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BEHAVIORAL INTERVENTION FOR EATING AND EXERCISE CHALLENGES IN CHILDREN WITH AUTISM SPECTRUM DISORDER

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EATING AND EXERCISE IN CHILDREN WITH ASD

BEHAVIORAL INTERVENTION FOR EATING AND EXERCISE CHALLENGES IN
CHILDREN WITH AUTISM SPECTRUM DISORDER

By

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EATING AND EXERCISE IN CHILDREN WITH ASD

Abstract

Autism Spectrum Disorder is a neurodevelopmental disability characterized by deficits in social-emotional reciprocity, deficits in nonverbal communicative behaviors relied on for social interactions, deficits in developing, maintaining, and understanding relationships, as well as restricted and repetitive patterns of interest and behavior, and sensitivity to certain sensory inputs. Individuals with Autism Spectrum Disorder are at an increased risk for multiple medical health concerns when compared to typically developing individuals, including overweight and obesity. Childhood obesity is a significant public health concern in the U.S. While many efforts have been made to prevent childhood obesity, few have been designed to align with the unique challenges faced by individuals on the autism spectrum. The present program development model includes combined weekly in-clinic therapy sessions and daily participation in online activities for parent(s) of autistic children as well as the child who is on the autism spectrum. Using the “5-2-1-0 Healthy Numbers for Kentucky Kids” initiative as a basis for behavior goals, the present program proposes implementation of interventions with empirical support for treating this population. Importantly, this intervention is meant to be applicable to children with autism across the nation, not only those residing in Kentucky. While the original initiative (5-2-1-0 Healthy Numbers for Kentucky Kids) on which this intervention is based was created for Kentucky children, childhood obesity is a national concern (Vorkoper, Artega, Berrigan, Bialy, Bremer, Cotton, & Anand, 2021).

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Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disability. Individuals with ASD demonstrate deficits in social and emotional reciprocity, repetitive, restricted, and stereotyped patterns of behavior and interests (American Psychiatric Association, 2013). Autism Spectrum Disorder can occur with a range of comorbidities such as epilepsy, sleep disorders, Attention Deficit Hyperactivity Disorder, intellectual disability, gastrointestinal disorders, anxiety, depression, motor disorders, anxiety, depression and feeding and eating challenges (Bauman, 2010). Selective eating is another challenging co-occurring problem experienced by many children on the autism spectrum (Tanner, Case-Smith, Nahikian-Nelms, Ratliff-Schaub, Spees, & Darragh, 2015). The restricted interests combined with social impairments and motor problems frequently present in children with autism spectrum disorder are thought to potentially decrease the opportunities for this population to engage in physical activity (Jones, Downing, Rinehart, Barnett, May, McGillivray, & Hinkley, 2017). Further, this combination of complications may put children with ASD at risk for engaging in more sedentary behavior than physical activity and thereby increase this population's risk of negative health outcomes such as obesity (Jones et al., 2017). The following case vignettes are provided to exemplify instances in which selective eating and challenging exercise habits (excessive engagement in sedentary behavior) co-occurred in children with autism spectrum disorder. Importantly, the following case vignettes have been de-identified for the purposes of this document:

Charlie is an eight year old male living in an urban area in the Mideastern region of the U.S. He has an existing diagnosis of autism spectrum disorder and presented with weight concerns as his weight falls within the overweight category. Charlie demonstrated a restricted interest in a television show character; "Mickey Mouse." He watched episodes of this television

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show repeatedly and engaged in tantrum behaviors when prompted to transition from this activity to other activities. Additionally, Charlie demonstrated selective eating. His mother reported that he would only eat two foods: chicken nuggets and goldfish crackers. When encouraged to eat other foods, Charlie would tightly close his mouth, move his head away from the food, and refuse to eat it. His mother's distress was apparent as she reported concerns for his weight gain which was apparently related to his selective eating and sedentary behavior.

Sven was a 5 year old male with a diagnosis of autism spectrum disorder. He presented with selective eating and challenging exercise habits. At the time of his intake, Sven reportedly only consumed smooth foods (e.g., milk, soft drinks, applesauce, yogurt) and one solid food: potato chips. Sven displayed a restricted and repetitive interest in staring at lights and watching his hands as he repetitively flapped them. When prompted to engage in activities involving more physical activity (e.g., walking, jumping jacks, playing tag with other siblings), Sven refused and/or engaged in tantrum behavior (e.g., kicking, screaming, crying) until allowed to resume watching lights or his hands as they flapped.

Autism Spectrum Disorder (ASD) is a neurodevelopmental disability. Individuals with ASD demonstrate deficits in social and emotional reciprocity. They often fail to learn or understand the social nuances that are naturally understood by most typically developing individuals. Further, individuals with autism demonstrate repetitive, restricted and stereotyped patterns of behavior and interests (American Psychiatric Association, 2013). Repetitive, restricted, and stereotyped behaviors represent a broad range of behaviors that are notable (e.g., rocking one's body repetitively, hand flapping, pacing, repetitive utterances and/or speech). The restricted interests present in Autism can vary greatly and are unique to the individual. Some examples of restricted interests may include trains, blocks, vacuum cleaners, historical figures,

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computers, animals, etc.. What is notable about restricted interests is the intensity of the interest demonstrated by the individual with autism. Frequently, individuals with autism struggle to engage in activities and/or conversations that are not centered around their particular restricted interest (Gunn, Delafield-Butt, 2016). These symptoms have the potential to interfere with an individual's ability to successfully participate in and gain from activities of daily life such as academics and social settings (Zhen-Huan, Quiao-Ling, Zhang-Yong, & Xiao-Zhen, 2016). Autism is considered a "spectrum" disorder because of the expansive variation in the severity of symptoms experienced by individuals with ASD. Individuals with ASD often require multiple forms of therapy such as behavioral therapy, occupational therapy, speech/language therapy, and/or physical therapy to target development of basic skills, to decrease problem behaviors, and/or to address their social skill concerns. Additionally, individuals with ASD are at greater risk for multiple medical health concerns (Trajkovski, 2019). Children and adults with autism have been found to have significantly increased rates of immune conditions, gastrointestinal and sleep disorders, dyslipidemia, hypertension, diabetes, and obesity (Croen, Zerbo, Qian, Massolo, Rich, Sidney, & Kripke, (2015).

Symptoms of ASD thought to contribute to physical health risks include social communication deficits, sensory aversions, restricted and stereotyped patterns of behavior and interests. According to researchers, significant differences between the amount of time spent engaging in moderate to vigorous physical activity and the amount of time spent in sedentary activity exists amongst children with ASD. Children with ASD, especially older children, spend more time engaging in sedentary activity than their typically developing peers (MacDonald, Esposito, & Ulrich, 2011). Research suggests that lower rates of social interaction with peers and adults may contribute to lower levels of physical activity in children on the autism spectrum

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(MacDonald, Esposito, & Ulrich, 2011). Further, the restricted and repetitive interests that are a core characteristic of ASD may prevent children from engaging in as much physical activity as their typically developing peers.

Clinical observations and empirical research demonstrate that food selectivity is a prominent concern in children with ASD (Cermack, Curtin, & Bandini, 2010). Food textures are a common matter discussed in food selectivity literature (Cermack, Curtin, & Bandini, 2010). It is thought that children with ASD may engage in selective eating as a result of the sensory sensitivity they experience. Some sensory qualities of foods may cause individuals with ASD to experience considerable discomfort, and this could prompt them to engage in food selectivity as a means of avoiding such discomfort. Sensory sensitivity has also been referred to as sensory defensiveness or sensory over-responsivity. Initially, sensory sensitivity was described as tactile defensiveness in some children with behavioral and learning challenges (Ayres, 1964). These children were described as having an over-reaction to certain touches such as a notable aversive response to tactile stimuli that most individuals would not be bothered by (e.g., pulling away from a hug or from being cuddled.) Researchers have suggested that sensitivity to tactile input could contribute to sensory eating challenges such as difficulty with textures of food seen in children with autism (Cermack, Curtin, & Bandini, 2010). In a survey of 100 parents of children with autism spectrum disorder, the majority of parents reported their child was a “picky eater” (Williams, Dalrymple, Neal, 2000). Authors reported that parents indicated factors influencing their child’s “picky eating” included texture, taste, smell, temperature, and appearance (Williams, Dalrymple, Neal, 2000).

The afore described concerns within individuals on the autism spectrum (selective eating and challenging exercise habits) were exemplified in the given case vignettes. Both children

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from the case vignettes entered a program based on the Kentucky 5-2-1-0 Initiative following their intake. Charlie's food selectivity decreased, and his physical activity increased following 9 weeks of intervention. Sven also experienced a decrease in food selectivity as well as an increase in engagement in non-sedentary behaviors. The program presented currently aims to assist children with autism whose wellbeing is at risk due to their selective eating and challenging physical activity habits.

Purpose

The objective of this doctoral project is to design an intervention program for children with Autism Spectrum Disorder who are or are at risk of becoming overweight, obese, and/or experiencing general health difficulties related to maladaptive eating and exercise behaviors. This program would consist of weekly individual therapy sessions with an emphasis on parent training, behavioral therapy techniques, and daily online homework for the child receiving the intervention, as well as their caregiver(s). Once developed, this program can be widely studied to understand its therapeutic effects. Further, this project aims to expand upon the efforts of the 5-2-1-0 Healthy Numbers for Kentucky Kids Initiative, which, as it stands, requires adaptations and additions to be effectively implemented with individuals and families of people on the autism spectrum. By combining empirically based behavioral therapy techniques and parent training strategies with the concepts of the 5-2-1-0 Healthy Numbers for Kentucky Kids Initiative, this project will aim to effectively improve the four simple health related behaviors outlined in the initiative within a specific population (children with ASD).

Statement of Significance

Research has demonstrated that children with ASD may have a higher incidence of obesity than children without a disability (Broder-Fingert, Brazauskas, Lindgren, Iannuzzi, & Van Cleave, 2014; Curtin et al., 2014; Shedlock et al., 2016). Further, children who are obese and on the autism spectrum may experience more severe daily life challenges as a result of obesity due to its negative effect on social motivation and motivation to be involved in structured physical activities (Zuckerman, Hill, Guion, Voltolina, & Fombonne, 2014). Considering the social deficits that are core characteristics of ASD, any additional negative impact on social skills and social involvement warrant concern for quality of life of this population. Moreover, parents of children with ASD express concerns regarding their child's eating habits at an increased rate when compared to parents of typically developing children (Bicer & Alsaffar, 2013; Williams, Dlarymple, & Neal, 2000). According to research, stress related to eating habits of a child with ASD can produce or increase stress within a household (Anderson, Mustin, Curtin, & Bandini, 2012; Rogers, Magill-Evans, & Rempel, 2012). Food selectivity has been found to occur in children with ASD at five times the rate in which it occurs with typically developing children (Sharp et al., 2013). This is an alarming rate considering the significant negative impacts selective eating can have on an individual's physical health. Numerous studies have found that nutritional deficits related to restricted dietary variation are more common in children with ASD than typically developing children (Dovey, Staples, Gibson, & Halford, 2008; Herndon, DiGuseppi, Johnson, Leiferman, & Reynolds, 2009; Lockner, Crowe, & Skipper, 2008). Moreover, researchers have found that children with ASD are less physically active than their peers who do not have disabilities (Trost et al., 2002; Pan, & Frey, 2006). The core symptoms of ASD including restricted/repetitive behaviors and/or interests as well as aversion to

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specific sensory inputs may place this population at an especial risk for developing health and psychological difficulties related to maladaptive eating behaviors (such as selective eating) and insufficient engagement in physically active behaviors. As the prevalence of ASD continues to rise, the impacts of selective eating and insufficient physical activity levels in children with ASD warrants further research and intervention development. Research should seek to better understand those interventions that will result in positive change of maladaptive eating and exercise behaviors displayed by children with ASD.

