

THESIS

THE EFFECT OF AN INTENSIVE, OUTDOOR CAMP ON PLAYFULNESS AND
ADAPTABILITY IN CHILDREN

Submitted by

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In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, CO

Summer 2021

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ABSTRACT

THE EFFECT OF AN INTENSIVE, OUTDOOR CAMP ON PLAYFULNESS AND ADAPTABILITY IN CHILDREN

Play is the primary occupation of childhood and promotes healthy cognitive, social-emotional, and physical development. Playfulness is the attitude that children bring to play situations. Playfulness can impact a child's play as well as how likely others are to engage with them in play. Adaptability is the ability to functionally adjust to changes in the environment. Both adaptability and playfulness can impact play participation, and both may be improved through play.

Children with sensory modulation difficulties and challenging behavior, including children with autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD), may have a harder time engaging in play than their typical peers. These children can show decreased playfulness and adaptability, both of which may be barriers to play. This is unfortunate because children with these challenges may especially benefit from engaging in play and outdoor engagement. The aim of this study was to look at the effect of an outdoor, intensive, five-day camp with occupational therapy supports on the playfulness of children with sensory modulation difficulties and challenging behavior. This study also looked at the relationship between playfulness and adaptability before and after camp.

Camp Jabiru is designed and run by occupational therapists, who provide embedded occupational therapy supports to promote participation in a typical summer camp experience.

This study used a one group, pre- test and post- test, quasi-experimental design using retrospective data collected before and after camp held April 2019. Participants were 37 overnight campers at Camp Jabiru, 11 females and 26 males, ages 8-12 years. All campers were identified to have sensory modulation difficulties and/or challenging behavior and most had a primary diagnosis of ASD and secondary diagnosis of ADHD.

We assessed playfulness using the Test of Playfulness (ToP) on the first and fourth day of camp and assessed adaptability two-three months before and two-three months after camp using the The Behavior Assessment System for Children, Second Edition (BASC-2). We found a significant increase in playfulness and adaptability following participation in Camp Jabiru, but a negative relationship between these constructs.

Results indicate that children with sensory modulation difficulties and challenging behavior, engaging in this camp model with embedded occupational therapy supports, experienced increased playfulness and to some extent increased adaptability. Additional research is needed to further understand the benefits of an intensive, outdoor camp model with embedded occupational therapy supports as well as the relationship between playfulness and adaptability.

ACKNOWLEDGEMENTS

Throughout this journey of completing my thesis, I have received a great deal of support and assistance.

I would first like to thank my thesis advisor, Shelly Lane. Not only did you provide me with endless expertise and insight for my research and writing, but you also gave unwavering support throughout this endeavor. Thank you for patiently guiding me while challenging me, providing consistent feedback while encouraging me to find my own voice, and for always asking about my well-being.

I would like to thank Anita Bundy for her support and expertise on Rasch, playfulness, loose parts, and risky play. You expanded my understanding in these areas and you pushed me to own my work in my writing, which I greatly appreciate.

I would also like to thank Susan Hepburn, who brought her unique lens outside of our world of occupational therapy that was vital to my revisions. Susan, thank you for challenging my research and writing, as well as connecting with me in my passion for outdoor play.

Additionally, I wish to express my gratitude to Hannah Burke. Hannah, I appreciate you being my scoring counterpart and for taking on more than your share of the videos. But beyond that, thank you for educating me on Camp Jabiru, sharing your expertise and zeal for outdoor play, and reviewing and providing feedback on my writing. You brought contagious happiness and enthusiasm to a daunting process.

Finally, I would like to thank my partner, friends, and family for their unfaltering love and support. I would not have been able to do this without your encouragement and belief in me when I felt doubt. You all bring such joy to my life.

TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iv
CHAPTER 1: INTRODUCTION.....	1
CHAPTER 2: LITERATURE REVIEW	6
Introduction	6
Play	6
<i>Describing play</i>	<i>6</i>
<i>The importance of play</i>	<i>7</i>
Playfulness and Adaptability	9
<i>Playfulness</i>	<i>9</i>
<i>Adaptability</i>	<i>10</i>
Sensory Modulation Difficulties and Challenging Behavior	11
<i>Challenging behavior</i>	<i>13</i>
Outdoor Play	14
<i>Outdoor camp</i>	<i>16</i>
Conclusion	18
Identifying the Knowledge Gap	19
CHAPTER 3: METHODS.....	20
Institutional Review Board/Ethics Committee	20
Research Design	20
Participants	20
Camp Jabiru	21
<i>Camp Overview</i>	<i>22</i>
<i>Loose Parts Play</i>	<i>23</i>
Fidelity	23
Measures	24
<i>The Test of Playfulness (ToP)</i>	<i>24</i>
<i>The Behavior Assessment System for Children, Second Edition (BASC-2)</i>	<i>24</i>
Procedures	25
Data Analysis	26
CHAPTER 4: RESULTS.....	27
CHAPTER 5: DISCUSSION.....	29
Limitations	35

Conclusion and Implications for Future Research	35
REFERENCES	38
APPENDIX A	52
APPENDIX B	54
APPENDIX C	55
APPENDIX D	56
APPENDIX E	57

CHAPTER 1: INTRODUCTION

Play is the primary occupation of childhood (Lynch & Moore, 2016). While difficult to define, play is described as:

activities that are intrinsically motivated, internally controlled, and freely chosen and that may include suspension of reality e.g., fantasy (Skard & Bundy, 2008), exploration, humor, risk taking, contests, and celebrations (Eberle, 2014; Sutton-Smith, 2009). Play is a complex and multidimensional phenomenon that is shaped by sociocultural factors (Lynch et al., 2016). (AOTA, 2020, p. 34)

Play, particularly unstructured play, is vital for children's healthy cognitive, social-emotional, and physical development (Barnett, 1990; Eberle, 2014; Flannigan & Dietze, 2017; Lynch & Moore, 2016; Murray, 2018; Sahoo & Senapati, 2014; Sutton-Smith, 1997; Yogman et al., 2018). Despite the growing body of evidence supporting the value and necessity of play, it is often perceived as frivolous and frequently replaced with structured activities by parents and school systems (Milteer et al., 2012; Ridgers et al. 2012).

An intrinsic factor that indicates a child's ability to engage in play is the playfulness of that child. Playfulness is viewed as the predisposition and attitude that children bring to play situations (Barnett, 1991; Bundy, 2001). Playful children demonstrate the flexibility and imagination that contribute to how well they participate in play opportunities (Fabrizi et al., 2016). Playfulness entails children's engagement, motivation, creativity, affect, and social interactions (Skard & Bundy, 2008). In order to engage successfully in play, children must be able to give and read cues, be motivated to play, decide the circumstances and playmates, and suspend reality (Skard & Bundy, 2008; Román-Oyola et al., 2018). Children must be motivated to play and be able to act in a way that results in others wanting to join in their play.

Another key characteristic and product of engaging successfully in play is adaptability (Greve & Thomsen, 2016; Hewes, 2014; Nijhof et al., 2018; Saunders et al., 1998; Shen et al., 2017; Yogman et al., 2018). While the definition of adaptability can be nearly as mercurial as that of play (Price et al., 2018), this quality has been described as the ability to functionally respond and adjust to changes in the environment (Bjorklund, 2015; Reynolds & Kamphaus, 2015; Shen et al., 2017). With this description in mind, adaptability can include, and is often referred to interchangeably with, terms such as creativity, cognitive flexibility, and problem-solving. This latter term includes divergent thinking, which is the ability to consider multiple solutions to a given problem (Greve & Thomsen, 2016; Nijhof et al., 2018; Yogman et al., 2018). A more adaptive child will also be able to perceive and respond to changes in the social environment, making adaptability a vital skill for successful participation in children's everyday lives (Greve & Thomsen, 2016; Hewes, 2014).

Thus, playing is supported by a playful disposition and inherent ability to adapt as the play frame shifts. However, a child's success in play can be influenced by a number of other characteristics. For instance, Bundy et al. (2007) have indicated that play is a sensory, motor, and social experience. As such, the ability to process sensory input and use this for movement and behavior would likely impact play. In fact, children that experience sensory modulation difficulties have been shown to display difficulty participating in the complex occupation of play (Bundy et al., 2007; Lane, 2020; Watts et al., 2014).

Sensory modulation is the ability of the brain to filter sensations and attend only to those that are relevant, supporting the ability to maintain attention to a task and optimal arousal levels (Lane, 2020). Difficulties with sensory modulation can be seen in the absence of a specific diagnosis (Miller et al., 2012; Reynolds & Lane, 2007; Yochman et al., 2013), but also

commonly impact children with specific diagnoses such as attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD).

