December 2019

Exploring Yoga as a Leisure-Stress Coping Strategy Among Adults with Intellectual and Developmental Disabilities

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ABSTRACT

Individuals with intellectual and developmental disabilities (IDD) are at a greater risk for experiencing stress, particularly stress associated with negative interpersonal relations, than individuals without disabilities. Research has found that individuals with IDD often use maladaptive coping strategies to manage stress. The purpose of this study was to explore whether participation in a seven-and-a-half week yoga intervention served as a leisure-stress coping strategy for adults with IDD. Using a multi-method research design, six participants completed pre- and post-Lifestress Inventory assessments, and nine participants completed post-intervention semi-structured interviews focused on yoga and coping. Qualitative results indicated that yoga served as an emotion-focused coping strategy for participants, as it enhanced their mood, and provided them a sense of social support. Qualitative data did not suggest that yoga served as a problem-focused coping strategy for participants. While results suggest that yoga has the potential to serve as emotion-focused coping strategy for adults with IDD, it is recommended that yoga be offered in conjunction with other stress management interventions when teaching stress-coping techniques to adults with IDD. Future research should continue to explore adults with IDD’s stress experiences, and the types of coping strategies they find most effective when managing stress.
ACKNOWLEDGMENTS

First, I would like to thank my committee chair, Dr. Brandi Crowe. She has pushed me through this thesis process and cheered me on. Brandi has helped me persevere through many trials during this thesis. I am very grateful for all of the dedication she has put into my thesis and success. Not only has she supported me through graduate school, but she has also supported in the field by answering questions about job interviews and filling out recommendation letters for jobs. Your passion for research and recreation therapy is clear and I’m thankful to have been a part of it! I would also like to thank my other committee members, Dr. Marieke Van Puymbroeck and Dr. Brent Hawkins. The knowledge you both gave me throughout the process helped me grow as a better researcher and recreation therapist. Thank you to everyone who was on the research team that played a role in the study, I am grateful to have worked a long side of all of you!

To my family, thank you for believing in me and pushing me to further my career. Thank you for picking up the phone to hear about my research, my day, or giving me encouragement. To my mom, thank you for inspiring me to help others and pursue this field, I love you. To my husband Emmett, first I would like to say thank you for reading my papers without any complaint. I am so grateful for your constant encouragement throughout this process and celebrating each small victory we have made in this along the way. I love you!
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CHAPTER ONE

Introduction

Diagnosed before age 22, developmental disabilities are chronic health conditions in which individuals experience deficits in physical or cognitive functioning (Centers for Disease Control and Prevention, 2018a; National Institutes of Health, 2018). Deficits in physical functioning may include visual impairment or motor deficits, while limitations in cognitive functioning may include difficulties with learning math, writing, or language skills (University of Minnesota Institute on Community Integration, 2018). Examples of developmental disabilities include individuals with autism spectrum disorder, intellectual disabilities, cerebral palsy, and spina bifida (Centers for Disease Control and Prevention, 2018a).

As of 2012, an estimated 4.7 million individuals living in the United States had an intellectual and developmental disability (Larson et al., 2014). Intellectual disabilities, a type of developmental disability, are diagnosed before the age of 18 and are characterized by limitations in cognitive and adaptive functioning. Deficits in cognitive functioning may include challenges with learning academic skills, problem solving, judgment and decision-making skills, and abstract thinking (American Psychiatric Association, 2013). Impairments in adaptive functioning include deficits in conceptual skills, social skills, and practical skills required for independent self-care (American Association of Intellectual and Developmental Disabilities, 2016; American Psychiatric Association, 2013; National Institutes of Health, 2018). Examples of intellectual disabilities include autism spectrum disorder, Down syndrome, Fragile X syndrome, and fetal alcohol
spectrum disorders (American Psychiatric Association, 2013; The Arc, 2015). This study focused on adults with intellectual and developmental disabilities (IDD), who have been diagnosed with a health condition during childhood that has resulted in impaired physical, cognitive, and/or adaptive functioning.

Between 1997 and 2008, there was a 17% increase in the prevalence rate of individuals with developmental disabilities (Boyle et al., 2011). Medical advancements, greater societal awareness of developmental disabilities, and the availability of earlier diagnostic screenings may contribute to the increased prevalence rate (Boyle et al., 2011). Also within the last 20 years, disability rights legislation and sociocultural attitudes towards individuals with disabilities and inclusion has improved such that fewer individuals with IDD are institutionalized, with higher employment rates occurring within this population (Amado, Stancliffe, McCarron, & McCallion, 2013). While these changes represent positive progress for individuals with IDD regarding community engagement, adults with IDD continue to be at an increased risk for secondary health conditions, including obesity, high blood pressure, and osteoporosis (Burk & Sharaievska, 2017; Martinez-Zaragoza, Campillo-Martinez, & Ato-Garcia, 2015; Heller, McCubbin, Drum, & Peterson, 2011; Johnson, 2009).