Section II: Literature Review

Methods for Literature Review Search

The literature review search was conducted primarily through the Eastern Kentucky University library website “EKU Libraries” in order to understand the previous research that has been conducted on selective eating behaviors, physical activity levels, and obesity rates in children Autism Spectrum Disorder. The search was initially broadened to include all physical health concerns that have been associated with Autism Spectrum Disorder, including epilepsy and sleep disorders. The search was then narrowed to include instances of physical health concerns present in ASD related to their eating and physical activity habits. The search also included psychological interventions used to treat behavioral concerns among children with ASD. There were several specific databases found useful in locating journal and articles related to these topics. PsychINFO, JSTOR, and ERIC were the primary databases used to search for journals and articles for this project. Key words that were explored included Autism, Autism Spectrum Disorder, Physical Health, Obesity, Childhood Obesity, Developmental Disabilities, Sedentary Behavior, Applied Behavior Analysis, behavioral intervention, selective eating, picky eating, nutrition and selective eating, parent training, parent management training, and parenting

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skills. Some of the journals that were utilized include *Autism*, *Journal of the Academy of Nutrition and Dietetics*, *Journal of Pediatrics*, *Research in Developmental Disabilities*, *Journal of Autism and Developmental Disorders*, *Harvard Review of Psychiatry*, *Journal of Developmental and Behavioral Pediatrics*, and *American Journal of Occupational Therapy*, *Journal of Developmental and Physical Disabilities*, *International Journal of Obesity*, *Hong Kong Journal of Occupational Therapy*, and *American Journal of Occupational Therapy*.

Research discussing the utility of behavior interventions for adults with Autism Spectrum Disorder was not included in the literature review. There are multiple reasons for limiting the age range for the program proposed within this project. First, early intervention is empirically supported as having positive effects on development of children with ASD. Second, considering the parenting training aspect of the program, it was determined that the program proposed would better align with the needs of parents of young children who have ASD. For these reasons, this specific program development focuses on children and adolescents ranging in age from 5 – 18 years. There are also multiple reasons to justify the time requirements of this program. Researchers found that a higher amount of treatment hours and younger age predicted more significant gains in the amount of therapy goals achieved among a sample of children with ASD receiving Applied Behavior Analysis intervention (Linstead, Dixon, Hong, Burns, French, Novack, & Granpeesheh, 2017.) Additionally, research has demonstrated that a higher treatment intensity (meaning more than 36 hours of ABA treatment per week) predicted IQ gains and adaptive skills gains in children with ASD. Studies have also found that longer treatment duration and higher treatment intensity have positive impacts on language skills, adaptive behavior, and intellectual functioning in children with ASD (Virues-Ortega, 2010). It is for these

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reasons that the program being proposed involves once weekly in-person therapy sessions as well as daily online homework for both the parent and the child.

Childhood Obesity in ASD

Childhood obesity is a significant health concern within the U.S. The prevalence of this health problem is continuing to rise. According to the Centers for Disease Control and Prevention, the prevalence of obesity among U.S. youth was 18.5% between the years of 2015 and 2016 (CDC, 2017). Further, data from the National Health & Nutrition Examination Survey (NHANES) indicate that approximately one third of children between the ages of 2-19 years are overweight or obese (Ogden, Carroll, & Flegal, 2012). Evidence from multiple studies demonstrate that children with ASD have a prevalence of obesity that is at least as high as that seen in typically developing children. Despite the important attempts at understanding and intervening with obesity in the typically developing pediatric population, there is a relative dearth of research focusing on treating obesity or overweight in children with ASD. As the prevalence of both ASD and childhood obesity rise, it is important to recognize the potential secondary risks of childhood obesity in the ASD population as a significant public health concern. Obese children generally remain obese as adults, and additional weight significantly increases risk level for chronic diseases such as cardiovascular disease, diabetes, and certain cancers (Curtin, Jojic, & Bandini, 2014). Consistency is suspected amongst risk factors linked to childhood obesity within typically developing and autistic children. However, individuals on the autism spectrum experience a variety of unique challenges that may also lead them to having higher susceptibility to typical risk factors. Additionally, they may be more susceptible to risk

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factors not shared by children in the general population. Atypical eating patterns, problem behaviors involving eating and meal time, restricted interests, and challenges with engaging in physical activity may be associated with the development of obesity in children with ASD.

Existing Initiative for Improving Childhood Obesity

Kentucky's Obesity Prevention Program began an initiative called "5-2-1-0 Healthy Numbers for Kentucky Kids" aimed at educating Kentucky families about four simple behaviors that could be incorporated into the daily lives of children to encourage healthy habits (Partnership for a Fit Kentucky, 2020). These four behaviors include the following:

- 5 – Eating five or more fruits and vegetables every day
- 2 – Spending less than two hours engaging in screen time
- 1 – Engage in 1 or more hours of physical activity every day
- 0 – Drink zero sugary drinks per day

This initiative occurred as a result of efforts to decrease Kentucky's rates of childhood obesity. Education about these four simple behaviors was printed on to posters and made available in healthcare clinics around the state. Healthcare providers were encouraged to educate parents and families about these four simple, healthy behaviors. This initiative also addressed steps parents could take to increase the likelihood of their children engaging in the four identified healthy behaviors. For example, making fruits and vegetables available within the home, creating spaces supportive of physical activity within the home, scheduling time for physical activity in to each day, and modeling drinking water rather than sugary drinks. According to Rogers & Motyka, (2009) implementation of the 5-2-1-0 Healthy Numbers for Kentucky Kids within multiple schools resulted in increased parent and teacher awareness of healthy behaviors that could be

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easily added to their child's/students' daily routine to prevent childhood obesity. Further, 33% of parents of students in the schools in which the program was implemented indicated that they made healthy changes related to physical activity based and eating behaviors for their children as a result of implementation of this program.

Selective Eating and ASD

Selective eating is described as the rejection of a vast range of both unfamiliar and familiar foods based on an individual's aversions to the sensory characteristics of those foods (Zickgraf, Richard, Zucker, & Wallace, 2020). This problem is common within individuals who have ASD. Selective eating can cause symptoms of avoidant/restrictive food intake disorder, such as nutritional deficiencies. Selective eating is common in individuals with ASD when compared to individuals who are typically developing and when compared to individuals with other developmental disabilities. Dietary variety in children with ASD has been compared to children with typical development and children with other developmental disabilities in numerous studies. Findings from these studies demonstrate that dietary variety is lower in children with ASD and show that children with ASD are more likely to refuse foods (Bandini et al., 2010; Marshall, Hill, Ziviani, & Dodrill, 2013; Williams, Hendy, & Knecht, 2008; Zimer et al., 2012). One possible reason for the heightened occurrence of selective eating in ASD is related to principal symptoms of autism. Namely, repetitive/restrictive behaviors and sensory sensitivity (Zickgraf, Richard, Zucker, & Wallace, 2020).

Physical Activity Levels in ASD

Inadequate levels of physical activity among children make up a significant public health concern in the United States (United States Department of Health and Human Services, 2012). Researchers have found that children with ASD spend significantly more time engaged in

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sedentary behavior when compared to their typically developing peers across multiple studies (Tyler et al., 2014; Must et al., 2014). Recently, emphasis has moved towards gaining insight into children's participation in sedentary behaviors. Research has demonstrated that disproportionate time spent engaging in sedentary behavior among children is associated with lower levels of fitness, heightened risk for overweight, decreased levels of academic achievement, and lower self-esteem among young children (Tremblay et al., 2011). While there are several efforts underway to increase the activity level of the general population of children in the U.S., fewer interventions exist targeting the activity level of children with ASD. Some characteristics of autism such as social communication deficits, restricted, repetitive behaviors and interests, perseveration on interests, and/or aversion to specific sensory inputs, may have impeded upon the potential of children with ASD to develop and maintain friendships (Schenkelberg, Rosenkranz, Milliken, Menear, & Dzewaltowski, 2017). Children with fewer friendships frequently engage in a lower rate of physical activity than their peers with numerous friendships. Rather, research demonstrates that individuals with fewer friendship connections spend an increased time engaging in sedentary behaviors such as watching television and playing video games. One study found that only 12% of their sample size (83 children with autism) were regularly physically active. This study revealed that children with ASD were more frequently engaged in solitary and sedentary play (Memari, Panahi, Ranjbar, Moshayedi, Shafiei, Kordi, & Ziaee, 2015).

Existing Treatments for Children with ASD

Behavioral intervention is commonly required for children with ASD. Positive Behavior Support is an intervention for challenging behaviors that is frequently used across the U.S. and other countries (Strydom, Bosco, Vickerstaff, Hunger & Hassiotis, 2020). Positive Behavior

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Support involves a therapeutic framework that is founded in social, educational perspectives, and largely behavioral approaches such as Applied Behavior Analysis to increase the quality of life of the client and to decrease their problem behaviors. Applied Behavior Analysis is defined as the practice of implementing psychological principles of learning theory in a systematic manner to change behavior (ABAEDU.org, 2020). ABA is used extensively to treat individuals with Autism Spectrum Disorder. This treatment has been found effective at intervening with symptoms of autism and improving cognitive and language functioning. Researchers found that Applied Behavior Analysis intervention resulted in statistically significant improvements in motor, socio-emotional, adaptive, communication, cognitive related behavior concerns, a decrease in symptoms of ASD, and a decrease in barriers to learning specific to children with ASD (Vietze & Lax, 2020). The empirical support for behavior therapy as effective interventions for children with ASD supports the proposal that such strategies would be beneficial to improving eating and exercise behavior in this population (Vietze & Lax, 2020). Applied Behavior Analysis involves systematic data collection, development of objective and clearly defined behavior goals, as well as specific and precise plans for intervening with challenging behaviors. Applied behavior analysis believes that all behaviors can most easily be changed by changing the environmental context for the behaviors, especially the consequences that follow behavior. Implementation of ABA involves identification of clearly defined and measurable behavior(s) that therapist(s) will attempt to accelerate or decelerate. Data regarding what happens before (antecedent) and after (consequence) a behavior occurs is collected to understand the function or purpose of the behavior. Once the antecedent and consequence of a behavior are understood, the behavior therapist has insight into the function or reason for the behavior. This

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allows the therapist to alter those influences (antecedent and consequence) so that the occurrence of the behavior either increases or decreases in frequency and or intensity.