Children that experience sensory modulation difficulties also often experience challenging behavior (Dean et al., 2018; O'Donnell et al., 2012). Challenging behavior, which can include emotional or physical outbursts, social withdrawal, and inappropriate speech (O'Donnell et al., 2012), is discussed intentionally broadly in this paper, as children may experience a range of these disruptive behaviors regardless of the presence or absence of a diagnosis (Alavi et al., 2018; Dean et al., 2018). Children that demonstrate disruptive behaviors and excessively externalize emotions may not have a diagnosis and therefore may not receive the supports that they need to successfully engage with and be accepted by their peers (Alavi et al., 2018; Taylor & Kuo, 2011). Children that experience challenging behavior and sensory modulation difficulties may have difficulties playing yet may also especially benefit from engaging successfully in play, so it is essential that these opportunities are bolstered and facilitated (Alavi et al., 2018; Dean et al., 2018; O'Donnell et al., 2012; Taylor & Kuo, 2011).

One way to facilitate play is by utilizing the outdoor environment (Fjørtoft, 2001; Flannigan & Dietze, 2017; Ridgers et al., 2012; Sterman, 2020). Spending time outside, which children are doing significantly less of over time (Larson et al., 2011), has been shown to improve physical health, mental health, and the overall well-being of children (Amoly et al., 2015; Flannigan & Dietze, 2017; Markevych et al., 2014). Playing outside and simply being amongst nature also facilitates sensory integration through exposure to numerous and natural smells, sounds, and textures (Wells, 2000). Additionally, playing outside provides children with more opportunities for unstructured play, more opportunities for play with reasonable risks, and is naturally incentivizing in ways that indoor play spaces cannot replicate (Bento & Dias, 2017;

Flannigan & Dietze, 2017; Ridgers et al., 2012; Sterman, 2020). While all children benefit from spending time outside, children with sensory modulation difficulties and challenging behaviors may especially benefit from spending time in nature (Amoly et al., 2015; Sahoo & Senaptai, 2014; Taylor & Kuo, 2011). This is because, in part, the outdoors has been shown to restore attention and enable desired vigorous activity (Amoly et al., 2015; Berman et al., 2008; Sahoo & Senaptai, 2014; Taylor & Kuo, 2011).

One way that children in the United States access outdoor play spaces is through outdoor camps, often during the school breaks. Although the nature of camp programs varies greatly, camps generally provide opportunity for children to be physically active, spend time outside, engage in current and new interests, and socialize with peers (Clark & Nwokah, 2011; Uhls, 2014; Wahl-Alexander & Morehead, 2020; Walker et al., 2010). The chance for children to play outside and engage in these spaces with peers is becoming increasingly important as such play opportunities at home are reduced due to lack of green space or parents' safety concerns (Larson et al., 2011; Ridgers et al., 2012) and less opportunity to engage with peers outside during school, as recess is regularly cut or eliminated (Pellegrini & Bohn-Gettler, 2013). Outdoor camps provide rich, intense experiences for children but are predominantly for typically developing children without disabilities (Browne et al., 2019). There is also a multitude of camps that cater to children with specific disabilities or illnesses, such as cerebral palsy, cancer, and muscular dystrophy, but there are very limited inclusive camps for children with sensory modulation difficulties and challenging behavior (Clark & Nwokah, 2011).

In summary, existing research has expanded our understanding of play, playfulness, adaptability, sensory modulation and challenging behavior, outdoor play, and outdoor camps. The literature has begun to show why these topics are important when considering children and

their play, but there is very limited research tying all of these together. There is a gap in our knowledge regarding the benefits of participating in a camp that is not diagnosis specific and enables participation in typical camp activities. In addition, a gap in knowledge exists in explicitly connecting adaptability and playfulness. Finally, there is limited research focused on children with sensory modulation difficulties and challenging behavior rather than a specific diagnosis. Thus, in the current project, we sought to gain insight into changes in playfulness and adaptability as a result of participation in an intensive, outdoor camp for children with sensory modulation difficulties and challenging behavior.

CHAPTER 2: LITERATURE REVIEW

Introduction

As noted in the introduction, play is a crucial childhood occupation (Flannigan & Dietze, 2017; Lynch & Moore, 2016; Yogman et al., 2018), and playfulness is a feature of play that impacts a child's success and engagement in play (Fabrizi et al., 2016; Gordon, 2014; Kent et al., 2018; Wilkes et al., 2011). In this study, we have examined play and playfulness in children, supporting play and development through nature-based engagement, the benefit of outdoor camp experiences, and child adaptability. Each is reflected in this literature review. In conducting this review the following search terms were used: play, playful*, child*, school-aged, camp, summer camp, outdoor play, risky play, adapt*, sensory processing disorder, sensory integration, autism, ADHD, ASD, attention deficit, challenging behavior, adaptive behavior, outdoor play, natural play, loose parts play. I searched in these databases: CINAHL Complete, PsychInfo, Pubmed, and ERIC. In addition, I reviewed the reference lists of articles found through my database searches and used literature from those lists. In this chapter I present the summaries of the literature identified that guided this project.

Play

Describing play

One of the challenges when discussing play and its value is the lack of a concrete, universal definition (Eberle, 2014; Murray, 2018; Sutton-Smith, 1997, Yogman et al., 2018). Play can be independent, parallel, with a partner, or with a large group. Play can take on endlessly changing forms and occur in a bedroom, a forest, a grocery store, riding in a car, a field, and everywhere in between. Play can involve many props or no props at all. Players may giggle and squeal in exuberance or they may remain in the somber character of a determined

superhero. This vast uniqueness and flexibility of play is what makes it both wonderful and difficult to define (Eberle, 2014; Murray, 2018; Sutton-Smith, 1997, Yogman et al., 2018).

While a concrete definition of play is elusive, proposed definitions and descriptions of play have clear commonalities (Eberle, 2014; Murray, 2018; Sutton-Smith, 1997; Yogman et al. 2018). Researchers agree upon key elements of play, such as play being participated in for the sake of it. Play is seen as joyful, volitional, and engaging. Play is dynamic and brings new understanding of the child's world. Play is both vital to the development of a healthy child and undervalued by our society and systems (Eberle, 2014; Murray, 2018; Sahoo & Senapati, 2014; Sutton-Smith, 1997; Yogman et al. 2018). In the American Occupational Therapy Practice Framework: Domain and Process (4th ed.; AOTA, 2020), play is described as follows:

activities that are intrinsically motivated, internally controlled, and freely chosen and that may include suspension of reality e.g., fantasy (Skard & Bundy, 2008), exploration, humor, risk taking, contests, and celebrations (Eberle, 2014; Sutton-Smith, 2009). Play is a complex and multidimensional phenomenon that is shaped by sociocultural factors (Lynch et al., 2016) (p. 34).

The importance of play

Even in early research, Karl Groos (1901) appreciated the value of play. He argued that our drive to play is a result of natural selection and provides children the opportunity to practice skills that are essential for later survival. Groos stated that play was the “stuff of childhood” (1901). Bodrova et al., (2013), drawing from the work of Vygotsky (1962), suggested that play promotes social, emotional, and cognitive development in children. Modern literature and research support and expand upon these perspectives of play and its importance. In this paper I

will touch on only a few characteristics of play that reflect its importance for children's healthy development and the foundation that will affect the rest of their lives.

The importance of play across multiple areas of development has been established by numerous authors (Barnett, 1991; Bodrova et al., 2013; Milteer et al., 2012; Yogman et al., 2018). There is broad agreement around the importance of engaging in play to support social interactions, providing opportunities to exercise emerging empathy as well as practice role-taking, sharing, cooperation, and self-control (Barnett, 1991; Bodrova et al., 2013; Milteer et al., 2012; Yogman et al., 2018). Play facilitates cooperation and integration in social groups, fostering children's adjustment and inclusion. Additionally, play provides opportunities to develop moral judgement, social attributional skills, and conceptions of friendships (Barnett, 1991; Bodrova et al., 2013; Greve & Thomsen, 2016; Milteer et al., 2012; Yogman et al., 2018). Play promotes emotional skills through these opportunities, as well as by promoting management of anxiety and childhood trauma (Barnett, 1991; Milteer et al., 2012). Through pretend play, children can reenact sources of distress and change the outcomes of these events by practicing role reversal (Barnett, 1991; Milteer et al., 2012).

Play promotes the development of cognitive skills by providing children with opportunities to experience new situations, overcome challenges, and cooperate and negotiate with others (Barnett, 1991; Bento & Dias, 2017; Milteer et al., 2012; Yogman et al., 2018). These experiences hone problem-solving skills, fostering divergent thinking and a flexible approach to the environment (Barnett, 1991; Bento & Dias, 2017; Milteer et al., 2012; Yogman et al., 2018). Divergent thinking is open-ended, focusing on connections between ideas and the multiple possibilities stemming from ideas that span out like a web. A flexible approach to the

environment means that a child is able to consider different approaches and outcomes. These cognitive skills that are promoted through play are all vital elements in adaptability.