While individuals with intellectual disabilities have reported experiencing stressors similar to the general population (Bramston, Fogarty, & Cummins, 1999; Bramston & Mioche, 2001), research indicates that individuals with intellectual disabilities may be at risk for experiencing more stress than individuals without a disability (Hartley & MacLean, 2005). Researchers attribute individuals with intellectual
disabilities’ additional stress to negative interpersonal relations (i.e., being teased or bullied), and lacking competencies necessary for successfully navigating the stressful events (Bramston et al., 1999; Hartley & MacLean, 2005). In a study specific to individuals with mild intellectual disabilities’ stress and coping processes (Hartley & MacLean, 2005), avoidant coping was found to be the most often utilized coping strategy among individuals with mild intellectual disability in response to negative interpersonal relations. Avoidant coping strategies can be maladaptive for individuals with intellectual disabilities as individuals need to learn to actively resolve stressful situations (Hartley & MacLean, 2005). Using maladaptive coping strategies can also increase individuals with IDD’s risk for experiencing symptoms of depression (Hartley & MacLean, 2005; Hartley & MacLean, 2009; Lunsy, 2003) and mental health conditions (Scott & Havercamp, 2014).

Yoga, an ancient Indian practice, focuses on postures, breathing, and meditation in order to increase physical, cognitive, and emotional health (National Center for Complementary and Integrative Health, 2013; Ross & Thomas, 2010). Yoga has shown to have therapeutic benefits for various populations with and without disabilities, including: healthy young adults (Pascoe & Bauer, 2015; Tracy & Hart, 2013); older adults (Schmid, Van Puymbroeck, & Koceja, 2010); college students (Pascoe et al., 2015); cancer patients (Bower, Woolery, Sternlieb, & Garet, 2005); cancer survivors (Bower et al., 2005; Mackenzie, Carlson, Ekkekakis, Paskevich, & Culos-Reed, 2013; Van Puymbroeck, Schmid, Shinew, & Hsieh, 2011); caregivers (Pascoe et al., 2015); individuals with Parkinson’s disease (Hawkins et al., 2018; Sharma, Robbins, Wagner, &
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Colgrove, 2015); individuals with intellectual disabilities (Hawkins, Stegall, Weber, & Ryan, 2012); individuals who have experienced a stroke (Schmid, Miller, Van Puymbroeck, & DeBaun-Sprague, 2014; Van Puymbroeck, Allsop, Miller, & Schmid, 2014); individuals with diabetes, multiple sclerosis, menopause, kidney disease, and schizophrenia (Ross & Thomas, 2010); and individuals with alcohol dependence, restless leg syndrome, and osteoarthritis (Pascoe et al., 2015). Results from various studies have shown participation in yoga improves quality of life and frequency of exercise (Hawkins et al., 2012); socialization (Ross & Thomas, 2010); flexibility and strength (Ross & Thomas, 2010; Schmid et al., 2014; Tracy & Hart, 2013; Van Puymbroeck et al., 2011); balance (Hawkins et al., 2018; Schmid et al., 2014; Schmid et al., 2010; Sharma et al., 2015); range of motion (Van Puymbroeck et al., 2014); body image (Van Puymbroeck et al., 2011); mobility (Hawkins et al., 2018); fear of falling (Hawkins et al., 2018; Schmid et al., 2014; Schmid et al., 2010); and stress levels and mood (Bower et al., 2005; Li & Goldsmith, 2012; Mackenzie et al., 2013; Pascoe et al., 2015; Smith, Hancock, Blake-Mortimer, & Eckert, 2006).

In an effort to explain the psychosocial benefits of yoga, Crowe, Van Puymbroeck, and Schmid (2016) proposed yoga as a form of leisure-stress coping. Specifically, Crowe et al., (2016) suggest yoga can serve as a problem- or emotion-focused coping strategy, including palliative coping, mood enhancement, and social companionship. As problem-focused coping, an individual attempts to decrease stress through the behavioral action of completing yoga poses, postures, and breathing exercises (Crowe et al., 2016). As emotion-focused coping, yoga participation facilitates
individuals changing their perspective about their stress, and their ability to manage it (Crowe et al., 2016). To further expand on emotion-focused coping, participation in yoga may offer individuals a brief reprieve from stress (i.e., palliative coping); a sense of optimism and renewed energy (i.e. mood enhancement), or social support when completed in a group setting with others (i.e., social companionship). To the author’s knowledge, there is no research investigating the potential for yoga to serve as a coping mechanism for adults with IDD.

**Purpose Statement**

Based on Crowe, Van Puymbroeck, and Schmid’s (2016) yoga as leisure-stress coping framework, the purpose of this study was to explore whether participation in a seven-and-a-half week yoga intervention served as a form of problem- or emotion-focused coping for adults with IDD. Specific to emotion-focused coping, this study also explored whether participation in yoga served as social companionship, palliative coping, or mood enhancement among adults with IDD. In order to better understand how adults with IDD cope with stress, data specific to perceived stress levels was also collected.

**Specific Aims**

*Specific Aim 1:* To explore whether participation in yoga served as a problem- or emotion-focused coping strategy for adults with IDD. The researcher hypothesized that participation in a seven-and-a-half week yoga intervention increases problem- and emotion-focused coping among adults with IDD.

*Specific Aim 2:* To explore whether participation in yoga served as one of the three subdomains of emotion-focused coping: palliative coping, social companionship, or
mood enhancement for adults with IDD. The researcher hypothesized that participation in
a seven-and-a-half week yoga intervention increases palliative coping, social
companionship, and mood enhancement among adults with IDD.
CHAPTER TWO

Literature Review

This literature review examines research related to individuals with IDD, stress and coping among adults with IDD, and yoga as a form of leisure-stress coping.

Developmental Disabilities

Developmental disabilities are a group of disorders that are diagnosed before the age of 22 and affect an individual’s cognitive and physical functioning. Approximately one in six children have a developmental disability in the United States (Centers for Disease Control and Prevention, 2018a). Developmental disabilities include communication disorders, learning disorders, motor disorders, and intellectual disabilities, and can result in deficits in socialization, academics, and occupational endeavors (American Association of Intellectual and Developmental Disabilities, 2016; American Psychiatric Association, 2013; National Institutes of Health, 2018).