Section III: Program Overview and Development

Program Goals

The components integrated within this program are targeting an improvement in the physical and psychological health of children with ASD. Implementation of empirically based behavioral intervention with children who have ASD can be helpful to improving the physical health of this population by decreasing maladaptive health related behaviors and increasing adaptive health related behaviors. Further, this program will aim to decrease parenting stress surrounding their child's unhealthy eating and exercise behaviors by increasing their competency through parenting skills training. Parenting skills training will also serve to promote generalization of the child's behavioral improvement to environments beyond the therapy setting. To optimize participation in and client gains from this program, it will entail once weekly in person therapy sessions as well as daily homework for both the parent and the child. The daily homework will be brief and will be accessed via a website that includes weekly modules.

As previously described, research supports the predictive power of treatment intensity and duration when analyzing ABA and therapy goal attainment amongst children with ASD. This program utilizes weekly therapy sessions and daily homework assignments for both the parent and child to increase intensity and duration of treatment. Further, research supports that practice and reinforcement of newly learned skills in multiple settings promotes generalization of those skills beyond the therapy room. This program will encourage generalization of the child's behavioral progress as well as generalization of the parent's parenting skills progress through daily homework assignments.

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Applied Behavioral Analysis has been presented as a beneficial form of intervention because of its effectiveness at teaching new skills, increasing adaptive behaviors, and decreasing maladaptive behaviors (Linstead, Dixon, Hong, Burns, French, Novack, & Granpeesheh, 2017). Having behavioral interventions based on ABA practice as the core of this program may allow for significant progress toward goals of increasing behaviors such as healthy eating and engaging in physical activity in children with ASD. Use of social stories and power cards have also been demonstrated to increase frequency of desired behaviors in children with ASD. Templates for social stories and power cards will be made available to parents within the website accompanying this treatment. Parents will have the ability to adapt the social story and power card templates to align with their child's specialized interest(s). Individuals with autism frequently have specialized interests and research supports that incorporating the interests of these individuals into their intervention plans can increase the child's engagement in treatment (Sze & Wood, 2008). Additionally, treatment protocols targeting improvement of parenting skills such as Parent Management Training have been found to result in improvements in children's problem behaviors (Thijssen, Vink, Muris, P, & de Ruiter, 2017). The hopes of this program are to improve parenting competence, decrease parenting stress, and improve their child's challenging behaviors through implementation of parenting skills training.

The specific behavioral interventions that will be utilized within this program include behavior data tracking, positive reinforcement schedules, and antecedent change. The specific parenting skills that will be taught include planned ignoring, planned attending, and labeled praise. Behavior data tracking refers to the process in which a therapist and/or caregiver record data regarding the antecedent, consequence, frequency, and intensity of a specific behavior. By tracking this data on a behavior, the therapist and caregiver will acquire concrete evidence that

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supports or negates the efficacy of the strategies being used to alter the target behavior. This allows the therapist to alter and/or adapt strategies as needed. Behavior data tracking was selected as a strategy for this intervention because of its utility in understanding the factors influencing a behavior (antecedents and consequences). Helping caregivers understand their ability to intervene with their children's behaviors by making changes to occurrences before and after the behavior occurs may decrease their caregiving related stress and increase their confidence. Positive reinforcement refers to providing access to a highly desired stimulus immediately following a behavior (e.g., play time with a favorite toy immediately after a child completes a class assignment) (Sigler & Aamidor, 2005). This stimulus must be so highly desired by the child that access to it following a behavior, increases the likelihood that the behavior will occur again in the future. This behavioral strategy was selected for Four Steps to Fitness because the intervention involves increasing desired behaviors including consumption of fruits and vegetables, drinking water, and engaging in exercise. Planned ignoring is a procedure in which a person deliberately does not provide attention to the occurrence of a pre-determined (target) behavior (Booth, 2017). A behavior that is thought to be maintained by attention may be changed by planned inattention. If the purpose or function of a child's problem behavior is to acquire the attention of their parent/caregiver, deliberately not giving that attention in response to the problem behavior demonstrates to the child that behavior will not result in what they are seeking (attention from caregiver). Planned ignoring is often used in combination with redirection which involves encourage the child to engage in a desired behavior rather than the behavior being deliberately ignored by the parent.

Of note, Four Steps to Fitness is designed to be effective for children with autism of a differing functioning levels. As autism is a spectrum disorder, the intellectual, executive,

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adaptive, and social functioning capacity of each autistic person is unique. Given this, the clinician should request access to any prior psychological evaluation conducted, request access to academic records, and conduct an in depth intake with the child's caregivers to best understand the child's level of functioning. Four Steps to Fitness is meant to be adaptable to the unique needs of each client. For example, use of images to support the understanding of individuals with poorer language abilities may support use of this intervention. Further, the clinician is prompted in the step by step session guide to consistently monitor caregiver and child's progress toward goals to determine whether or not adaptations should be made to increase the effectiveness of the intervention for each client.

By developing an interactive website as part of this program, parents and children will be able to benefit from psychoeducational videos, behavior tracking prompts and organizers, reminders, and receipt of positive reinforcement. The psychoeducational videos within this website will aim to review and consolidate information about implementing specific behavior plans with their child, as well as information about the healthy behavior being emphasized for that module. Additionally, the online portion of this program aims to motivate children to become actively engaged in their intervention. A game system will be implemented in which the child reports their progress toward healthy behavior goals (with the assistance of their caregiver if needed). The child client can receive reinforcers for progress toward goals via a token system built into the website. Once the child reaches a predetermined number of tokens, they can trade their tokens in for access to a highly preferred activity and/or object. During in person therapy sessions, the parent and therapist will collaborate to determine objective and easily trackable goals for the child. They will also collaborate to determine an appropriate expectation for the child's progress toward these goals.

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Because the “5-2-1-0 Healthy Numbers for Kentucky Kids” Initiative focuses on four specific health related behaviors, this program will last a total of 10 weeks. The time span of 10 weeks was deliberately selected considering the number of specific behaviors being addressed (4) as well as the need for an intake and termination session. A 10-week intervention would allow the clients 2 weeks of practice and adjustment to each of the 4 behavior goals.

Additionally, the length of 10 sessions is a standard length for a multitude of existing empirically supported interventions. Importantly, children on the autism spectrum often require extended practice, explicit direction, and generalizable experiences to master new behaviors/skills. This common need contributes to the rationale for selection of a 10-week intervention. Also of note, children with ASD represent a broad range of cognitive and adaptive functioning. Given this, the length of time they require to master new behaviors/skills may vary. Therefore, this intervention will be adaptable to the potential need for extended practice. This intervention could be repeated to allow for extended practice or therapists could extend the time spent focusing on a behavior that has been identified as more challenging and/or of higher priority for their client. The first week will include an intake session during which the therapist gains background information about the child and identifies a behavior for the parent to begin data collection. During the intake, information that should be considered includes the parent’s most pressing concern regarding the child’s eating and/or exercise behaviors (e.g., selective eating, sedentary behavior, excessive consumption of unhealthy food and/or drink). Importantly, children participating in this intervention should have an existing diagnosis of autism spectrum disorder as an autism assessment will not be conducted as part of this intake or intervention. The following eight weeks will involve once weekly in clinic sessions and daily online homework sessions for both

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the parent and child. The final tenth week will consist of a termination session focusing on reviewing the client's progress and addressing any lasting concerns.

Outline of Sessions

In order to understand how the program will address the health behaviors previously identified in children with ASD, a hypothetical, session-by session example of the proposed treatment will be provided in the Appendix of this manuscript. However, for those who are not as familiar with mental health treatment, a detailed description of each session is described in this section.

Session One

In session one, the most important goals are to establish rapport with the child and their parent(s), to obtain background information about the child, and to explain the plans for the upcoming weeks. The therapist will provide education to the parent about the "0-5-2-1 Healthy Numbers for Kentucky Kids" initiative. The therapist will also demonstrate to the parent and child how to access the website where they will find their daily homework assignments. The website will contain modules that are divided according to the behavior of the 0-5-2-1 Healthy Numbers for Kentucky Kids initiative. Each module will contain two weeks of daily prompts and assignments. Each behavior represented by the 5-2-1-0 Healthy Numbers for Kentucky Kids initiative will be the basis of the modules. Modules will contain a variety of assignments for each behavior represented by the 5-2-1-0 Healthy Numbers for Kentucky Kids initiative that allow the therapist to select an assignment most appropriate for the patient's level of cognitive ability.

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Session Two

In session two, the therapist will meet with the parent and the child to determine a plan for targeting the “5” of the 5-2-1-0 Healthy Numbers for Kentucky Kids initiative. This portion of the modules emphasizes increasing the child’s intake of fruits and/or vegetables. By collaborating with the parent, the therapist will implement behavioral strategies to increase their child’s intake of fruits and/or vegetables. First the therapist will discuss antecedent changes with the parent that will impact the child’s likelihood of eating fruits and/or vegetables. Antecedent changes can involve altering the environment before a common behavior occurs (such as eating an unhealthy food item) in an attempt to decrease the chances of that behavior occurring. An example of this strategy within the proposed program would involve instructing parents to ensure fruits and vegetables are visible and more easily accessible to their child than unhealthy food items. Additionally, the therapist will collaboratively create a positive reinforcement schedule with the parent. This will involve deciding when the child should receive access to a reinforcer for engaging in the desired behavior (eating a fruit or vegetable), what that reinforcer should be, and documenting this plan. The plan will be uploaded in to the parent’s account on the website that accompanies this program so they can refer back to it after the session. Additionally, the parent and therapist will collaboratively adjust the website settings to align with the child’s target goal. The website will provide image based tools such as visual schedules depicting to the child the expectation for receiving reinforcement (e.g., an image of carrots followed by an image of the child’s identified reinforcer). The purpose of this option is to ensure the program is appropriate for children with a range of cognitive ability levels. The therapist will assign a variety of psychoeducational videos about antecedent change and tracking behavioral data for the parent to watch as a portion of their daily homework assignments. Each day, the parent will be

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prompted by the website to enter the behavior data they obtained for that day. This data will include the number of fruits and/or vegetables their child ate that day as well as the antecedents and consequences of this behavior. Each day of the week spanning from this session to the following in clinic session, the child will participate in interactive assignments that are preloaded on the website accompanying the program. These interactive assignments will include game based education about healthy eating and exercise.

Session Three

Session three will begin with a therapist lead check in with the parent(s). The therapist will review the parent's collected behavior data from the previous week and allow the parent the opportunity to process their experience tracking behavior data, implementing antecedent change, and implementing a positive reinforcement schedule. The parent will be allowed the opportunity to ask the therapist any questions regarding these parenting skills and the therapist will model use of these skills with the child. This allows the parent(s) access to repeated modeling and guided practice of parenting and behavior management skills. The therapist will also allow the child an opportunity to process their experience participating in the program. Based on the child's reports, the therapist should collaborate with the parent and make adaptations to their behavioral plan as needed. During the interim period before the fourth in-clinic session, the parent(s) and child will again complete daily assignments accessible through the website accompanying this program.

