Journal of Environmental Research and Public Health, 16*, 1809. https://doi.org/10.3390/ijerph16101809

Pun, V. C., Manjourides, J., & Suh, H. H. (2018). Association of neighborhood greenness and self-perceived stress, depression and anxiety symptoms in older U.S. adults. *Environmental Health: A Global Access Science Source, 17*(1). https://doi.org/10.1186/s12940-018-0381-2

Ray, D. C. (2011). *Advanced play therapy: Essential conditions, knowledge, and skills for child practice.* Routledge.

Ray, D. C. (2016). *A therapist's guide to child development: The extraordinarily normal years.* Routledge.

Ray, D. C., Armstrong, S. A., Balkin, R. S., & Jayne, K. M. (2015). Child-centered play therapy in the schools: Review and meta-analysis. *Psychology in the Schools, 52*(2), 107-123. https://doi.org/10.1002/pits.21798

Ray, D. C., Lee, K. R., Meany-Walen, K. K., Carlson, S. E., Carnes-Holt, K. L., & Ware, J. N. (2013). Use of toys in child-centered play therapy. *International Journal of Play Therapy, 22*(1), 43-57. https://doi.org/10.1037/a0031430

Ray, D. C., Purswell, K., Haas, S., Aldrete, C. (2017). Child-Centered Play Therapy-Research Integrity Checklist: Development, reliability, and use. *International Journal of Play Therapy, 26*(4), 207-217.

Ray, D. C., Schottelkorb, A., & Tsai, M. (2007). Play therapy with children exhibiting symptoms of attention deficit hyperactivity disorder. *International Journal of Play Therapy, 16*(2), 95-111. https://doi.org/10.1037/1555-6824.16.2.95

Ray, D. C., Stulmaker, H. L., Lee, K. R., & Silverman, W. K. (2013). Child-centered play therapy and impairment: Exploring relationships and constructs. *International Journal of Play Therapy, 22*(1), 13-27. https://doi.org/10.1037/a0030403

Reese, R. F. (2016). EcoWellness & guiding principles for ethical integration of nature into counseling. *International Journal for the Advancement of Counseling, 38*, 345–357. https://doi.org/10.1007/s10447-016-9276-5

Rigolon, A. (2017). Parks and young people: An environmental justice study of park proximity, acreage, and quality in Denver, Colorado. *Landscape and Urban Planning, 165,* 73-83. https://doi.org/10.1016/j.landurbplan.2017.05.007

Rigolon, A., & Flohr, T. L. (2014). Access to parks for youth as an environmental justice issue: Access inequalities and possible solutions. *Buildings, 4*(2), 69-94. https://doi.org/10.3390/buildings4020069

Rivkin, M. S., & Schein, D. (2014). *The great outdoors: Advocating for natural spaces for young children.* National Association for the Education of Young Children.

Robinson, A., Simpson, C., & Hott, B. L. (2017). The effects of child-centered play therapy on the behavioral performance of three first grade students with ADHD. *International Journal of Play Therapy, 26*(2), 73-83. https://doi.org/10.1037/pla0000047

Robinson, C. (2019). Young children's spirituality: A focus on engaging with nature. *Australasian Journal of Early Childhood, 44*(4), 339-350. https://doi.org/10.1177/1836939119870907

Rogers, C. R. (1951). *Client-centered therapy: Its current practice, implications, and theory.* Constable and Company.

Rogers, C. R. (1957). The necessary and sufficient conditions of the therapeutic personality change. *Journal of Consulting Psychology, 21*(2), 95-103. https://doi.org/10.1037/h0045357

Rogers, C. R. (1959). A theory of therapy, personality, and interpersonal relationships, as developed in the client-centered framework. In S. Koch (Ed.) *Psychology: A study of a science: Vol. 3. Formulations of the person and the social context* (184-256). McGraw-Hill.