Intellectual disability. Globally, it is estimated that one percent of the population (approximately 10 out of every 1,000 individuals) has an intellectual disability (American Speech-Language-Hearing Association, 2018). An intellectual disability is type of developmental disorder characterized by deficits in cognitive and adaptive functioning. Deficits in cognitive functioning include difficulty in learning academic skills, problem solving, and abstract thinking. Limitations in adaptive functioning may include challenges with language, communication, and skills necessary for independent self-care (American Psychiatric Association, 2013). Previously, intellectual disabilities were diagnosed based on an individual’s IQ score. However, diagnosis is now based on the
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extent to which an individual’s adaptive and cognitive functioning are impaired during the developmental period (American Psychiatric Association, 2013). Individuals may be diagnosed as having a mild to moderate, severe, or profound intellectual disability, based on the extent to which adaptive and cognitive functioning are impaired, and the level of support needed in completing daily activities (Boat & Wu, 2015). For example, children whose adaptive functioning is mildly impaired may experience slower academic development, and require assistance when performing daily tasks or responding to social cues. As an adult, individuals with mild impairment can independently care for themselves, although their ability to respond to social cues may still be lacking. In contrast, individuals whose adaptive functioning is profoundly impaired are dependent on others for care, communication, and completion of daily tasks (American Psychiatric Association, 2013). For the purpose of this literature review, the most common types of intellectual disability among individuals living in the U.S. will be addressed; these include autism spectrum disorder, Down syndrome, Fragile X syndrome, and fetal alcohol spectrum disorder (American Psychiatric Association, 2013).

*Autism spectrum disorder.* One in 59 children in the United States are diagnosed with autism spectrum disorder (ASD) each year (Centers for Disease Control and Prevention, 2018d). ASD is an intellectual disability in which an individual’s social and communication skills are impaired (American Psychiatric Association, 2013). Communication deficits may include a lack of speech, trouble forming words, or issues with vocabulary and grammar. Social deficits may consist of issues with interacting with others, appropriately expressing emotion, and processing other’s emotional cues. Often,
individuals with ASD also demonstrate repetitive behaviors, such as rocking, or flapping their arms or hands (American Psychiatric Association, 2013). Symptoms associated with ASD may be noticeable within the first 12 months of life, however diagnosis occurs around the age of two, as ASD features become more distinguished. There is no cure for ASD, however early intervention can help improve symptoms related to ASD (National Institute of Mental Health, 2018). Treatment for individuals with ASD, including applied behavior analysis, sensory integration therapy, occupational therapy, recreational therapy, and pharmacology, aim to minimize functional deficits and promote the acquisition of new skills (Centers for Disease Control and Prevention, 2018d; Hume, Bellini, & Pratt, 2005).

*Down syndrome.* In the United States, Down syndrome (DS) is diagnosed in one out of every 700 newborns each year (Centers for Disease Control and Prevention, 2018e). DS is a type of intellectual disability diagnosed at infancy, and caused by the genetic condition trisomy 21. Individuals with DS typically have almond-shaped eyes, a flattened face, and hypotonia (Centers for Disease Control and Prevention, 2018e; U.S. National Library of Medicine, 2018a). Individuals with DS may experience both cognitive and physical deficits, including delays in learning, speech, crawling, and walking (U.S. National Library of Medicine, 2018a). Individuals with DS are also at risk for developing secondary medical conditions such as gastroesophageal reflux, celiac disease, hypothyroidism, leukemia, ASD, and Alzheimer’s disease. Occupational, speech, recreational and physical therapies are utilized with individuals with DS for the purpose of helping them develop self-care skills, improve communication skills, and increase
motor function (National Down Syndrome Society, 2018; National Institute of Child
Health and Development, 2017; Menear, 2007).

Fragile X syndrome. Approximately “1.4 per 10,000 males and 0.9 per 10,000
females” are diagnosed with Fragile X syndrome (FXS) globally (Centers for Disease
Control and Prevention, 2018b, para 1). FXS is an intellectual disability that can result in
varying delays in developmental (i.e., walking and crawling), learning (i.e., new skills),
and social behaviors (i.e., eye contact or speaking with others) (Centers for Disease
Control and Prevention, 2018b; U.S. National Library of Medicine, 2018b). FXS is
caused by a mutation in the FMR1 gene, which affects the normal development of the
brain (Centers for Disease Control and Prevention, 2018b). Characteristics become more
pronounced with age, and include “a long and narrow face, large ears, a prominent jaw
and forehead, unusually flexible fingers, flat feet” (U.S. National Library of Medicine,
2018b, para 3). Individuals with FXS are diagnosed around 37 months of age through
genetic tests, with one-third of individuals with FXS diagnosed as having co-occurring
ASD or attention deficit disorder. While there is no cure for FXS, speech, occupational,
recreational, and sensory integration therapies are used to address deficits in
communication skills, and practical skills necessary for activities of daily living (Centers
for Disease Control and Prevention, 2018b; Hume, Bellini, & Pratt, 2005).

Fetal alcohol spectrum disorders. Fetal alcohol spectrum disorders (FASD) occur
in individuals whose mother consumed alcohol while pregnant. As a result, alcohol enters
the baby’s bloodstream, which affects the child’s brain and physical development
(Centers for Disease Control and Prevention, 2018c). Studies indicate that there are “0.2
to 1.5 infants with fetal alcohol syndrome for every 1,000 live births in certain areas of the United States.” (Centers for Disease Control and Prevention, 2018c, para 2).