Session Four

Session four will emphasize the child's engagement in screen-based or sedentary activities. This session will begin the clients' progress toward the "2" of the "5-2-1-0 Healthy Numbers for Kentucky Kids" initiative. The "2" represents the need for children to spend 2 or less hours of

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screen time per day. During this session, the therapist will collaborate with the parent to devise a daily schedule that depicts activities the child will engage in. Collaborative creation of the schedule is important because it allows the parent to provide insight into a realistic plan. By creating realistic, and attainable goals, this program strives to encourage clients' engagement in and commitment to the intervention. The therapist should assist the parent with generation of activity ideas that do not involve sedentary behavior (such as engaging with electronics/screen time). The therapist will also dedicate a portion of the session to teaching the parent additional parenting skills including modeling desired behaviors, planned attending, and planned ignoring. The parent will be instructed to remove access to screens once the child has reached their two hour limit. At this time, the child may resist through externalized behaviors. In preparation for this possibility, the parent will be taught to engage in planned ignoring and/or redirection strategies. The child will be informed of the schedule and the new expectation that they will spend no more than two hours per day engaging in "screen time." The parent will be instructed to deliver planned attending and labeled praise each time the child complies with the parent's prompts to stop engaging in "screen time" with minimal resistance. The child will be offered 3 non-screen leisure activity choices (presented in a simple visual schedule) as options after their "screen time" is complete for the day. These activities should be ones in which the child has previously shown enjoyment. The parent(s) will again collect data on this behavior. Each day they will be prompted to submit their collected data on the child's frequency of screen use and compliance to the two hour limit. Additionally, the child will be prompted to report their compliance to the two hour limit, their choice of alternative activity, and record their time spent engaging in screen time (with the assistance of parent(s) if needed). The child will also interact with game based informative activities via the website accompanying this program each day.

Session Five

The fifth session will begin with a therapist lead check in with the parent(s). The therapist will review the parent's collected behavior data from the previous week and allow the parent the opportunity to process their experience tracking behavior data and implementing newly learned parenting skills during the previous week. The parent will be given the opportunity to ask the therapist any questions regarding these parenting skills and the therapist will model use of these skills with the child. The therapist will also allow the child an opportunity to process their experience participating in the program. During the interim period before the sixth in-clinic session, the parent(s) and child will again complete daily assignments accessible through the website accompanying this program. Importantly, the program will include assignment options for the parent and therapist to consider. After collaboration between therapist and parent as well as careful consideration of the child's cognitive ability and understanding level, the most appropriate assignment option will be selected. Parent(s) should continue antecedent, behavior, and consequence data collection regarding the child's compliance with the two hour limit on screen time.

Session Six

Session six will emphasize the number "1" of the "5-2-1-0 Healthy Numbers for Kentucky Kids" initiative. The number "1" of this initiative represents engaging in at least one hour of physical activity each day. The therapist will provide psychoeducation to the parent and child about the importance of physical activity to mental and physical health. Next, the therapist will collaborate with the parent to develop a daily schedule that includes at least one hour of physical activity for their child per day. The therapist will promote scheduling of activities that the parent will be

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available to engage in with the child and explain that doing so is practicing their newly learned skill, “modeling.” The therapist and parent will collaboratively create a positive reinforcement schedule in which the child gains access to positive reinforcement for engaging in predetermined durations of physical activity. If the parent expresses concern with setting a goal of engaging in one hour of physical activity each day, the therapist should decrease this time to align with a more realistic and attainable goal. The therapist will discuss this plan with the child and ensure they understand the steps they must take to earn access to reinforcers. During the week before the seventh session, the parent is instructed to collect antecedent, behavior, and consequence data regarding the child’s engagement in physical activity. The parent and child will also be prompted to engage in daily interactive activities on the website accompanying this program during the week prior to the seventh in-clinic session.

Session Seven

Session seven will begin with a therapist led check in with the parent(s). The therapist will review the parent’s collected behavior data from the previous week and allow the parent the opportunity to process their experience tracking behavior data, implementing antecedent change, modeling, and the positive reinforcement schedule for their child’s behavior. The parent will be provided the opportunity to ask any questions regarding newly learned parenting skills and/or the reinforcement schedule. The therapist will also allow the child an opportunity to reflect on their participation in the program thus far. The parent should continue to collect behavioral data during the week leading up to the eight in-clinic session. Both the parent and child should continue to engage with the website daily to complete their daily homework tasks.

Session Eight

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Session eight will emphasize the number “0” of the “5-2-1-0 Healthy Numbers for Kentucky Kids” initiative. The number “0” of this initiative represents encouragement to drink zero sugary drinks per day. The therapist should begin the session by providing psychoeducation about the impact of excessive consumption of sugary drinks. Sugary drinks include sodas, juices, as well as any drink other than water or milk. Next, the therapist should collaborate with the parent in creating an achievable goal regarding number of sugary drinks consumed by their child per day. The therapist should re-visit the strategy of antecedent change and assist parents in devising a plan to make sugary drinks less visible and less accessible as well as making healthy drinks (e.g., water, milk) more visible and easily accessible. A positive reinforcement schedule should be created focusing on reinforcing the behavior of drinking healthy drinks. The parent(s) and child should continue to complete their online assignments during the week leading up to the ninth in-clinic session.

Session Nine

Session nine will begin with a therapist led check in with the parent(s). The therapist will review the parent’s collected behavior data from the previous week and allow the parent the opportunity to process their experience tracking behavior data, implementing antecedent change, and implementing the positive reinforcement schedule. The parent will be allowed the opportunity to ask the therapist any questions regarding parenting skills and the therapist will model use of these skills with the child. The therapist will also allow the child an opportunity to process their experience participating in the program. During the interim period before the tenth in-clinic session, the parent(s) and child will again complete daily assignments accessible through the website accompanying this program.

Session Ten

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The focus of session 10 is termination of the intervention. The therapist will allow the child and parent(s) time to reflect on their progress throughout the program. The therapist will prompt the parent(s) and child to summarize and review information and skills learned throughout the duration of the program. Additionally, parents and their child will be prepared to demonstrate the physical activities they have learned or share a video of them participating in these activities as a pair.

Program Evaluation

To assess the effectiveness of Four Steps to Fitness, parent participants will complete pre and post assessment measures. Each measure was selected based on its ability to evaluate the impact of intervention on parents' stress related to caring for their child, as well as child participants' level of physical activity and range of foods they are willing to eat following intervention. One of the measures administered pre and post intervention is the Caregiver Strain Questionnaire (CGSQ) (Brannan, Heflinger, & Bickman, *1997*) during their initial intake and following their last session. The CGSQ contains 21-items that are measured on a five-point Likert scale. The Likert scale ranges from 1 to 5 with each number representing the severity of problem perceived by the parent (e.g., 1 = not at all a problem, 5 = very much a problem). CGSQ evaluates three domains of burden: objective strain, subjective internalized strain, and subjective externalized strain. Subscales scores and a global burden score are calculated. The CGSQ has been demonstrated to have strong internal consistency reliability (Brannan et al. 1997). Further, the domains of burden it addresses align with empirical findings indicative of increased stress levels in parents of children with autism (Batool & Khurshid, 2015).

A second measure that will be provided is the Three-Day Physical Activity Recall (3DPAR). The 3DPAR is a self-report measure used to record habitual physical activity of children (Hearst,

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Sirard, Lytle, Dengel, & Berrigan, 2012). 3DPAR utilizes a time-based recall strategy over the course of a 3-day period. Individual days are divided into blocks of time and children are prompted to record their specific activity and the intensity of the activity for each block.

Importantly, for the purposes of this program and considering the population it is intended for, caregivers should be prompted to assist or complete the 3DPAR for the child. The amount of assistance required for completing the 3DPAR will be determined by the clinician following intake based on the child's cognitive abilities.

Additionally, parent participants will complete a self-report list designed specifically to measure their child's range of accepted food items pre and post intervention. This measure will be administered during the intake session and following intervention. The measure will prompt parents to indicate the number of foods their child will eat. This tool can be found in the Appendix.

CGSQ scores, parent report of child's accepted foods, as well as the 3DPAR scores prior to intervention should be compared to these scores following intervention to evaluate changes in these domains.

Future Directions

This program aims to improve the physical health of children with autism by increasing their engagement in healthy behaviors. Further, this program aims to decrease caregiver stress related to eating and exercise behaviors of their child through psychoeducation regarding empirically based behavioral strategies. As this program is implemented and resultant data is collected, adaptations should be made to improve its effectiveness. Future implementation of a multidisciplinary approach to this program may also be a noteworthy consideration given the frequency with which children with autism require multidisciplinary care. Presently, the

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curriculum for Four Steps to Fitness is developed. With technical support and the assistance of a web development expert, the psychoeducation materials, behavior tracking, and interactive game component of the proposed intervention could be mounted as a website in the future. While the present program was inspired by a Kentucky based program, Four Steps to Fitness has been developed to address eating and exercise concerns for children in all states of the US.

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Appendix 1
Step-by-Step Session Guide

Session 1 – Treatment Outline

1. Establish rapport with child and their caregiver(s)
2. Conduct intake. Emphasis should be placed on questions regarding the child's food intake and exercise habits. The following questions should be asked:
 - What foods does your child consume?
 - What foods does your child reject?
 - How often does your child eat?
 - Are you concerned with the amount/frequency with which they eat?
 - What are your child's interests?
 - How frequently does your child engage in physical exercise?
 - What type of physical exercise does your child engage in?
3. Administer all measures (e.g., Caregiver Stress Scale and Four Steps To Fitness Eating and Exercise scale)
4. Request prior psychological assessment reports for review. This is critical to understanding the child's level of cognitive functioning. Such understanding is required to adapt interventions to the child's ability level.

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5. If child has identifiable target behaviors aligning with the purpose of the 5-2-1-0 Healthy Numbers Initiative, provide education about this program.
6. If caregiver(s) indicate interest in the program, explain the program, time commitment required, and demo use of the accompanying website. Use the following script:

“Four Steps to Fitness is an intervention inspired by the 0-5-2-1 Healthy Numbers for Kentucky Kids initiative. Within this intervention, we will learn about healthy eating, healthy exercise habits, as well as parenting strategies that may improve your child’s compliance with these lifestyle adaptations. This is a 10 week program involving once weekly meetings as well as daily “check-ins” with an online website that accompanies the program. There will be daily practice assignments that will help you become familiar with using newly learned parenting strategies to implement healthy lifestyle changes with your child. Your child will also be encouraged to complete daily “check-ins” on the website. These are fun, game-based activities that encourage the child to comply with healthy lifestyle behaviors and allow them the opportunity to access rewards for doing so. To begin, I will ask you to collect information about your child’s eating and exercise habits each day before our next meeting. This information will be required to adapt the intervention plan to your and your child’s specific needs.”
7. Provide caregiver with the behavior data tracking sheet for eating and exercise. Explain to the parent how they will use the data collection sheet using the following script:

“These are data collection sheets. Over the course of this intervention, you will be tracking your child’s behaviors using these forms. Each form has a section for you to record your child’s eating and exercise behaviors for each day of the week. On the “Eating Form” you will record how many and what type of fruits and vegetables your

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child consumed each day. On the “Exercise Form” you will record how many minutes and what type of physical exercise your child engaged in each day. It will be helpful to place these forms in a location where you are likely to see them frequently throughout the day for reminders to record your child’s behaviors.”