Playfulness and Adaptability

Playfulness

Playfulness is one internal factor that is both predictive of how likely a child is to engage in play and is increased through play (Fabrizi et al., 2016; Gordon, 2014; Kent et al., 2018; Wilkes et al., 2011). Playfulness is defined as the predisposition and attitude that children bring to play situations (Barnett, 1991; Bundy, 2001). Skard and Bundy (2008) identified four widely agreed upon elements of playfulness: framing, intrinsic motivation, internal control, and freedom to suspend reality. Framing is the ability to give and read social cues, both verbal and nonverbal, indicating how others should act towards the player. Intrinsic motivation means that the player is engaging in play for the sake of play and the enjoyment that it brings rather than for an external reward. Internal control refers to the control the player has in deciding their actions and some aspects of the direction of play. Freedom to suspend reality is the ability of the player to choose how closely the transaction of play resembles objective reality, or imagination.

Children's playfulness can be determined by their capacities with these four elements (Skard & Bundy, 2008). Early work by Barnett (1991) established that playfulness is an internal construct that can be measured through evaluating the underlying components of playfulness. In reference to the Children's Playfulness Scale, Barnett identified similar items that comprise a playful personality: physical spontaneity, social spontaneity, cognitive spontaneity, manifest joy, and sense of humor (Barnett, 1991). Barnett affirmed that playfulness impacts engagement in play, which she attested is essential for healthy childhood development (Barnett, 1990; Barnett, 1991). Over the years, playfulness has not received the same level of attention as play, despite

that it is considered an important element of play. Playfulness captures creativity, flexibility, affect, motivation, persistence, social interactions, and imagination (Bundy, 2001), which have all been shown to predict success in play and success in engaging other children in play (Fabrizi et al., 2016; Román-Oyola et al., 2018).

Adaptability

Adaptability is another intrinsic factor that reflects a child's ability to engage in play, as well as generally with the world around them (Greve & Thomsen, 2016; Hewes, 2014; Nijhof et al., 2018; Saunders et al., 1998; Shen et al., 2017; Yogman et al., 2018). The definition of adaptability is nearly as inconsistent as that of play but is described as the ability to functionally respond and adjust to changes in the environment (Bjorklund, 2015; Reynolds & Kamphaus, 2015; Saunders et al., 1998; Shen et al., 2017). Considering this description, adaptability includes, and is sometimes used interchangeably with creativity, cognitive flexibility, coping, and problem-solving skills, including divergent thinking (Greve & Thomsen, 2016; Nijhof et al., 2018; Saunders et al., 1998; Yogman et al., 2018). Play can promote adaptability (Sandseter, 2009; Shen et al., 2017), and research suggests a strong link between playfulness and adaptability (Bateson, 2014; Saunders et al., 1998).

It is not surprising then that Price et al. (2018) found the tool researchers are using to measure adaptability often defines it. As described by the authors of the tool used in the current study, adaptability is the ability to adapt readily to environmental changes, including changes in routine, shifting from one task to another, and sharing with peers (Reynolds & Kamphaus, 2015). Adaptability correlates with positive emotionality and self-regulation (Reynolds & Kamphaus, 2015). Also considered in measuring adaptive skills are functional communication, social skills, leadership, and activities of daily living (Reynolds & Kamphaus, 2015). Measuring adaptability

captures information of functional adjustment to everyday life and can be an indicator of child outcomes, particularly if they experience sensory and behavioral challenges (Lopata et al., 2013; Pugliese et al., 2016).

Sensory Modulation Difficulties and Challenging Behavior

Sensory modulation is a component of sensory integration and processing and is, most simply put, the ability of the brain to filter sensations and attend only to what is relevant, maintaining attention to a task and optimal arousal levels (Lane, 2020). Children with sensory integration dysfunction may have dyspraxia, poor sensory modulation, or both (Bundy & Lane, 2020). Praxis is described as the neurological process that directs the cognition of motor planning; dyspraxia is described as motor planning deficits that are developmental (Cermak & May-Benson, 2020). The focus in the current study was on sensory modulation. Sensory modulation disorders are prevalent in children diagnosed with attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) but are also found in children with other diagnoses and in children with no additional diagnosis (Lane, 2020). Sensory integration is defined by Ayres (1972) as “the neurological process that organizes sensation from one own’s body and from the environment and makes it possible to use the body effectively within the environment” (p. 11). Although not precisely the same, the term sensory integration is often used interchangeably with sensory processing. The focus of this section is on research that has included assessments that are specific to modulation, whether investigators used the term modulation or a related term, such as sensory integration or sensory processing.

Sensory modulation difficulties are increasingly identified in children and have many implications for their daily functioning and occupational engagement (Corbett et al., 2009). An evidence-based literature review conducted by Koenig and Rudney (2010) revealed indications

that children and adolescents that experience difficulties processing and integrating sensory input also display occupational performance deficits in social participation, instrumental activities of daily living, activities of daily living, school, and play. A delayed level of play is associated with children that experience sensory processing difficulties compared with peers. Watts et al. (2014) and Bundy et al. (2007) found that sensory modulation difficulties appeared to have a more direct effect on playfulness than did poor praxis.

Children with ADHD commonly have sensory integration deficits that negatively impact their arousal level, self-organization and self-regulation, and often experience impaired quality of life related to their physical, psychological, and social functioning (Corbett et al., 2009; Cordier et al., 2010; Miller et al., 2012; Sahoo & Senapati, 2014; Taylor & Kuo, 2011; Wilkes et al., 2011; Yochman et al., 2013). Numerous researchers have found the play of children with ADHD to be substantially impacted, which can affect those children's healthy social, emotional, and cognitive development (Cordier et al., 2010; Miller et al., 2012; Sahoo & Senapati, 2014; Taylor & Kuo, 2011; Wilkes et al., 2011; Yochman et al., 2013).

Children with ASD have also shown similar challenges with sensory integration, which can impact their ability to participate in their daily activities and meaningful occupations (Adamson et al., 2006; Muys et al., 2006; Román-Oyola et al., 2018). Children with ASD are characterized by some investigators as showing less flexibility and adaptability than their peers, which impacts their ability to adjust to changes in their environment (Kent et al., 2018; O'Donnell et al., 2012; Pugliese et al., 2015). These difficulties that may be experienced by children with ASD can negatively impact their ability to engage successfully in play, especially with peers (Kent et al., 2018; Muys et al., 2006; Román-Oyola et al., 2018).

In summary, children with sensory modulation difficulties and challenging behavior experience an impact to their engagement and participation in daily activities and occupations, such as play (Corbett et al., 2009; Koenig & Rudney, 2010). There is a high prevalence of comorbidity between sensory processing difficulties and behavioral problems in children (Gourney et al., 2012). Children with these difficulties may have a sensory diagnosis, a behavioral diagnosis, or a lack of a diagnosis. Often, children diagnosed with ASD and/or ADHD experience sensory modulation difficulties and challenging behavior and experience negative impacts to their successful play participation (Adamson et al., 2006; Cordier et al., 2010; Miller et al., 2012; Muys et al., 2006; Román-Oyola et al., 2018; Sahoo & Senapati, 2014; Taylor & Kuo, 2011; Wilkes et al., 2011; Yochman et al., 2013). Addressing the complex interplay of sensory modulation differences and behavioral challenges supports the need for a richer understanding of these differences in children and how occupational engagement and participation can be promoted.

Challenging behavior

There is evidence that play-based intervention may be beneficial for children with sensory modulation difficulties and challenging behavior, including children with ASD or ADHD (Barnes, 2017; Bundy et al., 2007; Kent et al., 2018). The strong positive correlation found between playfulness and sensory modulation supports play-based intervention (Bundy et al., 2007). Children with ADHD often have difficulty engaging in social play but have shown increased empathy and social skills following play-based interventions (Cordier et al., 2009a; Cordier et al., 2010b; Wilkes, 2011). Sahoo and Senapati (2014) found that sensory-based intervention (sensory diets) along with outdoor play can benefit children with ADHD by improving their functional behavior and self-perception, resulting in improved quality of life.

There is also evidence that utilizing sensory integration interventions for children with ASD results in significant progress towards individualized goals and a reduction of autistic mannerisms (Pfeiffer et al., 2011; Schaaf et al., 2013). Playing and spending time outside in natural, green spaces has been shown to improve the well-being of children with and without these diagnoses (Amoly et al., 2015; Hanscom, 2016; Taylor & Kuo, 2011). Outdoor play opportunities provide gently intriguing and balanced sensory experiences for children that can improve emotional regulation and attention, as well as mitigate behavioral outbursts, and anxiety (Hanscom, 2016).

Children that experience sensory modulation difficulties, including children with ADHD or ASD, may also produce inappropriate behaviors that do not meet the demand or expectation of the environment (Bundy & Lane, 2020; Koenig & Rudney, 2010). In addition, this challenging behavior can impact a child's ability to play, engage with and be accepted by peers, and participate successfully in daily occupations (Bundy & Lane, 2020; Koenig & Rudney, 2010). Considering the negative implications of these challenges and the increasing prevalence of their identification, interventions addressing these concerns are vital to these children's healthy development and adult competency. Beyond medication, interventions utilizing play and the outdoors have been shown to be promising in decreasing behavioral symptoms and promoting participation (Amoly et al., 2014; Berman et al., 2008; Dorsch et al., 2016; Hanscom, 2016; Sahoo & Senapati, 2014).