Individuals with FASD may have abnormal facial features (i.e., groove on upper lip or space between corners of the eyes), experience lower than average height or weight, and have deficits in intellectual functioning, self-regulation (i.e., mood or attention), and adaptive functioning (“Identifying Individuals with Prenatal Alcohol Exposure”, n.d.). Individuals with FASD may not be diagnosed until adolescence or adulthood as an individual’s learning impairments become more prominent with age. Due to the residual effects of FASD, adults with FASD are more at risk for experiencing “trouble with the law, mental health problems, an inability to live independently and victimization” (“Adults Living with FASD”, n.d., para 2). Early intervention services, including speech, physical, and recreational therapies, can improve the development of individuals’ physical strength, motor skills, social skills, and communication skills (Olsen & Montague, 2011). Symptoms associated with FASD are also treated with anti-depressant and anti-anxiety medications (Centers for Disease Control and Prevention, 2018c).

For the purposes of this study, the term intellectual and developmental disability (IDD) will be used to represent individuals who have been diagnosed with a health condition during childhood that has resulted in impaired physical, cognitive, and/or adaptive functioning. Stress can be experienced for individuals with IDD due to deficits individuals experience such as limitations in communication or social skills (Hartley & MacLean, 2005).

**Stress and Coping**
Stress can be defined as when “happens when you feel that you may not be able to handle a problem” (Hartley & MacLean, 2005, p. 289). Both positive and negative situations can create stress. Eustress occurs when a positive situation (e.g., getting married, starting a new job) creates stress that results in an individual feeling motivated, and improves their performance in completing tasks (Mills, Reiss, & Dombeck, 2018). Distress occurs when a negative situation (e.g., conflict with others, loss of a loved one) creates stress that is unpleasant and causes the individual experiencing it to become anxious or concerned (Mills et al., 2018). When an individual experiences distress that appears negative over an extended period of time, physical and emotional health is impacted, and can lead to an individual experiencing depression, anxiety, chronic fatigue, burn out, and pain (Granath, Ingvarsson, von Theile, & Lundberg, 2006; Smith et al., 2006). Thus, it is important that individuals establish healthy coping strategies for managing stress.

Coping can be defined as “the cognitive and behavioral efforts employed to manage the demands (external and/or internal) of a stressful situation and/or the emotions surrounding the situation” (Hartley & MacLean, 2008, p. 110; Lazarus & Folkman, 1984). According to Lazarus and Folkman (1984), primary appraisal occurs when an individual recognizes a situation has the potential to cause eustress or distress. Based on primary appraisal, if the individual determines the situation to be distress, the individual moves to secondary appraisal to determine what type of coping strategy to employ to eliminate the stressor (Folkman, Lazarus, Gruen, & DeLongis, 1986; Hutchinson, Loy, Kleiber, & Datillo, 2003).
In the Transactional Theory of Stress and Coping, Lazarus and Folkman (1984) identify problem- and emotion-focused coping as two strategies individuals use to manage stress. In problem-based coping, an individual’s attempts to eliminate the stressors behaviorally through their actions. Problem-focused strategies may include creating a to-do list (Folkman & Moskowitz, 2004), setting a goal, or seeking advice (Hutchinson, Loy, Klieber, & Dattilo, 2003). In emotion-focused coping, an individual makes an effort to decrease stress by changing their perspective of the situation (Folkman, Chesney, McKusick, Ironson, Johnson, & Coates, 1991). Positive emotion-focused strategies may include the use of meditation, support groups, humor, talking to someone; maladaptive emotion-focused strategies might include the use of illicit substances (Hutchinson, Loy, Klieber, & Dattilo, 2003). Stress and coping processes are complex, which result in individuals using different problem- or emotion-focused coping strategies to address various stressors. There is not one correct way of coping, and depending on the stressor, some events may require individuals to utilize more than one coping strategy at a time (Folkman & Moskowitz, 2004).

**Stress and coping for adults with IDD.** Research has reported that individuals with intellectual disabilities have stress similar to the general population (Bramston et al., 1999; Bramston & Mioche, 2001). Additional research indicates that individuals with intellectual disabilities have higher rates of stress, when compared to individuals without a disability, due to their experiencing negative interpersonal relations, and lacking competencies necessary for managing stress (Hartley & MacLean, 2005).
Stressors for individuals with IDD. Bramston et al. (1999) conducted a study to assess common stressors among individuals with mild to moderate intellectual disability (N=459). Quantitative data was obtained using the Lifestress Inventory, a scale specific to stress for individuals with intellectual disabilities. More than 50% of study participants identified arguing with others, being teased, and being interrupted by others as stressors as more stressful than any other situation for the individuals (Bramston et al., 1999).

In a similar study, Bramston and Mioche (2001) surveyed 80 participants with a disability, 31 of whom had an intellectual disability, using the Lifestress Inventory to inquire about perceived stress and disability. Thirty-nine percent of study participants identified their having a disability as being a stressor in their lives, which researchers attributed to individuals focusing on their lack of skills and limitations. Findings showed that more than 50% of the sample reported negative interpersonal relations as the most prevalent stressor in their lives. Researchers attributed to their experiencing physical barriers to interacting with others, or social prejudice when interacting with others as potential reasons for stress regarding interpersonal relations, however they indicate further investigation is warranted.