Session 2

1. Therapist and parent meet to determine specific target goals for their child’s intake of healthy foods. The therapist should introduce the goals of this session using the following script:

“The first step of Four Steps to Fitness focuses on ensuring children are eating a healthy number of nutritious foods each day. This would include at least five servings of fruits and vegetables. Today we will work together to create a plan for helping your child move closer to that healthy eating behavior (having five or more fruits and vegetables per day). First let’s review the data you collected during this past week to create a specific goal. *(Therapist should review data collected with parent and collaboratively select one specific goal to work toward regarding increased consumption of fruits and vegetables. For example, if the child is willing to eat a variety of fruits and vegetables but does not consume sufficient servings of fruits and vegetables – an appropriate goal to consider may be increasing the amount they are willing to eat.)*

2. Following the identification of a specific goal, the therapist will provide psychoeducation regarding behavioral strategies the parent will implement. This module will focus on

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antecedent change and positive reinforcement. These two strategies can be described using the following script:

“Now we will talk about behavior therapy skills. These are skills that therapists often use to increase a desired behavior or decrease an undesired or inappropriate behavior.

Because you spend the most time with your child, it will be beneficial for you to know these skills. Using these skills consistently and across different settings can increase the likelihood that the behavior you are working on with your child will improve.

Throughout the course of this intervention, you will be taught multiple behavior therapy skills to implement in your daily experiences as a caregiver/parent to your child. For the purposes of this intervention, you will be taught specifically how to implement these skills with the intent of improving your child’s healthy eating and exercise behaviors. The two behavior therapy skills you will learn about this week are antecedent change and positive reinforcement.

Antecedent change refers to altering the environment before a common behavior occurs (e.g., such as eating an unhealthy food item) in an attempt to decrease the chances of that behavior occurring. An example of this includes ensuring fruits and vegetables are visible and more easily accessible than other foods to increase the chances the child will eat them rather than less nutritious food options.

(Therapist then asks the parent/caregiver what they think could be changed about their environment to encourage more frequent consumption of nutritious foods and refers parent to the “Behavior How To: Antecedent Change” form. Provide them with their own copy so they may refer back to it throughout the following week for reminders of how to implement the skill at home.)

Positive Reinforcement refers to providing your child with something they like or enjoy immediately following a desired behavior. By providing your child with something they are highly motivated to earn (or reinforced by), you can increase the occurrence of a desired behavior. During this intervention, you will be using positive reinforcement to increase the frequency with which your child consumes fruits and/or vegetables as well as the frequency with which they engage in physical exercise. For the next two weeks, we will be using positive reinforcement specifically to increase your child's consumption of fruits and vegetables.

(Therapist should then ask the parent/caregiver what they think their child would be motivated by (e.g., watching a specific video on YouTube, playing with a specific toy, time with parents). It should be made clear to the parents that their child's access to the activity or item they decide to use as positive reinforcement should be reserved for times immediately following the child's engagement in the desired behavior. If they have free access to such a reinforcer, they are less likely to be motivated to earn it by engaging in the desired behavior. Once the reinforcer has been decided upon, the therapist will assist the caregiver with creating a schedule of positive reinforcement. This involves determining what specific behavior the child will earn access to the reinforcer for (e.g., eating two servings of vegetables in one day).)

3. The therapist should provide the caregiver with a copy of the "Behavior How To: Implement Antecedent Change" as well as the "Behavior How To: Implement Positive Reinforcement."
4. Teach the parent about power cards:

"A **power card**" is a card given to a child that shows expectations or instructions and consequences for specific behaviors. They can be motivating to children with autism by

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incorporating their specialized interest in a manner that encourages them to follow the listed expectations/instructions. We will make a power card for each of the behaviors addressed throughout this intervention. Encourage your child to carry their power card with them and point it out to them at meal/snack times to promote eating fruits and vegetables.” *Show parent the Power Card Template form*

Assist the parent and child in development of a power card incorporating their child’s specialized interest and encouraging the child to eat more fruits and vegetables.

5. Remind the parent of their data tracking forms as well as the importance of daily tracking of their progress toward the identified behavior goal (e.g., consuming more fruits and/or vegetables).
6. Introduce the child to the new expectations in an enthusiastic and positive manner:
“We’re going to work on being healthier! Did you know eating fruits, vegetables, drinking water, and getting regular exercise can help you to be healthy? For the next two weeks, you and your family will be working on eating more fruits and vegetables. When you eat your fruits and vegetables (*adapt this to align with the specific goal decided upon for the child*) you can earn rewards (*specify the reinforcer selected for the child*).”

Session 3 – Review

Materials Needed:

Parent's data collection from previous week

Session Objectives:

1. Therapist should begin the session by reviewing the information covered in the previous session. Prompt the parent to explain antecedent change and positive reinforcement. Then prompt them to describe how they implemented both strategies during the previous week.
2. Allow the caregiver the opportunity to process their experience using these strategies and encourage them to ask any questions they have about these strategies.
3. Review the data collected by the parent during the previous week. Discuss progress toward the identified goal.
4. Allow the child an opportunity to reflect on their experiences participating in the intervention.
5. Make alterations to antecedent changes and positive reinforcement as needed. For example, if the caregiver reports their child does not appear to be motivated for the reinforcer identified in the previous session, consider identifying a new one.
6. Based on the child's reports, the therapist should collaborate with the parent and make adaptations to their behavioral plan as needed. During the interim period before the fourth in-clinic session, the caregiver will again track their child's consumption of fruits,

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vegetables, and physical exercise daily. Additionally, they will continue to implement antecedent change and positive reinforcement.

7. The therapist should prompt the caregiver to summarize the key concepts of the review session and remind them that during the upcoming session, the focus will move to their child's engagement in physical exercise.

*It is important to note, this intervention is adaptable to each client's specific needs. If the family does not feel comfortable with their child's progression toward their goal of increased fruit/vegetable consumption, the therapist is encouraged to maintain emphasis on this concept. Preventing the caregiver from feeling overwhelmed and ensuring their goals remain attainable is important to sustaining their motivation and engagement in the intervention. *

Session 4

Materials Needed:

Parent's data collection from previous week, Behavior How To forms for implementing planned ignoring and creating a visual schedule.

Session Objectives:

1. Therapist should conduct a check in with the caregiver and child, allowing them an opportunity to process their experience during the week prior to this session.
2. The therapist should next provide psychoeducation about the impact of regular physical activity on their child's health using the following script:
"Research indicates that engagement in long periods of sedentary screen time can negatively impact children's mental and physical health (Archer, 2014). It is recommended that children engage in no more than two hours of recreational screen time per day."
3. Next, the therapist should provide the parent with psychoeducation regarding how to implement planned ignoring and labeled praise. These two behavior strategies will be implemented to decrease sedentary screen time. The therapist can describe these strategies using the following scripts:

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“To use labeled praise, you will provide your child with specific praise or compliments for a desired behavior. By being precise with your praise, your child begins to associate the exact behavior you would like to see more of with positive attention from you. This can lead to your child engaging in the desired behavior (in this case, complying with the limit on screen time) more frequently.” (The therapist should provide examples of labeled praise and prompt the caregiver to generate examples to ensure their understanding).

Planned ignoring is a strategy that involves deliberately withholding attention when a child engages in a pre-determined behavior. Sometimes, children continue to engage in behaviors because doing so results in receiving attention from their caregiver. If that attention is no longer provided in response to a problem behavior, this demonstrates to the child that the misbehavior will not result in what they are seeking (attention from the caregiver). During the next two weeks, you (caregiver) will be practicing planned ignoring when/if your child resists the screen time limit through externalized behaviors. When implementing planned ignoring, it can be helpful to follow ignoring the behavior with redirecting your child to different activity options. In preparation for this, we will work together to think of three activities that do not involve screen time you could redirect your child to when limiting screen time.”

4. Assist the parent and child in development of a power card incorporating the child’s specialized interest and encouraging the child to comply with the new limited screen time. Remind the parent and child to keep the power card nearby to promote motivation and cooperation with the screen time limit.
5. Remind the caregiver that they will be collecting behavior data again in the upcoming week. During this upcoming week, they will be tracking their child’s compliance with the two hour screen time limit.

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6. Provide caregiver with the Behavior How To forms for implementing planned ignoring and labeled praise.

Session 5 – Review

Materials Needed:

Behavior data collected by parent during the previous week

Session Objectives:

1. Therapist should begin the session by reviewing the information covered in the previous session. Prompt the parent to explain planned ignoring, labeled praise, and encourage them to process their experience implementing these strategies during the previous week for review.
2. Allow the caregiver the opportunity to process their experience using these strategies and encourage them to ask any questions.
3. Review the data collected by the parent during the previous week. Discuss progress toward the identified goal.
4. Make alterations to planned ignoring, labeled praise, and specified goal for this module as needed according to the caregiver's reports and the behavior they collected.
5. During the interim period before the fourth in-clinic session, the caregiver will again track their child's consumption of fruits, vegetables, and physical exercise daily. Additionally, they will continue to implement labeled praise and planned ignoring.

Session 6

Materials Needed:

Behavior data tracked by parent during the previous week, and the Behavior How To form for implementing modeling

Session Objectives:

1. Therapist should conduct a check in with the caregiver and child, allowing them an opportunity to process their experience during the week prior to this session.
2. Therapist should provide psychoeducation regarding the impact of regular physical exercise on children's health using the following script:

“Research indicates that regular physical exercise is beneficial to the physical and mental health of children (Archer, 2014). It is recommended that children engage in at least one hour of exercise per day. Today, our first task will be to determine an appropriate goal for your child's daily engagement in physical exercise.” *(The goal time should be appropriate for the child. For example, if the child currently engages in no exercise per day, starting with the goal of one hour could cause the caregiver and child to feel overwhelmed and/or discouraged.)*

3. The therapist and caregiver should determine a goal for an amount of exercise they would like their child to engage in each day (for example, 25 minutes per day).

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4. Therapist should next have a conversation with the caregiver about the daily schedule of their family. The goal of this conversation is to gather information so the therapist can assist in generating ideas for incorporating physical exercise in to the family's daily life.
5. Therapist will assist the caregiver with developing a schedule that demonstrates for the caregiver and child how many exercise activities or how many minutes of exercise they have to engage in to earn access to positive reinforcement.

“Now we will think back to the behavior therapy skill we learned two weeks ago, positive reinforcement. In the upcoming weeks you will be implementing positive reinforcement to increase your child's engagement in exercise.”
6. Assist the parent and child in developing a power card that incorporates the child's specialized interest and encourages them to engage in exercise. Remind the parent and child to keep the power card nearby to promote the child's cooperation and motivation to achieve their exercise goal.
7. Provide caregiver with the Behavior How To forms for implementing planned ignoring and labeled praise.
8. Remind the caregiver that they will be collecting behavior data again in the upcoming week. During this upcoming week, they will be tracking their child's time spent engaging in exercise.

Session 7 - Review

Materials Needed:

Behavior data collected by parent during the previous week

Session Objectives:

1. Therapist should begin the session by reviewing the information covered in the previous session. Prompt the parent to explain the behavior therapy skills they have learned about and how they have implemented these skills so far.
2. Allow the caregiver an opportunity to process their experience with these skills thus far and encourage them to ask any related questions.
3. Review the exercise data collected by the parent during the previous week. Review the data with the caregiver and discuss whether or not the positive reinforcer identified appears to be motivating enough for the child to continue to engage in daily exercise.
4. Adjust the positive reinforcement plan as needed according to the caregiver's reports and data from the prior week.
5. During the interim period before the eighth in-clinic session, the caregiver will again track their child's consumption of fruits, vegetables, and physical exercise daily. Additionally, they will continue to implement the behavior therapy skills they have learned thus far in the intervention.