Outdoor Play

The out-of-doors provides children with a naturally rich environment that promotes play and learning (Fjørtoft, 2001; Flannigan & Dietze, 2017; Hanscom, 2016; Ridgers et al., 2012). Outside play is positively correlated with increased balance and coordination, better immunity,

and improved social skills (Bento & Dias, 2017; Hanscom, 2016; Fjørtoft, 2001). The outside environment is intriguing and promotes creativity and connectedness to nature (Bento & Dias, 2017; Hanscom, 2016; Flannigan & Dietze, 2017). The out of doors, which can range from forests to urban green spaces and everything in between, have been shown to promote physical activity and health benefits in children, protect against adverse mental health outcomes, and improve attention-direction abilities (Amoly et al., 2014; Berman et al., 2008; James et al., 2015; Hanscom, 2016; Markevych et al., 2014). Due to the nature of play in the out of doors environment, risky play is often a component, and is described as exciting and challenging play that is child directed and has chance of failure or injury (Sandseter, 2009; Brussoni et al., 2015). Risky, out of doors play has demonstrated positive impacts on health, as well as improved social competencies, creativity, and resilience (Sandseter, 2009.)

One reason behind these additional benefits of experiences in the natural environment is that children enjoy playing outside, which is a vital component of engaging play (Fjørtoft, 2001; Ridgers et al., 2012). The natural environment promotes creativity and captures the attention of children in ways that the indoor environment cannot (Bento & Dias, 2017; Fjørtoft, 2001). Adding loose parts, which are natural or synthetic materials with no specific directions or defined purpose, to the outdoor environment may enhance the play experiences of children (Bundy et al., 2017; Flannigan & Dietze, 2017; Hanscom, 2016). Children may be more motivated to express themselves, use unfamiliar objects, take risks, and have new experiences through loose parts and outdoor play, which is all beneficial to language development, balance and coordination, and social skills (Bundy et al., 2017; Flannigan & Dietze, 2017; Hanscom, 2016).

Additionally, there is evidence that even simply being more proximal to urban green spaces and viewing pictures of green spaces can be beneficial for children's mental health, attention, and overall well-being (Amoly et al., 2014; Berman et al., 2008; Markevych et al., 2014). Dorsch et al. (2016) found that children with natural items in the home had improved attention and better overall well-being than those without. These findings strengthen evidence of the power of nature and the positive impact that it can have on children, even when vast outdoor spaces are not readily available or accessible.

While all children benefit from time outside, children with sensory modulation difficulties and challenging behavior may especially benefit from the outside. Access to outdoor spaces and spending time outside has been shown to restore attention and reduce hyperactivity (Amoly et al., 2014; Berman et al., 2008; Dorsch et al., 2016; Sahoo & Senapati, 2014). This is because nature is filled with interesting stimuli that modestly grabs attention, allowing direction attention abilities to replenish (Berman et al., 2008) and physical activity may decrease challenging behavior (Ussher et al., 2007). Despite the growing body of evidence that supports the breadth of health benefits of outdoor play, children are currently playing outside less than they ever have before (Larson et al., 2011).

Outdoor camp

One way that children are able to engage in outdoor play opportunities is through outdoor camps. These vary greatly in the experiences that they offer, but generally provide opportunities for increased physical activity, peer interaction, time outside, and the chance to explore new or current interests (Clark & Nwokah, 2011; Uhls, 2014; Wahl-Alexander & Morehead, 2020; Walker et al., 2010). Despite the prevalence of outdoor camps and the positive impact they may have on children, camp participants are predominantly typically developing children without

disabilities (Browne et al., 2019). There are camps that cater to particular illnesses or disabilities, such as cancer, cerebral palsy, and muscular dystrophy, but because these camps are diagnosis specific, they are not available to children with other concerns (Clark & Nwokah, 2011). Furthermore, there are few camps that provide supports that enable participation for children with sensory modulation and challenging behavior (Clark & Nwokah, 2011).

Camps designed to include therapeutic supports have shown many benefits for campers and their families. A supportive, outdoor recreation opportunity for youth and adults with disabilities showed improvements for participants in overcoming social barriers, destigmatization, fostering friendships, enhancing quality of life, and increasing confidence and skills (Dorsch et al., 2016). Preteen participants of only a 5-day outdoor camp that did not allow electronics showed significant improvements in their ability to recognize nonverbal emotional cues compared with preteens that maintained media use (Uhls, 2014). Children with sensory modulation disorders that participated in sensory interventions and therapeutic horseback riding showed improved competency and satisfaction in occupational performance of their daily activities (Candler, 2003). Similarly, children with ASD that participated in sensory interventions within the contexts of summer therapeutic activities programs showed significant progress towards individualized goals, and a decrease in autistic mannerisms (Pfeiffer et al., 2011). Furthermore, research has shown that supported camp experiences can improve the social skills of children with ASD and ADHD (Hantson et al., 2012; Walker et al., 2010). Participation in a 2-week summer day program for children with ADHD that focused on building social skills showed improved peer relationships in those children (Hantson et al., 2012). Children with ASD that attended a 4-week summer camp, which focused on promoting social skills and peer

interaction through sensory-motor and language-based play, showed improvements in verbal communication, social interaction, attention to task, and transition (Walker et al., 2010).

Clearly, children with or without various disorders experience diverse benefits from an assortment of summer camp experiences, but there are few outdoor camps that explicitly support the needs of children with sensory modulation difficulties and challenging behavior (Candler, 2003; Clark & Nwokah, 2001; Dorsch et al., 2016; Pfeiffer et al., 2011; Uhls, 2014; Walker et al., 2010). Participation in outdoor camps may be especially beneficial for children with sensory modulation difficulties and challenging behavior because these experiences provide the opportunity to spend time outside, engage in physical activity, build social connections, and foster a sense of competence (Candler, 2003; Clark & Nwokah, 2001; Dorsch et al., 2016; Pfeiffer et al., 2011; Uhls, 2014; Walker et al., 2010).

Conclusion

In summary, it is well established that play and playfulness contribute to the health and well-being of children (Barnett, 1990; Bundy, 2001; Eberle, 2014; Flannigan & Dietze, 2017; Lynch & Moore, 2016; Murray, 2018; Sutton-Smith, 1997; Yogman et al., 2018.) However, children with sensory modulation difficulties and challenging behavior may experience difficulty in engaging successfully in play and tend to display less playfulness and adaptability than their typical peers (Bundy et al., 2007; Bundy & Lane, 2020; Lane, 2020; Watts et al., 2014). These intrinsic factors have a reciprocal relationship with play as they are vital to engaging in play and have also been shown to improve as a result of play (Barnett, 1991; Bundy, 2001; Bento & Dias, 2017; Greve & Thomsen, 2016; Hewes, 2014; Saunders et al., 1998; Yogman et al., 2018). One way to promote play in children experiencing these difficulties may be by utilizing the outdoor environment, which has shown to be incentivizing and have additional benefits (Amoly et al.,

2015; Fjørtoft, 2001; Flannigan & Dietze, 2017; Markevych et al., 2014; Ridgers et al., 2012).

While children are experiencing less time outside than in the past, outdoor play opportunities can be provided through outdoor camps (Clark & Nwokah, 2011; Larson et al., 2011; Pellegrini & Bohn-Gettler, 2013; Ridgers et al., 2012; Uhls, 2014; Wahl-Alexander & Morehead, 2020; Walker et al., 2010). These programs are common in the United States but are primarily for typically developing children without disabilities or are therapeutic camps for children with specific medical conditions and diagnoses (Browne et al., 2019; Clark & Nwokah, 2011). There is promising evidence, however, that children experiencing sensory modulation difficulties and challenging behavior may experience an array of benefits from participating in typical outdoor camps that provide necessary supports to facilitate engagement (Candler, 2003; Clark & Nwokah, 2001; Dorsch et al., 2016; Pfeiffer et al., 2011; Uhls, 2014; Walker et al., 2010).

Identifying the Knowledge Gap

While research has provided some promising insight into these areas, more research is needed to strengthen these relations and evidence. There is little known about the benefits to children with sensory modulation disorders and challenging behaviors of participating in a typical outdoor camp with therapeutic supports. A gap in knowledge also exists in explicitly connecting adaptability and playfulness. Finally, further insight is needed on how an intensive camp experience can impact playfulness. In this research study, we investigated changes in playfulness before and at the end of camp and look at the relationship between playfulness and adaptability. The following research questions were addressed:

1. How does participation in Camp Jabiru impact playfulness of children with sensory modulation difficulties and challenging behavior?
2. What is the relationship between playfulness and adaptability pre- camp and post- camp?

CHAPTER 3: METHODS

My research questions that drove this study: 1. How does participation in Camp Jabiru impact playfulness of children with sensory modulation difficulties and challenging behavior? 2. What is the relationship between playfulness and adaptability pre- camp and post- camp?