Bishop-Fitzpatrick, Mazefsky, Minshew, and Eeck (2015) examined perceived stress and social support on quality of life in adults with autism spectrum disorder (N=40) and individuals without a diagnosis of an intellectual disability (N=28). Results found that individuals with autism spectrum disorder have lower numbers of social support and quality of life than individuals without a diagnosis of intellectual disability which can be linked to stress. The study found that perceived stress was related to lower quality of life
for individuals with autism spectrum disorder while it was not correlated for individuals without an intellectual disability while both found perceived stress to be correlated with social support. The quality of life variance was 56% for individuals with autism spectrum disorder and 63% for individuals without intellectual disability when also factoring in perceived stress, treatment exposure, and social support (Bishop-Fitzpatrick, Mazefsky, Minshew, & Eeck, 2015).

_Coping strategies used among individuals with IDD._ Due to social strain and limited ability to regulate their emotions, adults with intellectual disabilities may use inappropriate coping strategies to deal with stress during interpersonal interactions. Hartley and Maclean (2005) conducted a study for the purpose of assessing stress, perceived control, psychological distress, and the types of coping strategies used by individuals with mild intellectual disabilities (N=88). Data was obtained using the Lifestress inventory, the Birleson Depressive Short Form Self-Rating Scale, and a four-point Likert-scale that asked about control in specific situations (Hartley & MacLean, 2005). Results indicated that participants used one or more of the following coping strategies: avoidant coping, active coping, or distraction coping. Individuals with intellectual disabilities who utilized avoidant coping strategies attempted to steer clear of the stressor all together. With active coping, individuals attempted to gain control over the stressor, or their emotions in relation to the stressor. Individuals who used distraction coping aimed to divert from the stressor through positive activities and thoughts (Hartley & MacLean, 2005). Findings suggested that 69.3% of individuals with mild intellectual disabilities used a combination of active, distraction, and avoidant coping strategies when
dealing with stress, while only 4.25% used a single coping strategy (Hartley & MacLean, 2005). The authors did not indicate what coping strategies the remaining 26.45% of participants used. Overall, authors concluded that active coping strategies were used more than avoidant or distraction coping. Individuals used active coping strategies during situations deemed as controllable (e.g., autonomous decision-making, independently managing money). Distraction coping strategies were used during situations that were out of the control of the individual (e.g., individuals arguing, someone becoming seriously ill) (Hartley & MacLean, 2005).

Also, based on Lifestress Inventory responses, participant’s answers regarding stress were grouped into three sub-categories: stress associated with general worry, competency concerns, or negative interpersonal relations. Hartley and MacLean (2005) then analyzed which coping strategies were more prevalent specific to the type of stress experienced. There was no significant difference in the use of distraction coping across the three subcategories of stress. Active coping strategies were used more for stressors linked to general worry or competency concerns; avoidant strategies were more often used for stress associated with negative interpersonal relations. Researchers concluded that the use of maladaptive coping strategies among individuals with intellectual disabilities specific to interpersonal relations could be the result of their lacking the functional skills required for navigating interpersonal relations, and/or their lack of independence when making decisions or handling situations due to their being under the care of a parent/guardian. Researchers suggest an increased focus on education regarding stress and active coping strategies is needed for individuals with intellectual disabilities.
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so that they can learn how to problem solve or modify stressful situations (Hartley & MacLean, 2005).

Hartley and MacLean (2008) conducted another study for the purpose of evaluating coping strategies used by individuals with intellectual disability (N=114) during stressful social situations. Specifically, the study evaluated the use of active coping strategies, including problem-focused (behavior modification to manage stress), emotion-focused (attempt to manage stress through emotional response), and support-seeking coping strategies (using others to gather solutions for stress). Data related to stress was obtained through quantitative measures; qualitative methods were used to obtain data related to coping. Researchers also explored the use of avoidant coping strategies, including behavioral-avoidance (physically staying away from stressor), and cognitive-avoidance (not thinking about stressor) coping strategies (Hartley & MacLean, 2008). Findings indicated that 42.5% of individuals with intellectual disabilities used both active and avoidant coping strategies when dealing with stressful social situations (Hartley & MacLean, 2008). Problem-focused strategies were used by 34% of participants, with 13% using emotion-focused strategies, 17% using support-seeking strategies, 19% using behavioral-avoidance strategies, and 15% using cognitive-avoidance strategies. While problem-focused coping was used the most by study participants, Hartley and MacLean (2008) suggest that emotion-focused strategies should be encouraged among individuals with intellectual disabilities as they can create positive emotions, and decrease psychological distress related to social stressors. Results also concluded that participants used both cognitive- and behavioral-avoidance strategies in
equal amounts; the researchers suggest that active strategies are more beneficial for individuals with intellectual disabilities than avoidance strategies.

*Risk factors associated with maladaptive coping for individuals with IDD.* A lack of proper coping strategies can lead to secondary health issues, including symptoms of depression and mood-related problems in individuals with IDD (Hartley & MacLean, 2005). Lunsky (2003) analyzed differences in depression in 48 women and 51 men with mild to moderate IDD. In comparison to men, women with intellectual disabilities were found to have higher rates of depressive symptoms. Additionally, researchers found that female participants’ higher depression scores were linked to higher stress levels, poor social support, and their using fewer coping strategies in comparison to male participants with mild to moderate IDD. Lunsky (2003) concluded that female participants encounter more stress as a result of challenges with housing, employment, social relationships, decreased family support and feelings of loneliness.