Session 8

Materials Needed:

Behavior data collected by caregiver during the previous week, and the Behavior How To form for antecedent change

Session Objectives

1. Therapist should conduct a check in with the caregiver and child, allowing them an opportunity to process their experience during the week prior to this session.
2. Therapist should provide information regarding the impact of consumption of sugary drinks (e.g., soda, juices, sports drinks) on their child's health.

“Research indicates that drinking sugary drinks can contribute to negative health outcomes in children such as weight gain and childhood obesity (Taylor, Scragg, & Quigley, 2005). It is recommended by medical health professionals that children drink 0 sugary drinks per day and instead drink water. The focus of our session today will be creating a goal for decreasing the number of sugary drinks your child drinks per day and increasing the amount of water your child drinks per day. We will select a goal that you feel is reasonably attainable for your child.”

3. Explain that antecedent change and positive reinforcement will be implemented again to target the new goals (increasing water intake and decreasing sugary drinks).

“Remember using antecedent change a few weeks ago to increase the number of fruits and vegetables your child ate in a day? We are going to use that same strategy to decrease the number of sugary drinks your child has each day. How do you think you could change your child's environment to make them more likely to drink water instead of sugary drinks?”

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Collaboratively generate ideas for antecedent change as needed with the caregiver (e.g., placing water bottles at the front of the fridge in place of sodas).

“You will also continue to implement positive reinforcement while addressing this goal with your child in the upcoming weeks. When your child drinks the (insert goal amount) of water each day, they earn access to a reinforcer. What reinforcer do you think your child will be motivated by?”

4. Assist the parent and child in developing a power card that incorporates the child’s specialized interest and encourages them to drink more water/fewer sugary drinks. Remind the parent and child to keep the power card nearby to promote the child’s cooperation and motivation to achieve this goal.
5. Remind the caregiver to track how much water and how many sugary drinks their child has each day.
6. Provide the caregiver with additional copies of the Behavior How To forms antecedent change and positive reinforcement.

Session 9 – Review

Materials Needed:

Behavior data collected by caregiver during the previous week

Session Objectives

1. Therapist should begin the session by reviewing the information covered in the previous session. Prompt the parent to explain the behavior therapy skills they have learned about and process their experience implementing these skills thus far.
2. Encourage the caregiver to ask any questions about implementing antecedent change and/or positive reinforcement to increase their child's water intake and decrease the number of sugary drinks per day.
3. Review the data collected by the caregiver during the previous week. Ask the caregiver if they feel any adaptations should be made to their positive reinforcement schedule or the antecedent changes, they have implemented to address the present goal.
4. Help the caregiver adjust their strategies to align with their reports and the data they collected in the previous week.
5. During the interim period before the tenth in-clinic session, the caregiver will again track their child's consumption of fruits, vegetables, physical exercise, and water intake daily. Additionally, they will continue to implement the behavior therapy skills they have learned thus far in the intervention.
6. Remind caregiver and child of their homework assignment of creating a video demonstration of their favorite fruit, vegetable, and favorite exercise activity to show the therapist at their upcoming session.

Session 10 – Termination

Materials Needed

Behavior data collected over the course of the intervention

Session Objectives

1. The purpose of this session is termination of the intervention.
2. The therapist should allow the caregiver and child an opportunity to process their experience participating in the intervention.
3. Allow the caregiver to review the behavior therapy skills they learned and prompt them to ask any remaining questions.
4. Provide the child an opportunity to review what they have learned about healthy behaviors.
5. Prompt caregiver and child to show their video demonstration of their favorite parts of the intervention.
6. Provide parents with Caregiver Strain Scale as well as the Four Steps to Fitness Eating and Exercise Scale. Ask them to complete these measures before leaving.

Appendix 2:

Behavior Management Strategies: How To

How To Implement Planned Ignoring

Planned ignoring is a procedure in which a person deliberately does not provide attention to the occurrence of a pre-determined (target) behavior. A behavior that is thought to be maintained by attention may be changed by planned inattention. In other words, people engage in behaviors for a purpose or function. If the purpose or function of a child's problem behavior is to acquire the attention of their parent/caregiver, deliberately not giving that attention in response to the problem behavior demonstrates to the child that behavior will not result in what they are seeking (attention from caregiver). An example of planned ignoring might be with a child who engages in tantrum behavior when their father is on the phone. The father is unlikely to be able to attend to the child while their attention is focused on the phone call. Therefore, it is reasonable to postulate that repeated occurrences of tantrum behavior while father is on the phone may serve the function of acquiring father's attention. Father could decide to implement planned ignoring during future phone calls by selectively ignoring tantrum behavior that occurs during phone calls. This ignoring strategy can serve as a useful intervention strategy by continuing to demonstrate that tantrums will not result in the child getting their father's attention, they may be less likely to engage in the future.

How To:

- Importantly, dangerous behaviors (those that include possibility of an injury or other serious consequence) should never be ignored.
- Ignore the same behavior consistently.
- To ignore the behavior, actively avoid eye contact and turn away from the child.
- The behavior may initially get worse, which is common.

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- Remind yourself of your reason for ignoring to encourage yourself to maintain the planned ignoring and not stop prematurely.

How To Implement Positive Reinforcement

Positive reinforcement is a commonly used behavioral strategy. It occurs when a stimulus becomes available immediately following a behavior. Importantly, this stimulus must be something that increases the probability of that behavior occurring again in the future. Examples are provided below:

Example 1:

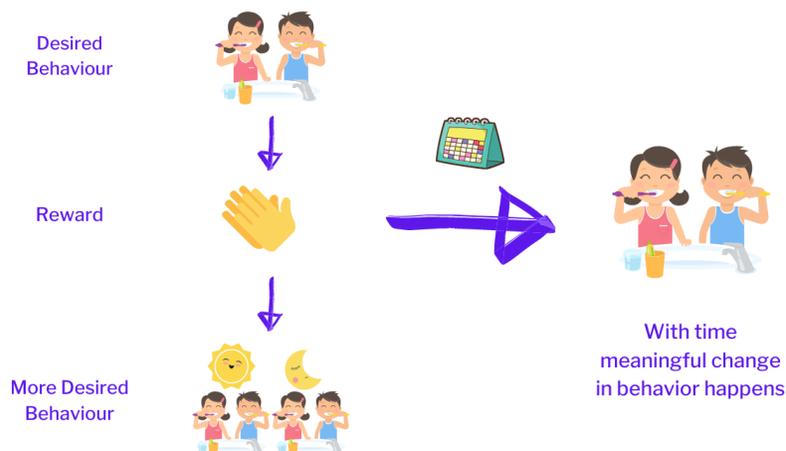
Vivi shouts at her mother while her mother is cleaning. Her mother provides Vivi with attention immediately. Vivi's probability of engaging in the behavior of shouting at her mother as she cleans increases. The following day, Vivi shouts at her mother while she cleans.

Example 2:

Tomas completed his math homework and is immediately given a piece of his favorite candy. The following week, Tomas completes his math homework.

Example 3

Shante tastes a new food. She is immediately provided access to the laptop on which she watches her favorite show. Shante has a higher probability of trying that food again in the future.



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How to Implement Antecedent Behavior Consequence (ABC) Behavior Data Collection

Antecedent, Behavior, and Consequence data is collected to gather information regarding the function or the purpose of specific behaviors (Sugai, Horner, Dunlap, Hieneman, Lewis, & Rued, 2000). Doing so can reveal opportunities to change antecedents and/or consequences of the behavior in a manner that may decrease or increase the target behavior. To collect ABC data, one records what happened immediately before (antecedent) the behavior occurred, information about the behavior, and what happened immediately following the behavior (consequence). The following is an example of ABC data collection for the target behavior: iPad use. This type of data is a direct observation, it should be recorded directly as it is observed when the behavior occurs.

<i>Antecedent</i>	<i>Behavior</i>	<i>Consequence</i>
Parent asks Jim to stop playing on the iPad.	Jim shouts “No!” and refuses to leave the iPad.	Parent tells Jim to leave the iPad again.
Parent tells Jim to leave the computer.	Jim again refuses to leave.	Parent starts counting to 10 as a warning to get off the iPad.
Parent starts counting to 10 as a warning to leave the iPad.	Jim does not move from the iPad.	Parent finishes counting to 10 and again warns Jim to get off the iPad.
Parent finishes counting to 10 and again warns him to get off the iPad.	Jim continues playing on the iPad and refuses to leave it.	Parent threatens that Jim lose iPad privileges in the future.
Parent threatens that Jim will lose iPad privileges in the future.	Jim ignores and continues playing on the iPad.	The parent count to 10 again and again threatens future iPad use.
The parent counts to 10 again and again threatens future computer use	Jim ignores and continues iPad use.	The parent becomes angry and leaves the room.

How To:

Implement Labeled Praise

Labeled praise refers to verbally praising or complimenting specific behavior (Leijten, Thomaes, de Castro, Dishion, & Matthys, 2016). By being precise with praise, your child begins to associate the exact behavior you would like to see more of with positive attention from you. This can lead to your child engaging in the appropriate behavior more frequently. Labeled praise can be used in any setting for any desired behavior. Examples of labeled praise are provided below:

Example 1:

Lewis remains seated at the table during dinner time. His mother provides labeled praise by stating, “I love the way you are staying in your chair!”

(Desired behavior = remaining seated. Labeled Praise = Mother stating, “I love the way you are staying in your chair!”).

Example 2:

Ava drank a cup of water. Her father provides labeled praise by saying, “Good job drinking your water!”

(Desired behavior = drinking water. Labeled Praise = Father saying, “Good job drinking your water!”).

Appendix 3: Visual Supports – Descriptions and Examples

Social Stories: Description and Examples

Social stories concisely and accurately describe a social situation, skill, or concept using simplistic language and concrete images (Gray & Garand, 1993). They are short stories that are individualized to teach socially appropriate behaviors and expectations needed for specific situations or skills (Gray, 1998). They were developed to help individuals with autism understand the social behavior expected in specific settings (e.g., doctor’s office, classroom, restaurant.) The social impairment which is core to autism spectrum disorder often leads autistic individuals to fail to naturally learn or understand the social nuances existent within our society. Reading a social story to a child with autism can help them feel prepared for a new situation or a new behavioral expectation. By reading your child social stories regarding healthy eating and exercise, you will be improving their understanding of your new expectations for them (e.g., eating fruits and vegetables, drinking water, and engaging in regular exercise). Your therapist will assist you in development of social stories that are specific to your child’s unique goals for each focus of this intervention (e.g., goals related to eating fruits/vegetables, exercise, and drinking water). Making the social stories specific to your child’s goals, opportunities for reinforcement, and interests will help your child remain motivated throughout the intervention. Examples of social stories are provided below.