Institutional Review Board/Ethics Committee

Ethical approval for this study was obtained from the Human Research Ethics Committee at the University of Newcastle, Australia, #H-2018-0438. Researchers obtained parental consent and child assent from all participants prior to enrolling them in the study. All families enrolled in overnight camp were invited to participate in this study

Research Design

This study used a one group, pre-test and post-test, quasi-experimental design. This is a retrospective study, based on data collected before and after Camp Jabiru, held in April 2019. We examined data on the playfulness of participants before and after camp. We looked at the relationship between playfulness and adaptability pre- camp and post- camp.

Participants

Campers included in this study were 37 children, 11 girls and 26 boys, ranging from 8-12 years of age (Table 1). Data on IQ was not specifically gathered. The Behavior Rating Inventory of Executive Function (BRIEF; Roth et al., 2014) was completed by parents, and the Cognitive Regulation Index (CRI) reflects the ability of the child to control and manage cognitive process and engage in problem solving. The mean CRI in our sample was 64.39+10.03, indicating a mild elevation over desired score, and some difficulty with self-regulation. All participants engaged in overnight camp at Camp Jabiru. Participants all had sensory modulation and behavioral concerns. In addition, they had a variety of diagnoses but were predominantly identified as

having autism spectrum disorder. One parent or guardian, typically the mother, established goals and completed assessments for each child, both before and after camp.

Table 1

Demographics of Camp Jabiru Participants

Primary Diagnosis	N	Age Range (Months)	Sex Ratio (M:F)
ADHD	2	101-140	1:1
ASD	29	104-155	22:7
SPD	2	123-134	0:2
Other	4	113-134	3:1

Camp Jabiru

Camp Jabiru, Australia, uses a model that combines a YMCA camp environment with embedded therapeutic supports, such that children with sensory modulation and behavioral difficulties can experience and fully participate in a typical camp environment. To support full child participation, Camp Jabiru has a staff to camper ratio of 1:1.5 and each camper has an individualized program. Staff consists of lead occupational therapists assigned to each cabin, occupational therapists serving as clinical support staff for the lead occupational therapists, and YMCA outdoor education staff. In addition, camp includes occupational therapy students and practicing occupational therapists attend camp as practicum students. The goal of camp is to provide children with a typical camp experience by embedding occupational therapy supports for successful engagement.

During the April 2019 camp session that was used for this study, master clinicians all had at least 28 years of experience in pediatric occupational therapy practice. There were eight lead occupational therapists (two per group) with an overall average of 6.63 years of experience in pediatric occupational therapy (range 2-10 years, $SD = 2.56$ years).

Camp Overview

Campers participate in activities typical of any YMCA camp experience, including morning and night activities of daily living and instrumental activities of daily living, such as brushing teeth and showering, eating all meals together in the dining hall, engaging in campfire activities, and participating in YMCA camp activities throughout the day. These include kayaking, canoeing, rock climbing, caving, giant swing, abseiling, games, high and low ropes courses, and a variety of cooperative activities, such as alpine rescue. Campers also have time for free play and down time.

Unique to Camp Jabiru is the integration of occupational therapy throughout the day to provide support for all camp activities, and the opportunity to engage in therapist planned activities, interspersed with camp activities throughout the day. These are created by the lead therapists and clinical support staff and can vary greatly in nature, but include activities such as tie-dye, slip-n-slide play, field games, crafts, etc. “Reverse garbage”, based on the construct of loose parts play, is a therapist designed activity in which campers also engage.

The occupational therapy supports provided at camp were individualized to each child and integrated throughout the day. Based on the overall camp intervention model, nightly planning sessions involving lead occupational therapists, practicum therapists and students worked with clinical support staff to identify each child’s strengths and needs, and developed individualized plans to support the child’s full participation throughout the camp day. Plans might include sensory-based strategies (i.e., use of specific soundtracks from the Therapeutic Listening® program) or modification or adaptation of the environment or activity. Capitalizing on these clinical reasoning sessions, occupational therapists could set the child up for successful

engagement proactively and have strategies prepared to promote sustained participation in a given camp activity.

Loose Parts Play

Loose parts are open-ended materials that children can manipulate, experiment, and interact with (Flannigan & Dietze, 2017; Gibson et al., 2017; Gull et al., 2019). These materials, which can be natural or synthetic, are provided to promote imaginative, creative, child-led play (Flannigan & Dietze, 2017; Gibson et al., 2017; Gull et al., 2019). Camp Jabiru's version of loose parts play, called reverse garbage, is modeled after the Sydney Playground Project (SPP) (Bundy et al., 2017). In SPP, loose parts materials were available during recess at school, offering children the opportunity to engage with materials without a defined purpose. Reverse garbage features materials such as barrels, tires, tubes, ropes, boxes, swim noodles, and a variety of other materials with no specific 'play' function. Reverse garbage takes place in a natural environment with surrounding trees and grass fields with an open, covered patio space. Rigorous studies of loose parts play are limited, but a systematic review by Gibson et al. (2017) showed that children engaged in more dynamic, creative play than without loose parts materials. Flannigan and Dietze (2017) illustrated how providing loose parts materials in a natural environment can provide a variety of play opportunities for children that promote social skills, risk taking, and gender inclusivity. Bundy and colleagues found this provision of loose parts in support of play to increase social skills and physical activity of the participating children (Bundy et al., 2017). For the purpose of the current study, engagement in reverse garbage was video recorded and scored for playfulness, using the Test of Playfulness (ToP) (Skard & Bundy, 2008).

Fidelity

A fidelity tool was developed to support adherence to the camp intervention model (Appendix A). An assessment of fidelity was completed daily by master clinicians and practicum therapists. Fidelity ratings of 80% adherence were considered acceptable. Average ratings of greater than 80% were achieved on most days, with slightly less than 80% recorded on the first day of camp.

Measures

The Test of Playfulness (ToP)

The ToP includes 28 features of playfulness, scored on subscales of extent, intensity, and/or skill, and rated using a 4-point Likert scale. Previous research using the ToP with children both with and without special needs found high interrater reliability for trained raters, evidenced by all raters and 96% of items fitting the Rasch measurement model. The ToP has strong content validity, as 93% of items fit the measurement model and accurately represent the facets of playfulness (Bundy et al., 2001). Adequate ($r = 0.46$) predictive validity and construct validity was found between the ToP and the Children's Playfulness Scale (CPS). The CPS was used for comparison as it has established adequate construct validity (Bundy et al., 2001). ToP data from 92% of participants, both typically developing and children with developmental delays and disorders, was in acceptable limits and showed adequate goodness of fit, indicating adequate content validity (Skard & Bundy, 2008).

The Behavior Assessment System for Children, Second Edition (BASC-2)

This study used the Parent Rating Scales (PRS) of the BASC-2 (Reynolds & Kamphus, 2004) to measure the adaptability of campers. The full BASC-2 assessment is used to monitor and better understand the behavioral and emotional status of children and adolescents. The PRS is one of five BASC-2 components and provides descriptive information on the adaptive and

challenging behaviors of a child in their home and school environments (Reynolds & Kamphus, 2004). The child version (ages 6-11) takes 10 to 20 minutes to complete and uses a 4-point scale ranging from “never” to “almost always” regarding the listed behaviors. For the purpose of this study, the adaptive skills composite scores were used. The adaptive composite is composed of five items: adaptability, social skills, leadership, study skills, and functional communication. Reynolds and Kamphus (2004) indicate that individual components, such as the adaptive skill domain, are reliable when used independently. The BASC-2 has been used with clinical and neurodiverse populations but was norm-referenced on neuromajority populations. Authors report that reliability of the adaptive skills composite of the BASC-2 is 95% for male, female, and combined for ages 8-11 of the general norm samples (p. 164). For ages 6-11, the reliability of the adaptive skills composite for males with ADHD is 93% and is 95% for females with ADHD (BASC-2, p. 165).

Procedures

All children enrolled in the study were video recorded during engagement in reverse garbage play on the first and fourth day of camp in April 2019. Play on the fifth day was not recorded because camp activities are altered on the final day as children prepare to leave and parents arrive. Playfulness was scored by two calibrated researchers using the ToP (Skard & Bundy, 2008). The same children were scored at both time points by the same rater and there was no designation of pre- or post- videos. Calibration consisted of each researcher being trained on the ToP through joint viewing and scoring of practice videos, individually scoring a series of training videos, and examining rater fit with ToP scoring standards.

Video recordings were used for scoring of campers’ playfulness per the ToP. While there are strengths and weaknesses to using videotapes for data extraction, videos are noted to be a

valid observational method which can increase ecological validity, allow for multiple viewing and re-viewing. This method is considered by some investigators to be less intrusive, decreasing the observer effect, and allowing researchers to capture simultaneous complex interactions, create a permanent and complete record, and enable self-evaluation and reflection (Asan & Montague, 2014). Pepler and Craig (1995) found that “remote audiovisual observations provide a unique opportunity to observe children’s interactions that generally occur beyond adults’ view” (p. 552) and increases external validity.

Parents or guardians of campers completed the BASC-2 PRS (Reynolds & Kamphus, 2004) two-three months before and two-three months after camp.