Individuals with intellectual disabilities who experience symptoms of depression are also more likely to use avoidant coping strategies during stressful social situations (Hartley & MacLean, 2008; 2009). Hartley and MacLean (2009) conducted a study for the purpose of understanding stress and coping specific to social situations among individuals with intellectual disabilities diagnosed as being depressed (n=47), and individuals with intellectual disabilities not experiencing depression (n=47). Participants were asked to complete various measures related to depression, stressful social interactions, coping strategies, and causal attribution. Findings showed that individuals with intellectual disabilities who were depressed experienced more stressful social
situations than individuals without depression. Subsequently, individuals with intellectual disabilities who were depressed experienced more stress as a result of the higher frequency of stressful social situations than individuals without depression. Results also indicated that individuals in the depressed group used fewer coping strategies than the non-depressed group. Individuals with intellectual disabilities who were depressed used more avoidant, and less active coping strategies, than individuals who were not depressed. Thus, similar to Hartley and MacLean (2005), researchers recommended that practices focused on teaching active coping strategies to individuals with intellectual disabilities experiencing depression of use in managing stressful social situations increase (Hartley & MacLean, 2009).

Individuals with IDD may be more at risk for mental health and behavioral conditions due to maladaptive coping strategies used during stressful situations. Scott and Havercamp (2014) conducted a study to determine the prevalence of mental health conditions among individuals with intellectual disabilities (N=10,627). Data was obtained using a survey in which individuals with intellectual disabilities completed 13 items asking about stressful events and social support; participants’ case workers also completed a 16-item checklist related to the individual’s mental health. Thirty-six percent of individuals in the study had a co-occurring mental health condition, with 45% having at least one behavior problem. Thirty-nine percent of individuals reported experiencing at least one stressful life event. Researchers determined that individuals were at a 20% increased risk for experiencing mental health issues, and a 19% increased risk for experience behavioral issues (e.g., aggression, destructive behaviors) for every additional
stressor experienced. With higher stress, there is a need for individuals with intellectual disabilities to use healthy coping strategies so that risks associated with secondary mental health conditions and behavioral issues are minimized (Scott & Havercamp, 2014). Although not previously researched, a potential way for individuals with IDD to manage everyday stressors and minimize secondary health risks could be through participation in yoga.

**Yoga**

Yoga involves the practice of physical postures, breathing exercises, and meditation for the purpose of improving physical, cognitive, and emotional health (National Center for Complementary and Integrative Health, 2013; Ross & Thomas, 2010). Yoga studies have been completed with numerous populations, including: healthy young adults (Pascoe et al., 2015; Tracy & Hart, 2013); older adults (Schmid et al., 2010); college students (Pascoe et al., 2015); cancer survivors (Bower et al., 2005; Mackenzie et al., 2013; Van Puymbroeck et al., 2011); caregivers (Pascoe et al., 2015); individuals with intellectual disabilities (Hawkins et al., 2012); individuals who have experienced a stroke (Schmid et al., 2014; Van Puymbroeck et al., 2014); individuals with diabetes, multiple sclerosis, menopause, kidney disease, schizophrenia (Ross & Thomas, 2010). Results of the aforementioned yoga studies have shown that participation in yoga can lead to physical and psychosocial benefits including: improvement in quality of life and frequency of exercise (Hawkins et al., 2012); socialization (Ross & Thomas, 2010); flexibility and strength; (Ross & Thomas, 2010; Schmid et al., 2014; Tracy & Hart, 2013; Van Puymbroeck et al., 2011); balance (Hawkins et al., 2018; Schmid et al., 2014).
Yoga and stress. Yoga has also been shown to decrease levels of stress and improve mood for various populations (Bower et al., 2005; Li, & Goldsmith, 2012; Mackenzie et al., 2013; Pascoe et al., 2015; Smith et al., 2006). In a systematic review of 25 studies, yoga was found to decrease stress and improve mood among multiple populations, including healthy adults, caregivers, and individuals with physical and psychological needs (e.g., individuals with cancer, alcohol dependence, mood disorders, and osteoarthritis) (Pascoe et al., 2015). Yoga programs implemented Hatha, Iyengar, prenatal, restorative, or Patanjali yoga, and ranged in length between five weeks and six months. The systematic review revealed that participation in Hatha, Iyengar, and prenatal yoga programs leads to biological change (e.g., cortisol levels) and decreased stress levels. In the review, yoga was reported to be practiced as “self-management” and appeared to be growing in popularity as individuals find it more appealing to engage in than taking medication (Pascoe et al., 2015, p.19).

Sharma (2014) conducted a systematic review examining seventeen studies that address yoga as a stress management technique. The yoga interventions were conducted in varies places such as schools, community centers, work sites, health care settings, and military sites with the types of yoga implemented were hatha yoga, Dru yoga, Sudarshan kriyha, Bikram, mindful yoga, Iyengar, Kripalu, and vinyoga (Sharma, 2014). The duration for the yoga ranged from 30 minutes to six months with the most frequent being
eight weeks long. The scale most often used in the yoga interventions was Cohen’s perceived stress scale. Twelve of the seventeen studies showed positive results of physiological and psychological outcomes related to stress and yoga. Only eight of the twelve studies had randomized controlled trial designs which can be a limitation as it decreases validity without the randomization. Another limitation found in the studies can be concluded that all but two of the studies had sample sizes under 100 participants which calls for future research to use large samples (Sharma, 2014).