Ryan, R. M., Weinstein, N., Bernstein, J., Brown, K. W., Mistretta, L., & Gagné, M. (2010). Vitalizing effects of being outdoors and in nature. *Journal of Environmental Psychology, 30,* 159-168. https://doi.org/10.1016/j.jenvp.2009.10.009

Sando, O. J. (2019). The outdoor environment and children's health: A multilevel approach. *International Journal of Play, 8*(1), 39-52. https://doi.org/10.1080/21594937.2019.1580336

Sarkar, C. (2017). Residential greenness and adiposity: Findings from the UK Biobank. *Environment International, 106,* 1-10. https://doi.org/10.1016/j.envint.2017.05.016

Sato, I., & Conner, T. S. (2013). The quality of time in nature: How fascination explains and enhances the relationship between nature experiences and daily affect. *Ecopsychology, 5*(3), 197-204. https://doi.org/10.1089/eco.2013.0026

Schein, D. (2014). Nature's role in children's spiritual development. *Children, Youth and Environments, 24*(2), 78-101.

Schottelkorb, A. A., & Ray, D. C. (2009). ADHD symptom reduction in elementary students: A single-case effectiveness design. *Professional School Counseling, 13*(1), 11-22.

Scott, J. T., Kilmer, R. P., Wang, C., Cook, J. R., & Haber, M. G. (2018). Natural environments near schools: Potential benefits for socio-emotional and behavioral development in early childhood. *American Journal of Community Psychology, 62*, 419-432. https://doi.org/10.1002/ajcp.12272

Seltenrich, N. (2015). Just what the doctor ordered: Using parks to improve children's health. *Environmental Health Perspectives, 123*(10), A254-A259. https://doi.org/10.1289/ehp.123.A254

Shaw, K., Anderson, D. M., & Barcelona, B. (2015). Parental perceptions of constraints to family participation in nature-based, outdoor experiences. *Journal of Outdoor Recreation, Education and Leadership, 7*(1), 3-19. https://doi.org/10.7768/1948-5123.1241

Skår, M., & Krogh, E. (2009). Changes in children's nature-based experiences near home: From spontaneous play to adult-controlled, planned and organised activities. *Children's Geographies, 7*(3), 339-354. https://doi.org/10.1080/14733280903024506

Skar, M., Wold, L. C., Gundersen, V., & O'Brien, L. (2016). Why do children not play in nearby nature? Results from a Norwegian survey. *Journal of Adventure Education and Outdoor Learning, 16*(3), 239-255. https://doi.org/10.1080/14729679.2016.1140587

Snell, T. L., Lam, J. C. S., Lau, W. W., Lee, I., Maloney, E. M., Mulholland, N., Wilson, L., & Wynne, L. J. (2016). Contact with nature in childhood and adult depression. *Children, Youth and Environment, 26*(1), 111-124. https://doi.org/10.7721/chilyoutenvi.26.1.0111

Stevenson, M. P., Dewhurst, R., Schilhab, T., & Bentsen, P. (2019). Cognitive restoration in children following exposure to nature: evidence from the attention network task and mobile eye tracking. *Frontiers in Psychology, 10,* 42. https://doi.org/10.3389/fpsyg.2019.0042

Strife, S., & Downey, L. (2009). Childhood development and access to nature: A new direction for environmental inequality research. *Organization & Environment, 22*(1), 99-122, https://doi.org/10.1177/1086026609333340

Swank, J. M., Cheung, C., Prikhidko, A., & Su, Y., (2017). Nature-based child-centered group play therapy and behavioral concerns: A single-case design. *International Journal of play Therapy, 26*(1), 47-57. https://doi.org/10.1037/pla0000031

Swank, J. M., & Shin, S. M. (2015a). Garden counseling groups and self-esteem: A mixed methods study with children with emotional and behavioral problems. *The Journal for Specialists in Group Work, 40*(3), 315-331, https://doi.org/10.1080/01933922.2015.1056570