Data Analysis

To answer my first research question, we conducted a repeated-measures *t*-tests examining pre- and post- camp differences in the ToP ratings and BASC adaptive composite ratings. ToP and BASC-2 raw scores were used in our analyses (Table 1). To answer my second question, we examined the correlation between ToP scores and the adaptability scale before camp and the ToP scores and the adaptability scales after camp. Correlation was deemed significant at .05 (2-tailed). All data was analyzed using IBM SPSS Statistics (Version 26) predictive analytics software.

CHAPTER 4: RESULTS

Data was available for 33 children for the ToP. One outlier was removed for BASC analyses, and BASC-post scores were not available for one child. The mean scores of both the ToP and the BASC-adaptive composite showed an increase when examining ratings before and after participation in Camp Jabiru (Table 2).

Table 2

Descriptive Statistics of ToP and Adaptive Composite

Variable	N	Mean	SD	Change Scores
ToP pre-	33	41.73	10.99	
ToP post-	33	51.03	10.61	9.30±12.40
BASC-adapt comp pre-	36	37.75	8.98	
BASC-adapt comp post-	35	41.34	8.30	3.6±9.28

Note. Adapt comp pre-/post-= adaptive composite pre/post camp; ToP pre-/post-= Test of Playfulness pre-/post- camp

The change in ToP scores pre- to post-camp was statistically significant, $t(32)=4.31$, $p < .001$ (Appendix B). This resulted in a large effect size ($d = .86$) (Laerd Statistics, n.d.). The change between pre- and post- measures of the BASC adaptive composite was also significant, $t(34) = 2.21$, $p = .034$ (Appendix C). This resulted in $d = .42$ reflecting a small effect size (Laerd Statistics, n.d.).

A Spearman's rank-order correlation was run to assess the relationship between playfulness and adaptability pre- and post-camp. There was no significant correlation between

pre-camp scores on the ToP and BASC adaptive composite, $r_s(32) = -.03$, $p = .89$ (Appendix D).

There was a significant negative correlation between post-camp scores on the ToP and BASC adaptive composite, $r_s(31) = -.36$, $p = .04$ (Appendix E).

CHAPTER 5: DISCUSSION

The purpose of this study was to examine the impact of an intensive, five-day, outdoor camp intervention with embedded occupational therapy supports on the playfulness and adaptability of children with sensory modulation difficulties and challenging behavior. In just four days of participation in Camp Jabiru, the children in this study showed significantly increased playfulness. This suggests that, when the necessary supports are provided, children can demonstrate a greater expression of playfulness, which can promote successful engagement in the essential occupation of play. Adaptability increased over a longer period of time, so it is more difficult to link to the experiences in camp; this will need further research. The natural environment was a bonus, opening up many options for additional play opportunities and benefits.

As discussed previously, play is the primary occupation of childhood (Lynch & Moore, 2016). Children with sensory modulation difficulties and challenging behavior, however, have been shown to have difficulty engaging in play (Alavi et al., 2018; Dean et al., 2018; O'Donnell et al., 2012; Taylor & Kuo, 2011). This is unfortunate because engaging in play is essential for children's healthy cognitive, social-emotional, and physical development (Barnett, 1990; Eberle, 2014; Flannigan & Dietze, 2017; Lynch & Moore, 2016; Murray, 2018; Sahoo & Senapati, 2014; Sutton-Smith, 1997; Yogman et al., 2018). Playfulness is described as the predisposition and attitude that children bring to play situations (Barnett, 1991; Bundy, 2001) and was one construct of interest in this study. Characteristics that are encompassed by the construct of playfulness, and measured by the ToP, include being actively engaged, directing one's own play, transitioning, sharing, creativity and imaginative play, responding to others' cues and giving cues, and clowning or joking (Skard & Bundy, 2008). Playfulness is an intrinsic factor that can impact a

child's success in engaging in play (Fabrizi et al., 2016; Gordon, 2014; Kent et al., 2018; Román-Oyola et al., 2018; Wilkes et al., 2011).

The change noted in playfulness in the current study is likely due to a myriad of factors. We suggest that one of these is the play opportunities children had at camp, including myriad outdoor camp-related activities, child-led, loose parts, risky, unstructured and structured play, all with occupational therapy support. Similar findings are reflected in studies included in my literature review. The benefit of an out-of-doors environment in promoting play has been shown by Fjørtoft (2001), Flannigan & Dietze (2017) Hanscom (2016) and Ridgers et al. (2012), and camp participation increasing elements of playfulness, such as social skills, was demonstrated by (Hantson et al. (2012) and Walker et al. (2010). These outdoor opportunities can support better expression of playfulness over time (Cordier et al., 2009; Wilkes-Gillan et al., 2016). Children may experience additional benefits related to play, playfulness, and adaptability that includes loose parts (Bundy et al., 2008; Flannigan & Dietze, 2017; Gibson et al., 2017; Gull et al., 2019) and opportunities of risky play (Sandseter, 2009; Brussoni et al., 2015).

A second consideration relates to the Camp Jabiru model. Some investigators have found that occupational therapists leading and modeling play groups can be especially beneficial for children in promoting play and increasing playfulness over time (Fabrizi et al., 2016; Wilkes-Gillan et al., 2016). In looking more closely at these studies, it is notable that most take place over a period of week. In contrast, the Camp Jabiru model spans only five days, and provides intensive occupational therapy support continually throughout the day. There is no current literature specifically examining the intensity provided in camp-based programs in playfulness, but there are studies on intensive camp models that demonstrate positive changes in related behaviors. For instance, Hantson et al. (2012) provided a 2-week camp for children with ADHD

and demonstrated improved social skills and peer relationships. A study by Walker et al. (2010) showed that children with an ASD diagnosis showed improvements in verbal communication, social interaction, attention to task, and transition following a 4-week summer day camp that emphasized sensory-motor and language-based play.

A third factor that must be considered is that of emerging coping skills. Playfulness has been associated with coping in both preschoolers and adolescents (Hess & Bundy, 2003; Magnuson & Barnett, 2013). Change that we saw might reflect better coping across the week of camp, as children were guided by the embedded occupational therapy supports and became familiar with camp routines, connected or reconnected with their peers, challenged themselves to participate in camp activities, and developed friendships. The supported environment of Camp Jabiru could help participants be more able to demonstrate and express their innate playfulness, which is considered a state variable and inherent to each individual (Bundy et al., 2001; Gordon, 2014).

Previous research on therapeutic summer camps has shown myriad benefits for children including improved peer interactions, self-esteem, attention, and self-efficacy (Candler, 2003; Clark & Nwokah, 2001; Dorsch et al., 2016; Pfeiffer et al., 2011; Uhls, 2014; Walker et al., 2010). The evidence related to playing and spending time in natural spaces includes a breadth of social, emotional, cognitive, and physical benefits for children (Fjørtoft, 2001; Flannigan & Dietze, 2017; Hanscom, 2016; Ridgers et al., 2012). An increase in playfulness following participation in Camp Jabiru would cohere with this research.

Previous camp research, however, has not focused explicitly on the playfulness of campers. Since this embedded occupational therapy model may have been important to the increased playfulness of campers, future research is needed to determine if simply participating

in any summer camp would show similar findings. It is also possible that an increase in playfulness, such as what we saw in this study, may have emerged due to the campers' increased comfort with the camp environment, adults, and fellow campers as the week progressed. An initially lower score on the ToP could be due to the novelty of the camp environment on day one, which involves variations from a typical home environment that include sleeping in a cabin with multiple other campers, eating in a dining hall as a large group, and engaging in less typical activities, such as kayaking and zip lining, that could be anxiety-inducing. Changes in routine can be especially challenging for children with ASD, who make up a large portion of our campers (Factor et al., 2016). However, most overnight campers have participated in Camp Jabiru before, so they are familiar with many of the therapists, camp activities, and fellow campers, especially as cabins are organized by age. In addition, many campers attend therapy sessions at the same clinic and have some familiarity with lead therapists and clinical support staff. These factors likely would have mitigated at least some of the stress of the camp environment and decreased the likelihood of an uncharacteristically low ToP score on day one.

Adaptability, the other construct related to play and of interest in our study, is described as the ability to functionally respond and adjust to changes in the environment, including the social environment (Bjorklund, 2015; Reynolds & Kamphaus, 2015; Saunders et al., 1998; Shen et al., 2017). An increase in adaptability was seen across a period of four to six months, which was the timeframe that parents would have scored the BASC PRS before and after Camp Jabiru participation. While we cannot link this change specifically to camp participation, given this longer timeline, factors that could have attributed to this increase in adaptability are the high volume of play opportunities, particularly increased social, outdoor, loose parts, and risky play, which could all challenge and increase adaptive skills (Greve & Thomsen, 2016; Hewes, 2014;

Nijhof et al., 2018; Saunders et al., 1998; Shen et al., 2017; Yogman et al., 2018). Additionally, since the BASC framed and measured adaptability for this study, participation in activities of daily living, especially in the less familiar environment of camp, could also contribute to this increase in adaptability. Overall, the less familiar camp environment and activities would reasonably challenge and improve adaptability. Further research is needed to strengthen this link between camp participation and improved adaptability, but given the related research and the nature of Camp Jabiru, this increase would be logical.