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Social Story Example 1:

<p>I want to be healthy.</p> 	<p>To be healthy, I need to exercise every day.</p> 	<p>There are a lot of ways I can exercise.</p> 
<p>I can go for a walk with my family.</p> 	<p>I can play basketball with my sister.</p> 	<p>I can do yoga with my Mom.</p> 
<p>I will exercise for ___ minutes every day.</p> 	<p>My family will exercise with me.</p> 	<p>When I exercise, I feel better because I am being healthy.</p> 

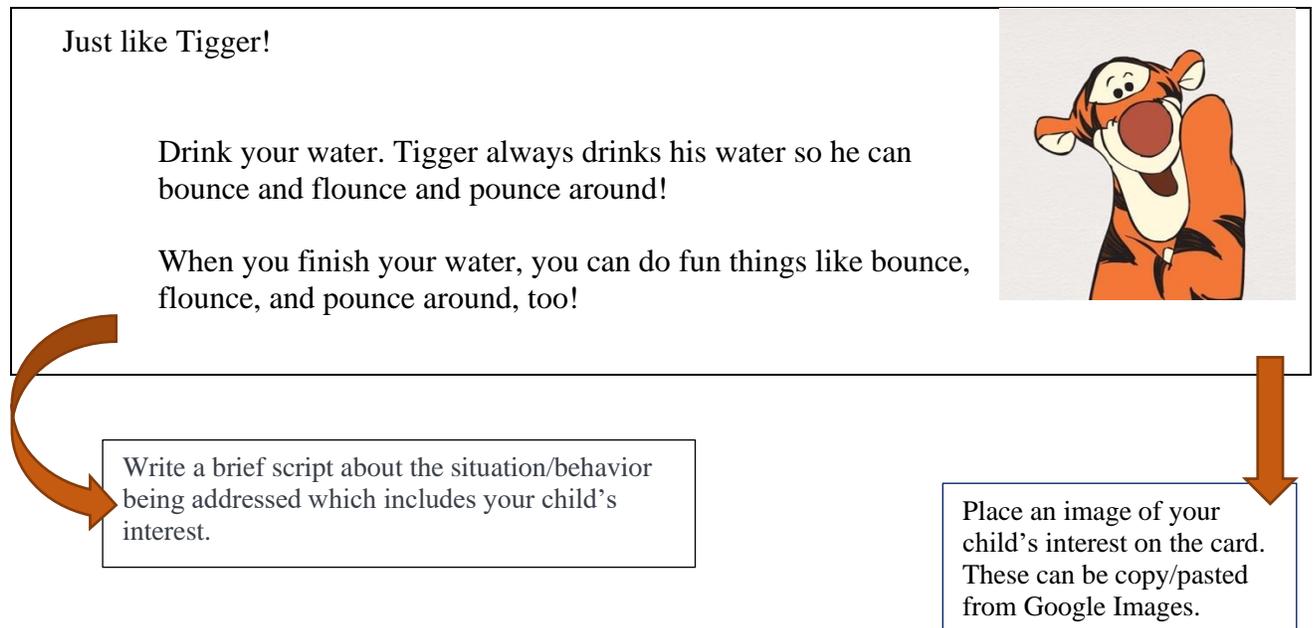
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Social Story Example 2:

<p>I want to be healthy and strong.</p> 	<p>I need to eat fruits and vegetables every day to be healthy and strong.</p> 	<p>When I am healthy and strong, I can do the things I like.</p>  <p><small>© dresner/line.com</small></p>
<p>I need to eat __ servings of vegetables each day.</p>  <p><small>www.gograp.com</small></p>	<p>When I eat my vegetables, my parents are proud of me and I get a reward.</p> 	<p>My parents will tell me how many more vegetables I need to eat to get my reward.</p> 
<p>I can eat my vegetables every day to be healthy, strong, and get a reward.</p> 		

Power Card: Description and Example

A “**power card**” is a card provided to a child that lists expectations or instructions and consequences for specific behaviors. Power cards are unique in that they incorporate a child’s specialized interest to motivate them to follow the listed expectations/instructions. In each module, you will find a template for a power card that aligns with the module goal. You can edit the template to incorporate the specific behavior your child is focusing on and their specialized interest.



Creating a Visual Schedule

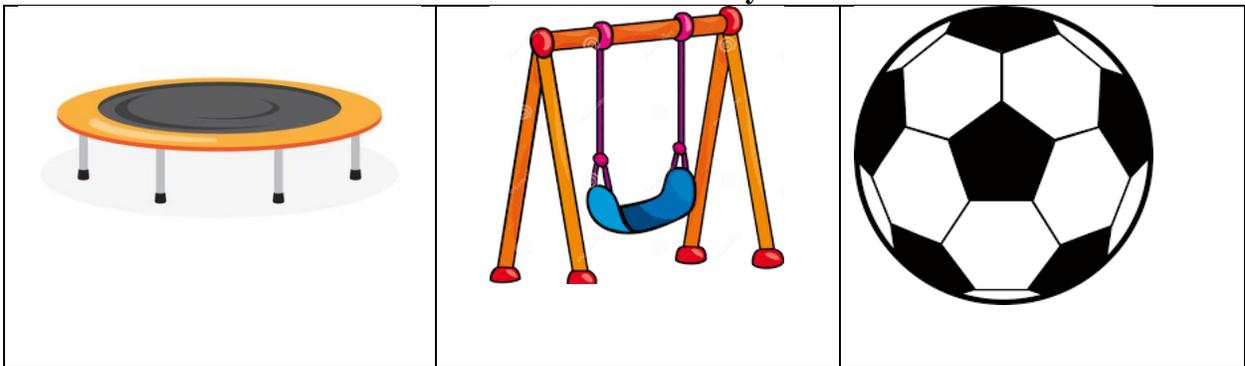
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Visual schedules are image-based representations of expected tasks or behaviors. They are helpful for simplifying multi-step tasks and improving the likelihood that children complete said tasks. Visual schedules may help to decrease anxiety by providing a concrete and consistent depiction of what is expected of the child. Additionally, visual schedules can help maintain a child's motivation to persist through completion of the task by clearly indicating their access to a reinforcer following task completion. A sample of a visual schedule is provided below. Your therapist will work with you to create visual schedules that align with and support your child's specific goals for each module.

2 Hours of Screen Time



Non-Screen Activity



Appendix 4: Measures

**Measure 1:
Caregiver Strain Questionnaire**

Please think back over the past 6 months and try to remember how things have been for your family. We are trying to get a picture of how life has been in your household over that time.

For each question, please tell me which response (which number) fits best.

In the past 6 months, how much of a problem was the following:

	Not at all	A little	Somewhat	Quite a bit	Very much
1. Interruption of personal time resulting from your child's emotional or behavioral problem?	1	2	3	4	5
2. You missing work or neglecting other duties because of your child's emotional or behavioral problem?	1	2	3	4	5
3. Disruption of family routines due to your child's emotional or behavioral problem?	1	2	3	4	5
4. Any family member having to do without things because of your child's emotional or behavioral problem?	1	2	3	4	5
5. Any family member suffering negative mental or physical health effects as a result of your child's emotional or behavioral problem?	1	2	3	4	5
6. Your child getting into trouble with the neighbors, the school, the community, or law enforcement?	1	2	3	4	5
7. Financial strain for your family as a result of your child's emotional or behavioral problem?	1	2	3	4	5
8. Less attention paid to other family members because of your child's emotional or behavioral problem?	1	2	3	4	5
9. Disruption or upset of relationships within the family due to your child's emotional or behavioral problem?	1	2	3	4	5
10. Disruption of your family's social activities resulting from your child's emotional or behavioral problem?	1	2	3	4	5

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In this section, please continue to look back and try to remember how you have felt during the past 6 months.

For each question, please tell me which response (which number) fits best.

In the past 6 months:

		Not at all	A little	Somewhat	Quite a bit	Very much
11.	How isolated did you feel as a result of your child's emotional or behavioral problem?	1	2	3	4	5
12.	How sad or unhappy did you feel as a result of your child's emotional or behavioral problem?	1	2	3	4	5
13.	How embarrassed did you feel about your child's emotional or behavioral problem?	1	2	3	4	5
14.	How well did you relate to your child?	1	2	3	4	5
15.	How angry did you feel toward your child?	1	2	3	4	5
16.	How worried did you feel about your child's future?	1	2	3	4	5
17.	How worried did you feel about your family's future?	1	2	3	4	5
18.	How guilty did you feel about your child's emotional or behavioral problem?	1	2	3	4	5
19.	How resentful did you feel toward your child?	1	2	3	4	5
20.	How tired or strained did you feel as a result of your child's emotional or behavioral problem?	1	2	3	4	5
21.	In general, how much of a toll has your child's emotional or behavioral problem taken on your family?	1	2	3	4	5

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Measure 2: Three Day Physical Activity Recall

Activities Scale

This purpose of this questionnaire is to estimate the amount of physical activity that you perform. The name of each day (Tuesday, Monday, and Sunday) that you will describe is located in the top right hand corner of each time sheet.

1. For **each** time period, write in the activity number that corresponds to the **main** activity you actually performed during that particular time period.
2. Then rate how physically **hard** each activity was. Place a "✓" in the timetable to indicate one of the following intensity levels for each activity.

• Light - Slow breathing, little or no movement.



• Moderate - Normal breathing and some movement.



• Hard - Increased breathing and moderate movement.



• Very Hard - Hard breathing and quick movement.



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Activity Numbers

Eating

- 1.) Eating a meal
- 2.) Snacking

Work

- 3.) Working (e.g., part-time job, child care) (list) _____
- 4.) Doing house chores (e.g., vacuuming, dusting, washing dishes, animal care, etc.)
- 5.) Yard Work (e.g., mowing, raking)

After School/Spare Time/ Hobbies

- 6.) Church
- 7.) Hanging around
- 8.) Homework
- 9.) Listening to music
- 10.) Marching band/flag line/drill team
- 11.) Music lesson/playing instrument
- 12.) Playing video games/surfing Internet
- 13.) Reading
- 14.) Shopping
- 15.) Talking on phone
- 16.) Watching TV or movie

Transportation

- 17.) Riding in a car/bus
- 18.) Travel by walking
- 19.) Travel by bicycling

Sleep/Bathing

- 20.) Getting dressed
- 21.) Getting ready (hair, make-up, etc.)
- 22.) Showering/bathing
- 23.) Sleeping

School

- 24.) Club, student activity
- 25.) Lunch/free time/study hall
- 26.) P. E. Class
- 27.) ROTC
- 28.) Sitting in class

Physical Activities and Sports

- 29.) Aerobics/aerobic dancing
- 30.) Basketball
- 31.) Bicycling
- 32.) Bowling
- 33.) Calisthenics(i.e., jumping jacks, sit-ups)
- 34.) Cheerleading
- 35.) Dancing (social, recreational)
- 36.) Dancing (ballet, jazz, modern, tap)
- 37.) Field hockey
- 38.) Frisbee
- 39.) Golf
- 40.) Horseback riding
- 41.) Ice/roller skating
- 42.) Jogging/running
- 43.) Karate/judo/martial arts/ self-defense
- 44.) Rollerblading
- 45.) Skateboarding
- 46.) Soccer
- 47.) Softball/baseball
- 48.) Stationary exercise machines (e.g., cycle, ski machine, stair climber, treadmill)
- 49.) Street hockey
- 50.) Swimming, water exercise
- 51.) Tennis
- 52.) Volleyball
- 53.) Walking (briskly)
- 54.) Weight/circuit training
- 55.) Gymnastics/tumbling
- 56.) Kickboxing/Tae Bo
- 57.) Track and field
- 58.) Trampoline
- 59.) Other _____

Sample activity time sheet:

The table below shows the correct way to fill out the activity time sheets.
Note that only **one** intensity level is checked for each activity.