Swank, J. M., & Shin, S. M. (2015b). Nature-based child-centered play therapy: An innovative counseling approach. *International Journal of Play Therapy, 24*(3), 151-161. https://doi.org/10.1037/a0039127

Swank, J. M., Shin, S. M., Cabrita, C., Cheung, C., & Rivers, B. (2015). Initial investigation of nature-based, child-centered play therapy: A single-case design. *Journal of Counseling & Development, 93*, 440-450. https://doi.org/10.1002/jcad.12042

Swank, J. M., & Smith-Adcock, S. (2018). On-task behavior of children with attention-deficit/hyperactivity disorder: Examining treatment effectiveness of play therapy interventions. *International Journal of Play Therapy, 27*(4), 187-197. https://doi.org/10.1037/pla0000084

Swank, J. M., & Swank, D. E. (2013). Student growth within the school garden: Addressing personal/social, academic, and career development. *Journal of School Counseling, 11.*

Swank, J. M., Walker, K. L. A., & Shin, S. (2020). Indoor nature-based play therapy: Taking the natural world inside the playroom. *International Journal of Play Therapy,* 29(3), 155-162. https://doi.org/10.1037/pla0000123

Taylor, A. F., & Keo, F. E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders, 12*(5), 402-409. https://doi.org/10.1177/1087054708323000

Taylor, A. F., & Kuo, F. E. (2011). Could exposure to everyday green spaces help treat ADHD? Evidence from children's play settings. *Applied Psychology: Health and Well-Being, 3*(3), 281-303. https://doi.org/10.1111/j.1758-0854.2011.01052.x

Taylor, A. F., Kuo, F. E., & Sullivan, W. C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior, 33*(1), 54-77. https://doi.org/10.1177/00139160121972864

Tillmann, S., Clark, A. F., & Gilliland, J. A. (2018). Children and nature: Linking accessibility of natural environments and children's health-related quality of life. *International Journal of Environmental Research and Public Health, 15*, 1072. https://doi.org/10.3390/ijerph15061072

Torquati, J., Schutte, A., & Kiat, J. (2017). Attentional demands of executive function tasks in indoor and outdoor settings: Behavioral and neuroelectrical evidence. *Children, Youth and Environments, 27*(2), 70-92.

Twohig-Bennett, C., & Jones, A. (2018). The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes. *Environmental Research, 166,* 628-637. https://doi.org/10.1016/j.envres.2018.06.030

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*(4647), 420-421. https://doi.org/10.1126/science.6143402

Ulrich, R. S., Simons, R.F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology, 11*(3), 201-230. https://doi.org/10.1016/S0272-4944(05)80184-7

Ulset, V., Vitaro, F., Brendgen, M., Bekkhus, M., & Borge, A. I. H. (2017). Time spent outdoors during preschool: Links with children's cognitive and behavioral development. *Journal of Environmental Psychology, 52*, 69-80. https://doi.org/10.1016/j.jenvp.2017.05.007

United States Department of Agriculture. (2018). *Urban nature for human health and well-being: A research summary for communicating the health benefits of urban trees and green space.* https://www.fs.usda.gov/sites/default/files/fs_media/fs_document/urbannatureforhumanhealthandwellbeing_508_01_30_18.pdf

van den Berg, A. E., & van den Berg, C. G. (2010). A comparison of children with ADHD in a natural and built setting. *Child: care, health and development, 37*(3), 430-439. https://doi.org/10.1111/j.1365-2214.2010.01172.x

van Dijk-Wesselius, J. E., Maas, J., Hovinga, D., van Vugt, M., & van den Berg, A. E. (2018). The impact of greening schoolyards on the appreciation, and physical, cognitive and social-emotional well-being of schoolchildren: A prospective intervention study. *Landscape and Urban Planning, 180,* 15-26. https://doi.org/10.1016/j.landurbplan.2018.08.003