The relationships that we found between adaptability and playfulness is challenging to explain. While we had anticipated finding a relationship between playfulness and adaptability, our data are perplexing. We did not find a significant relationship pre-camp and, although both adaptability and playfulness improved, we found a significant negative correlation post-camp. One reason for the lack of a pre-camp relationship could be that the ToP is based on actual observation of behavior in the moment, while the BASC reflects perception of behavior over time. For example, the ToP scores a child on how often and well they transition during the 15 minutes of observed play, whereas the BASC asks if a child *typically* recovers well after a setback. The ToP is scored based on the 15 observed minutes of play and the BASC is scored based on accumulated parent observations. The BASC is a parent report measure whereas the ToP is researcher scored. Researchers do not enter with the depth of knowing and understanding a child the way that their parents do, and child behavior can vary across contexts (De Los Reyes, 2009). However, parental depth of knowing and understanding their child has its downside. Parents, with a much more established image of the child and child behavior, could be resistant to change. It may require a longer period of time and more consistent behavior from the child to change parent ratings. This may explain the very small change in parent ratings before and after

camp. Additionally, researchers and parents may have different conceptualizations of adaptive or disruptive behaviors as described on the BASC, which could result in discrepancies (De Los Reyes, 2009).

Overall, while both play and adaptability increased, our analyses showed that they had very different trajectories of change. A potential explanation for this relationship is how adaptability was measured in our study. Since there is no universal definition of adaptive behavior, the assessment tools used to measure this construct also define this construct (Price et al., 2018; Lopata et al., 2013). The assessment tool that researchers use may create a narrow lens for viewing adaptability, which is a robust and complex construct (Price et al., 2018). Since the BASC measures adaptability based on its own manualized definition, including how the assessment is structured, scored, and interpreted, a different tool measuring adaptability may yield different results (Price et al., 2018; Lopata et al., 2013). Two potential alternative tools to measure adaptability are the Adaptive Behavior Assessment System, Third Edition (ABAS-3; Harrison & Oakland, 2015) and the Vineland Adaptive Behavior Scales, Third Edition (Vineland-3; Sparrow et al., 2016). The ABAS-3, while it can be used with any individual ages 0-89, is intended for evaluating less typical populations, including individuals with ASD and sensory impairments (Harrison & Oakland, 2015). The Vineland-3 includes a survey interview from, which uses semi-structured interview for comprehensive and domain specific information (Sparrow et al., 2016). In using any of these tools, it may also be helpful to collect data using the teacher report forms in addition to parent/caregiver forms, as changes may be more easily observed in environment with peers, which aligns more closely to the camp environment. Evidence has suggested a relationship between playfulness and adaptability, and both constructs significantly increased between pre- and post-camp. Measuring these constructs on a more

similar timeline, or using a different tool to assess adaptability, may have pointed to a different relation between playfulness and adaptability. Additional research is needed to better understand the nature of the relationship between these two constructs.

Limitations

As with all research, our study had its limitations. Videotaping was conducted using a fixed angle in an outdoor environment, at times making it challenging to record each child within the group. Researchers addressed this by only scoring children whose actions were in view for a total of 15 minutes. The benefit of the fixed angle camera was that its location was consistent, and it was therefore easy for the child to become accustomed to the camera. In addition, there was potential recall bias from asking parents to rate the behavior scales two months before and after camp. However, this timing ensured that there was a minimum of five weeks between the first and second ratings, decreasing the likelihood of recall bias. Finally, some participants had missing information and could not be part of the data analysis, which could result in an incomplete picture. These children could represent a more challenging group. However, researchers conducted analyses with and without outliers to attempt to address how the missing data could sway results and found similar results.

Conclusion and Implications for Future Research

The significant increase in playfulness and adaptability following participation in Camp Jabiru demonstrated the potential value of similar interventions for children with sensory modulation difficulties and challenging behavior. Our study has shown that children with these challenges can be playful in the outdoor, intensive, occupational therapy supported camp model. The improved behaviors related to playfulness demonstrated by children following participation in this model demonstrates that this vital occupation may be promoted not only through

traditional therapy or therapeutic camps, but in children's natural contexts. Occupational therapists seek to enable full participation of individuals at every age and ability level in their natural contexts. Camp Jabiru is designed to be the natural context of a typical camp. By showing a measurable increase in playfulness after only four days of camp participation, as well as an increase in adaptability within six months, our findings suggest that playfulness and adaptability are malleable constructs that could be improved through using a similar model of an outdoor camp with embedded occupational therapy supports.

This study helps to strengthen and connect components that other studies have focused on in isolation, such as the benefits of the natural environment, free play, loose parts play, or camp experiences. This has implications for any context of childhood, from homes to schools to anywhere providing occupational therapy. Parents, educators, and occupational therapists can advocate for and create more opportunities for all children to play, outside, particularly to play freely, outside, with loose parts. The demonstrated significant increase in playfulness and adaptability can also help support the importance for children with any impairment, disability, or delay, such as sensory modulation difficulties and challenging behavior, to have the opportunities and necessary supports to engage successfully in play.

Future research should include extending this study by using the test of playfulness 2-3 months prior to the start of camp to establish a longer baseline, as well as 2-3 months following the end of camp to determine if the observed increases in playfulness are maintained. Additionally, a comparison group of children that do not attend Camp Jabiru, but perhaps a typical YMCA camp so that the comparison group experiences the same YMCA staff and environment as the experimental group, could strengthen our findings of the impact of occupational, embedded therapeutic supports. A more in-depth characterization of children that

did or did not do well with this camp intervention could help create more individualization in meeting those children's needs. Further research with larger sample sizes will help strengthen these results and beget more generalizable findings.

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APPENDIX A



Group Number: _____ Date: April ____ 2019 Rater: _____

Camp Jabiru® Fidelity Tool - Group (Stackhouse, Hacker, Burke, Lane, 2019)

For the following elements, **rate what happened today** by circling your choice on the provided scale:

1. **a. The team utilized mindful clinical reasoning.**
 Strongly disagree Disagree Agree Strongly agree
1. **b. The team made adjustment(s) to the treatment plan based on mindful clinical reasoning through the SpliRiT® model and Jabiru team process.**
 Strongly disagree Disagree Agree Strongly agree
2. **The team provided relationship-based intervention.**
 Strongly disagree Disagree Agree Strongly agree
3. **The team provided access to meaningful activities.**
 Strongly disagree Disagree Agree Strongly agree
4. **The team provided opportunities that promoted a sense of playfulness.**
 Strongly disagree Disagree Agree Strongly agree

5. The team **provided** sensory-integration informed treatment including:
 - a. **Use/influence of individualized sensory-based input.**
 Strongly disagree Disagree Agree Strongly agree
 - b. **Activities/interactions that targeted foundations of S-A-M.**
 Strongly disagree Disagree Agree Strongly agree
 - c. **Activities/interactions that provided a JRC.**
 Strongly disagree Disagree Agree Strongly agree
 - d. **Activities/interactions that evinced an adaptive response.**
 Strongly disagree Disagree Agree Strongly agree
 - e. **Frequency, intensity, duration, and rhythmicity of sensation that was purposefully selected and targeted based on clinical reasoning.**
 Strongly disagree Disagree Agree Strongly agree
6. **The quality, timing, and consistency of intervention was “intensive.”**
 Strongly disagree Disagree Agree Strongly agree
7. **The intervention utilized the elements of the STEPSI.**
 Strongly disagree Disagree Agree Strongly agree