	Activity Number	Light	Moderate	Hard	Very Hard
7:00-7:30	22	✓			
7:30-8:00	21	✓			
8:00-8:30	18		✓		
8:30-9:00	28	✓			
9:00-9:30	28	✓			
9:30-10:00	26			✓	
10:00-10:30	26			✓	

EATING AND EXERCISE IN CHILDREN WITH ASD

SUNDAY

Put a "✓" to rate the intensity of each activity.

Write activity numbers in this column.



	Activity Number	Light	Moderate	Hard	Very Hard
breakfast	7:00-7:30				
	7:30-8:00				
	8:00-8:30				
	8:30-9:00				
	9:00-9:30				
	9:30-10:00				
	10:00-10:30				
	10:30-11:00				
lunchtime	11:00-11:30				
	11:30-12:00				
	12:00-12:30				
	12:30-1:00				
	1:00-1:30				
	1:30-2:00				
	2:00-2:30				
	2:30-3:00				
supper time	3:00-3:30				
	3:30-4:00				
	4:00-4:30				
	4:30-5:00				
	5:00-5:30				
	5:30-6:00				
	6:00-6:30				
	6:30-7:00				
evening	7:00-7:30				
	7:30-8:00				
	8:00-8:30				
	8:30-9:00				
	9:00-9:30				
	9:30-10:00				
	10:00-10:30				
	10:30-11:00				
11:00-11:30					
11:30-12:00					

EATING AND EXERCISE IN CHILDREN WITH ASD

Activity Numbers

Eating

- 1.) Eating a meal
- 2.) Snacking

Work

- 3.) Working (e.g., part-time job, child care)
(list) _____
- 4.) Doing house chores (e.g., vacuuming, dusting, washing dishes, animal care, etc.)
- 5.) Yard Work (e.g., mowing, raking)

After School/Spare Time/ Hobbies

- 6.) Church
- 7.) Hanging around
- 8.) Homework
- 9.) Listening to music
- 10.) Marching band/flag line/drill team
- 11.) Music lesson/playing instrument
- 12.) Playing video games/surfing Internet
- 13.) Reading
- 14.) Shopping
- 15.) Talking on phone
- 16.) Watching TV or movie

Transportation

- 17.) Riding in a car/bus
- 18.) Travel by walking
- 19.) Travel by bicycling

Sleep/Bathing

- 20.) Getting dressed
- 21.) Getting ready (hair, make-up, etc.)
- 22.) Showering/bathing
- 23.) Sleeping

School

- 24.) Club, student activity
- 25.) Lunch/free time/study hall
- 26.) P. E. Class
- 27.) ROTC
- 28.) Sitting in class

Physical Activities and Sports

- 29.) Aerobics/acrobic dancing
- 30.) Basketball
- 31.) Bicycling
- 32.) Bowling
- 33.) Calisthenics(i.e., jumping jacks, sit-ups)
- 34.) Cheerleading
- 35.) Dancing (social, recreational)
- 36.) Dancing (ballet, jazz, modern, tap)
- 37.) Field hockey
- 38.) Frisbee
- 39.) Golf
- 40.) Horseback riding
- 41.) Ice/roller skating
- 42.) Jogging/running
- 43.) Karate/judo/martial arts/ self-defense
- 44.) Rollerblading
- 45.) Skateboarding
- 46.) Soccer
- 47.) Softball/baseball
- 48.) Stationary exercise machines (e.g., cycle, ski machine, stair climber, treadmill)
- 49.) Street hockey
- 50.) Swimming, water exercise
- 51.) Tennis
- 52.) Volleyball
- 53.) Walking (briskly)
- 54.) Weight/circuit training
- 55.) Gymnastics/tumbling
- 56.) Kickboxing/Tae Bo
- 57.) Track and field
- 58.) Trampoline
- 59.) Other _____

Sample activity time sheet:

The table below shows the correct way to fill out the activity time sheets.
Note that only **one** intensity level is checked for each activity.

	Activity Number	Light	Moderate	Hard	Very Hard
7:00-7:30	22	✓			
7:30-8:00	21	✓			
8:00-8:30	18		✓		
8:30-9:00	28	✓			
9:00-9:30	28	✓			
9:30-10:00	26			✓	
10:00-10:30	26			✓	

EATING AND EXERCISE IN CHILDREN WITH ASD

MONDAY

Put a "✓" to rate the intensity of each activity.

Write activity numbers in this column.



	Activity Number	Light	Moderate	Hard	Very Hard
before school	7:00-7:30				
	7:30-8:00				
during school	8:00-8:30				
	8:30-9:00				
	9:00-9:30				
	9:30-10:00				
	10:00-10:30				
	10:30-11:00				
lunchtime	11:00-11:30				
	11:30-12:00				
	12:00-12:30				
	12:30-1:00				
	1:00-1:30				
	1:30-2:00				
after school	2:00-2:30				
	2:30-3:00				
	3:00-3:30				
	3:30-4:00				
	4:00-4:30				
	4:30-5:00				
supper time	5:00-5:30				
	5:30-6:00				
	6:00-6:30				
	6:30-7:00				
	7:00-7:30				
	7:30-8:00				
evening	8:00-8:30				
	8:30-9:00				
	9:00-9:30				
	9:30-10:00				
	10:00-10:30				
	10:30-11:00				
	11:00-11:30				
	11:30-12:00				

EATING AND EXERCISE IN CHILDREN WITH ASD

Activity Numbers

Eating

- 1.) Eating a meal
- 2.) Snacking

Work

- 3.) Working (e.g., part-time job, child care)
(list) _____
- 4.) Doing house chores (e.g., vacuuming, dusting, washing dishes, animal care, etc.)
- 5.) Yard Work (e.g., mowing, raking)

After School/Spare Time/ Hobbies

- 6.) Church
- 7.) Hanging around
- 8.) Homework
- 9.) Listening to music
- 10.) Marching band/flag line/drill team
- 11.) Music lesson/playing instrument
- 12.) Playing video games/surfing Internet
- 13.) Reading
- 14.) Shopping
- 15.) Talking on phone
- 16.) Watching TV or movie

Transportation

- 17.) Riding in a car/bus
- 18.) Travel by walking
- 19.) Travel by bicycling

Sleep/Bathing

- 20.) Getting dressed
- 21.) Getting ready (hair, make-up, etc.)
- 22.) Showering/bathing
- 23.) Sleeping

School

- 24.) Club, student activity
- 25.) Lunch/free time/study hall
- 26.) P. E. Class
- 27.) ROTC
- 28.) Sitting in class

Physical Activities and Sports

- 29.) Aerobics/aerobic dancing
- 30.) Basketball
- 31.) Bicycling
- 32.) Bowling
- 33.) Calisthenics(i.e., jumping jacks, sit-ups)
- 34.) Cheerleading
- 35.) Dancing (social, recreational)
- 36.) Dancing (ballet, jazz, modern, tap)
- 37.) Field hockey
- 38.) Frisbee
- 39.) Golf
- 40.) Horseback riding
- 41.) Ice/roller skating
- 42.) Jogging/running
- 43.) Karate/judo/martial arts/ self-defense
- 44.) Rollerblading
- 45.) Skateboarding
- 46.) Soccer
- 47.) Softball/baseball
- 48.) Stationary exercise machines (e.g., cycle, ski machine, stair climber, treadmill)
- 49.) Street hockey
- 50.) Swimming, water exercise
- 51.) Tennis
- 52.) Volleyball
- 53.) Walking (briskly)
- 54.) Weight/circuit training
- 55.) Gymnastics/tumbling
- 56.) Kickboxing/Tae Bo
- 57.) Track and field
- 58.) Trampoline
- 59.) Other _____

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Note that only **one** intensity level is checked for each activity.

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7:00-7:30	22	✓			
7:30-8:00	21	✓			
8:00-8:30	18		✓		
8:30-9:00	28	✓			
9:00-9:30	28	✓			
9:30-10:00	26			✓	
10:00-10:30	26			✓	

EATING AND EXERCISE IN CHILDREN WITH ASD

TUESDAY

Put a "✓" to rate the intensity of each activity.

Write activity numbers in this column.



	Activity Number	Light	Moderate	Hard	Very Hard
before school	7:00-7:30				
	7:30-8:00				
during school	8:00-8:30				
	8:30-9:00				
	9:00-9:30				
	9:30-10:00				
	10:00-10:30				
lunchtime	10:30-11:00				
	11:00-11:30				
	11:30-12:00				
	12:00-12:30				
	12:30-1:00				
	1:00-1:30				
	1:30-2:00				
after school	2:00-2:30				
	2:30-3:00				
	3:00-3:30				
	3:30-4:00				
	4:00-4:30				
supper time	4:30-5:00				
	5:00-5:30				
	5:30-6:00				
	6:00-6:30				
	6:30-7:00				
	7:00-7:30				
	7:30-8:00				
	8:00-8:30				
	8:30-9:00				
	9:00-9:30				
evening	9:30-10:00				
	10:00-10:30				
	10:30-11:00				
	11:00-11:30				
	11:30-12:00				

EATING AND EXERCISE IN CHILDREN WITH ASD

Activity Numbers

Eating

- 1.) Eating a meal
- 2.) Snacking

Work

- 3.) Working (e.g., part-time job, child care)
(list) _____
- 4.) Doing house chores (e.g., vacuuming, dusting, washing dishes, animal care, etc.)
- 5.) Yard Work (e.g., mowing, raking)

After School/Spare Time/ Hobbies

- 6.) Church
- 7.) Hanging around
- 8.) Homework
- 9.) Listening to music
- 10.) Marching band/flag line/drill team
- 11.) Music lesson/playing instrument
- 12.) Playing video games/surfing Internet
- 13.) Reading
- 14.) Shopping
- 15.) Talking on phone
- 16.) Watching TV or movie

Transportation

- 17.) Riding in a car/bus
- 18.) Travel by walking
- 19.) Travel by bicycling

Sleep/Bathing

- 20.) Getting dressed
- 21.) Getting ready (hair, make-up, etc.)
- 22.) Showering/bathing
- 23.) Sleeping

School

- 24.) Club, student activity
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- 29.) Aerobics/aerobic dancing
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- 46.) Soccer
- 47.) Softball/baseball
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7:30-8:00	21	✓			
8:00-8:30	18		✓		
8:30-9:00	28	✓			
9:00-9:30	28	✓			
9:30-10:00	26			✓	
10:00-10:30	26			✓	

EATING AND EXERCISE IN CHILDREN WITH ASD

Measure 3: Caregiver Report of Accepted Foods

In the space below, please list the foods your child will eat.

A large, empty rectangular box with a thin blue border, intended for the caregiver to list the foods their child will eat.