Similarly, outcomes of participation in a 10-week Hatha yoga intervention for adults with perceived levels of stress and anxiety (N=131) was conducted (Smith et al., 2006). Quantitative data specific to anxiety, psychological distress, and quality of life was obtained. Quantitative results showed that participation in yoga improved quality of life, and decreased stress and anxiety levels. However, data collected during qualitative interviews post-intervention indicated participants perceived there to be no change in their stress or anxiety levels. Researchers concluded that yoga is a feasible intervention to reduce stress and anxiety as the study yielded positive short-term results. Differences in qualitative findings were attributed to participants having high expectations regarding the extent to which their health would change as a result of the intervention (Smith et al., 2006).

In a systematic review conducted by Li and Goldsmith (2012), 35 yoga trials related to stress and anxiety were reviewed. Researchers found 25 of the 35 yoga trials yielded a decrease in stress and anxiety symptoms. Yoga trials included in the review were offered between two and 10 weeks; study participants included individuals with
cancer, pregnant and postmenopausal women, individuals with metabolic syndrome, and firefighters. Studies assessed changes in perceived stress using a variety of measures such as the Perceived Stress Scale, and Symptoms of Stress Inventory. Studies evaluated anxiety using measures such as Hamilton Anxiety Rating Scale, State Trait Personality Inventory Subscale, Positive Affect & Negative Affect Schedule, Beck Anxiety Inventory, Performance Anxiety Questionnaire, and General Health Questionnaire. While 25 of the 35 studies indicated yoga as having positive outcomes regarding stress and anxiety, due to small sample sizes and a lack of randomized trials, researchers did not recommend yoga replace traditional forms of treatment (i.e., medication) until further evidence regarding the therapeutic use of yoga is available (Li & Goldsmith, 2012).

While several studies have indicated yoga as a means for decreasing stress and improving mood, there is a scarce number of studies that evaluate yoga as a coping mechanism, to determine why or what specific to yoga decreases stress.

**Yoga as coping.** Crowe and colleagues (2016) recently proposed a framework explaining yoga as a leisure-stress coping strategy, based on Iwasaki and Mannell’s (2000) Leisure-Stress Coping Conceptual Framework and Lazarus and Folkman’s (1984) Transactional Theory of Stress and Coping. In working to explain the psychosocial benefits of yoga, Crowe et al.’s (2016) framework suggests that participation in yoga has the capacity to serve as a problem- or emotion-focused coping strategy for individuals working to manage everyday stressors. Through problem-focused coping, an individual can make a behavioral attempt to change the stressor by completing the action requirements of yoga poses and breathing exercises and therefore experience a decrease
in stress. For example, individuals who experience stress related to a fear of falling can participate in yoga as a means to actively improve their balance; thus decreasing their stress and anxiety related to falling (Crowe et al., 2016). As emotion-focused coping, yoga participation results in an individual interpreting or approaching their stressor from a more positive perspective. For example, participation in a group yoga program can bring about a sense of connectedness with self and others. Individuals within the group experiencing similar stressors can provide support and encouragement to one another, causing individuals to feel a restored sense of confidence regarding their ability to manage their stress (Crowe et al., 2016).

The proposed framework extends yoga as an emotion-focused coping strategy to include three sub-categories: yoga as social companionship, yoga as mood enhancement, and yoga as palliative coping strategies. As indicated in the previous example, participation in group yoga programs can serve as social companionship among individuals, which can serve as a coping strategy in that individuals feel supported as they work through their stress. As palliative coping, yoga participation can provide individuals an opportunity to take a break from their stressor. As a result of this brief reprieve, individuals exit yoga with a renewed sense of energy and attitude regarding their stressor and/or their ability to handle their stressor. Yoga as coping through mood enhancement occurs when yoga participation results in individuals experiencing an increase in optimistic thoughts, and a decrease in negative attitudes, resulting in individuals being mentally, in a better frame of mind, and better equipped to manage their stress.
While yoga as coping mechanism has not been researched with individuals with IDD, one study has looked at yoga and coping for women experience symptoms of menopause (Crowe & Van Puymbroeck, 2019). A mixed method study examined the use of yoga as a leisure stress coping strategy through problem and emotion focused coping strategies for twelve women experiencing menopausal symptoms. Results found that through the yoga intervention women found emotion focused coping strategies such as a reprieve or pause during the yoga related to palliative coping, the women had an increase in mood and positive energy and felt a sense of community related to social companionship. The women also found yoga to be a problem focused coping strategies such as the breathing exercises or using the postures (Crowe et al., 2016).

Yoga as coping for individuals with IDD. Crowe et al.’s (2016) framework has not been tested specific to individuals with IDD. However, current evidence suggests that yoga has the potential to serve as a problem- or emotion-focused coping strategy for individuals with IDD. For example, individuals with IDD are more at risk for obesity which can be a stressor for individuals to lose weight (Burk & Sharaievsksa, 2017; Martinez-Zaragoza, Campillo-Martinez, & Ato-Garcia, 2015; Heller, McCubbin, Drum, & Peterson, 2011; Johnson, 2009). As problem-focused coping, an individual with IDD may be dealing with the stress of trying to lose weight, through learning to master the skills of yoga poses and postures, individuals with IDD are choosing to live healthier lives and therefore decreasing stress related to obesity.