8. The social milieu was facilitated to foster belonging.
Strongly disagree Disagree Agree Strongly agree

9. The SplRiT© Model reflected the children's individual profiles.
Strongly disagree Disagree Agree Strongly agree

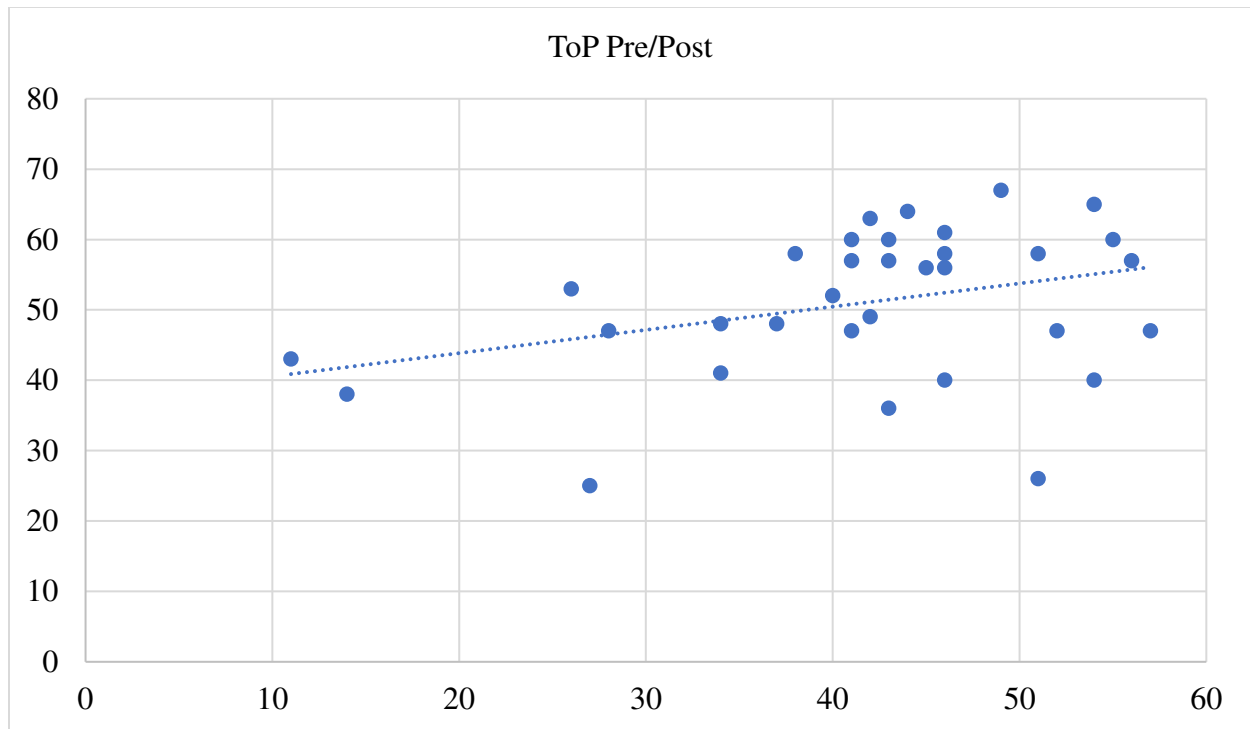
10. Activities/interactions were directed at/to campers goals.
Strongly disagree Disagree Agree Strongly agree

11. A daily, individualized intervention for each child and group was written and followed.
Strongly disagree Disagree Agree Strongly agree

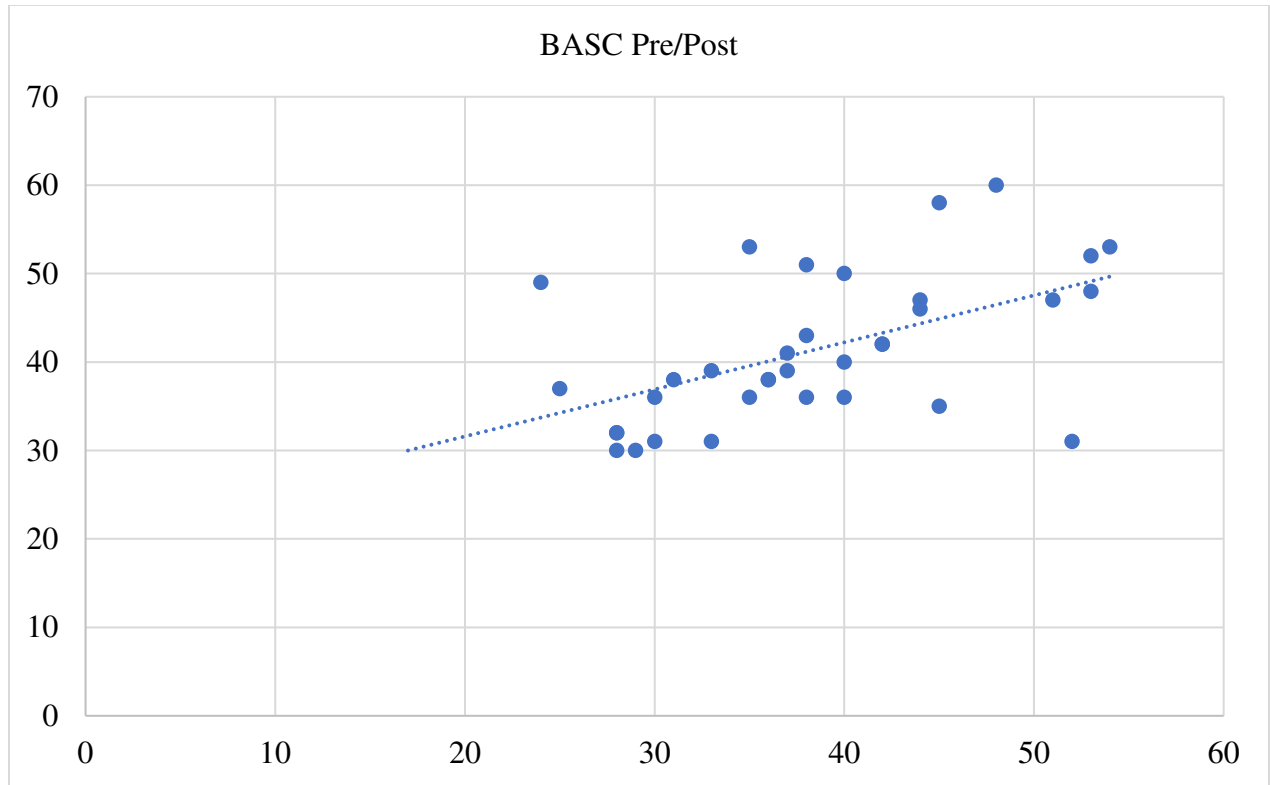
12. Overall, the camp experience/intervention was a good match for the children and their goals.
Strongly disagree Disagree Agree Strongly agree

If there were children (one or more) in the group that **did not seem to meet the fidelity standards** for the group (and you rated this on Q11) OR **if you answered "Disagree" or "Strongly Disagree"** to any elements above, describe the discrepancy here. Indicate what **actions** were/will be taken to correct this each day/across the week:

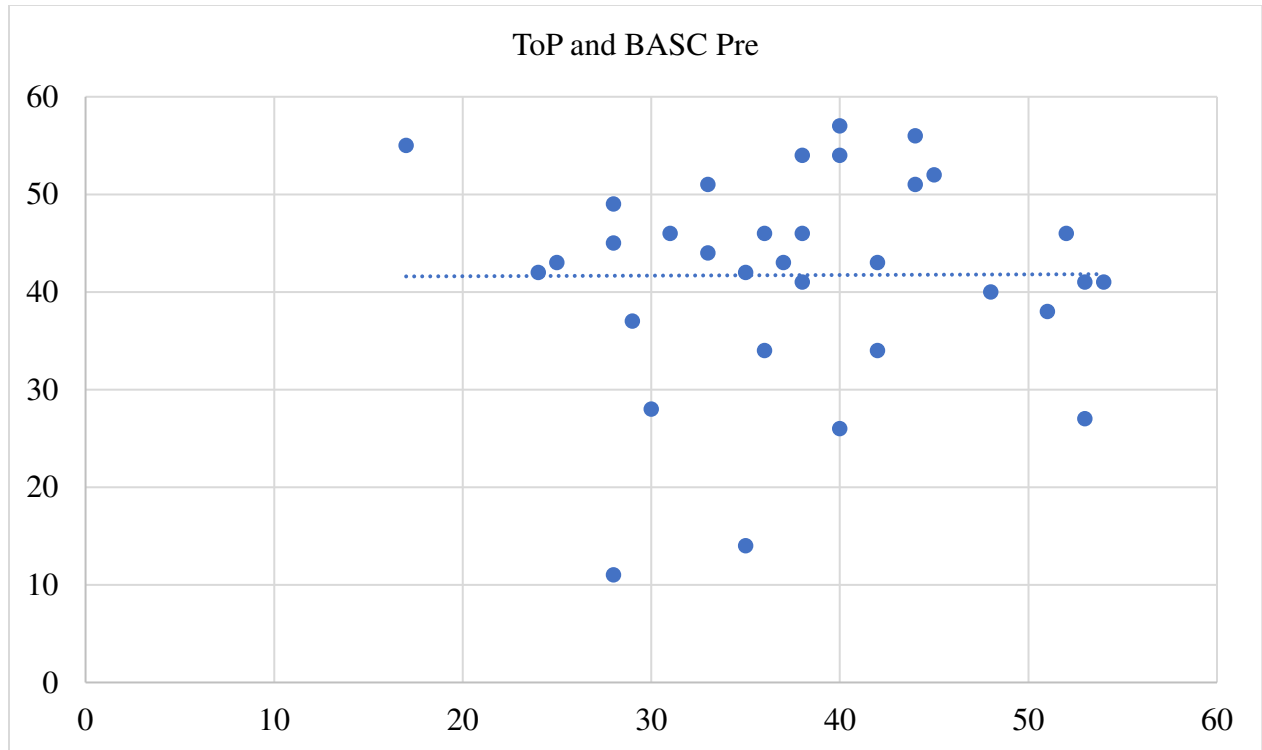
APPENDIX B



APPENDIX C



APPENDIX D



APPENDIX E