Vienneau, D., de Hoogh, K., Faeh, D., Kaufmann, M., Wunderli, J. M., Röösli, M., & The SNC Study Group. (2017). More than clean air and tranquility: Residential green is independently associated with decreasing mortality. *Environmental International, 108,* 176-184. https://doi.org/10.1016.jenvint.2017.08.012

Ward, J. S., Duncan, J. S., Jarden, A., & Stewart, T. (2016). The impact of children's exposure to greenspace on physical activity, cognitive development, emotional wellbeing, and ability to appraise risk. *Health & Place, 40,* 44-50. https://doi.org/10.1016/j.healthplace.2016.04.015

Weeland, J., Moens, M. A., Beute, F., Assink, M., Staaks, J. P. C., & Overbeek, G. (2019). A dose of nature: Two three-level meta-analyses of the beneficial effects of exposure to nature on children's self-regulation. *Journal of Environmental Psychology, 65*, 101326. https://doi.org/10.1016/j.jenvp.2019.101326

Wells, N. M. (2000). At home with nature: Effects of "greenness" on children's cognitive functioning. *Environment and Behavior, 32*(6), 775-795.

Wells, N. M., & Evans, G. W. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior, 35*(3), 311-330. https://doi.org/10.1177/0013916503251445

Wilson, B. J., & Ray, D. (2018). Child-centered play therapy: Aggression, empathy, and self-regulation. *Journal of Counseling & Development, 96,* 399-409. https://doi.org/10.1002/jcad.12222

Wilson, E. O. (1984). Biophilia: The human bond with other species. Harvard University Press.

Wilson, E. O. (1993). Biophilia and the conservation ethic. In S. R. Kellert & E. O. Wilson (Eds.) The Biophilia Hypothesis. Island Press.

Wilson, N. W., Ross, M. K., Lafferty, R., & Jones, J. (2008). A review of ecotherapy as an adjunct form of treatment for those who use mental health services. *Journal of Public Mental Health, 7*(3), 23-35. https://doi.org/10.1108/17465729200800020

World Health Organization & Secretariat of the Convention on Biological Diversity. (2015). Connecting Global Priorities: Biodiversity and Human Health. WHO Press. https://apps.who.int/iris/bitstream/handle/10665/174012/9789241508537_eng.pdf;jsessionid=AE79F6B13126F6B8FB459E4DB0BFD382?sequence=1

Yang, B., Zeng, X., Markevych, I., Bloom, M. S., Heinrich, J., Knibbs, L. D., Dharmage, S. C., Kin, S., Jalava, P., Guo, Y., Jalaludin, B., Morawska, L., Zhou, Y., Hu, L., Yu, H., Yu, Y., & Dong, G. (2019). Association between greenness surrounding schools and kindergartens and attention-deficit/hyperactivity disorder in children in China. *JAMA Network Open, 2*(12), e1917862. https://doi.org/10.1001/jamanetworkopen.2019.17862

Yitshak-Sade, M., Kloog, I., & Novack, V. (2017). Do air pollution and neighborhood greenness exposures improve the predicted cardiovascular risk? *Environment International, 107,* 147-153. https://doi.org/10.1016/j.envint.2017.07.011

Zach, A., Meyer, N., Hendrowarsito, L., Kolb, S., Bolte, G., Nennstiel-Ratzel, U., Stilianakis, N. I., & Herr, C. (2016). Association of sociodemographic and environmental factors with the mental health status among preschool children – Results from a cross-sectional study in Bavaria, Germany. *International Journal of Hygiene and Environmental Health, 219,* 458-467. https://doi.org/10.1016/j.ijheh.2016.04.012

Zijlema, W. L., Avila-Palencia, I., Triguero-Mas, M., Gidlow, C., Maas, J., Kruize, H., Andrusaityte, S., Grazuleviciene, R., & Nieuwenhuijsen, M. J. (2018). Active commuting through natural environments is associated with better mental health: Results from the PHENOTYPE project. *Environment International, 121,* 721-727. https://doi.org/10.1016/j.envint.2018.10.002