Also, studies have shown that individuals with IDD have stressors related to negative interpersonal relations and their disability itself (Bramston et al., 1999;
Bramston & Mioche, 2001; Hartley & MacLean, 2005). As emotion-focused coping, individuals with IDD can create a sense of connectedness with others in their yoga group, and experience a sense of support when sharing about their stressors related to negative interpersonal relations and their having a disability. Through the participation in yoga with others with IDD and sharing about the stressors, individuals can perceive their stress (and their ability to manage it) more positively (Crowe et al., 2016).

**Conclusion**

There is research to suggest individuals with IDD experience more stress than individuals without disabilities, and may need assistance in developing healthy coping strategies for managing stress. A few studies focused on understanding stress and coping processes among individuals with IDD exist, and there is ample literature highlighting the benefits of yoga for various populations to include decreased stress, depression, and anxiety. However, to the author’s knowledge there is no research investigating the potential for yoga to serve as a healthy coping mechanism for individuals with IDD. Thus, the purpose of this multi-method study was to explore whether yoga serves as a leisure-stress coping strategy for adults with IDD.
CHAPTER THREE

Methods

Design of Study

Using a multi-method research design, quantitative and qualitative data were collected to determine whether participation in yoga served as a form of problem- or emotion-focused coping for adults with IDD. A deductive approach was used to evaluate whether problem- or emotion-focused coping (i.e., palliative coping, mood enhancement, or social companionship) was experienced by adults with IDD during, or as a result of participation in yoga as proposed by Crowe et al.’s (2016) yoga as leisure-stress coping framework.

A multi-method research design was used for this study, as there are a limited number of quantitative assessments that address stress and coping for individuals with IDD. In this study, qualitative data served as the primary data strand used to address the research question; quantitative data collected was used to support the qualitative data (Morse, 2003).

Procedures

The primary researcher invited adults with IDD who met the study’s inclusion criteria to participate in a seven-and-a-half week yoga intervention. Recreation program staff assisted with recruitment by sending a packet of information about the yoga study home to participants’ legally appointed representative (LAR). The packet included a cover letter providing information about the yoga program and associated research study, a LAR consent form (see Appendix A), a media release form, and the Physical Activity Readiness Questionnaire (PAR-Q) (see Appendix B). After obtaining LAR consent,
verbal assent (see Appendix C) was obtained from adults with IDD interested in completing the research study.

Individuals who provided verbal assent, obtained LAR consent to participate in the study, and were deemed safe to participate in physical activity based on PAR-Q responses, were asked to complete a three-step cognitive screener for the Lifestress Inventory (LSI). The three-step cognitive screener, a screener used to assess participants’ understanding of the concept of stress and the Likert scale answer options used for the LSI. The LSI was conducted with participants at Clemson University or at the participants’ recreation program facility depending on when participants’ consent and assent was obtained, and based on the participant’s scheduling availabilities. If participants passed the three-step cognitive screener, prior to the start of the yoga intervention, participants completed the LSI to gather information about participants’ stress levels. The LSI was audio- and video-recorded, and conducted with the primary researcher at participants’ recreation program facility. Following pre-data collection, participants engaged in biweekly, 60-minute yoga sessions for seven-and-a-half weeks at Clemson University. At the conclusion of the seven-and-a-half week yoga intervention, participants were asked to complete the LSI again, and participate in a 1:1 semi-structured interview with the primary researcher to gather information about stress, coping, and the influence of yoga on stress and coping processes. Post-data was collected at participants’ recreation program facility.

Selection of Subjects
After receiving Institutional Review Board approval, a purposive criterion-based sampling strategy was used to recruit participants (Smith, Sparkes, & Caddick, 2014). Participants eligible for the study met the following inclusion criteria: (a) were age 18+; (b) had an IDD; and (c) participated in a local recreation program in the southeast United States. Participants were excluded from the study if it was determined that it was not safe for them to engage in physical activity, as indicated by their score on the PAR-Q screener (see Appendix B; Strohle, 2009; Thomas, Reading, & Shephard, 1992). Participants were also excluded from participation in the study if it was determined that they did not cognitively understand the concepts of stress and coping based on results of the three-step cognitive screener (see Appendix D; Hartley & MacLean, 2005; 2008; 2009). The target sample size for this study was 10; this number was based on participation rates at two previous yoga research studies that had been completed with participants from the recreation program.

**Physical Activity Readiness Questionnaire.** The Physical Activity Readiness Questionnaire (PAR-Q) is an eight-item questionnaire that was used as a screener to determine if it was safe for study participants to engage in moderate physical activity (see Appendix B; Strohle, 2009; Thomas, Reading, & Shephard, 1992). The PAR-Q was completed by participant’s LAR. If a LAR answered “yes” to any of the items, the participant with IDD was excluded from the study, unless documentation from their physician indicating it was safe for them to take part in yoga and the study was received.

**Three-step cognitive screener.** Following consent and assent processes, the primary researcher completed a three-step cognitive screener (see Appendix D) with
participants prior to the administering the LSI to confirm participants’ understanding of stress, and the LSI Likert scale answer options. While this process is not part of the LSI’s standardized protocol, two of the three steps were introduced and used in three previous studies involving individuals with intellectual disabilities (Hartley & MacLean, 2005; 2008; 2009).

**Step one.** The first step of the screening process involved the primary researcher reading a definition of “stress” aloud to participants, then asking participants to provide an example of stress or a stressful event. Communication cards with pictures and written text reflective of positive and negative events were provided to participants as needed (see Appendix I), to allow them to choose an example of a stressful event if they could not verbally identify one. If participants were unable to give an example of stress, they were excluded from participation in the LSI.

**Step two.** If the participant gave an appropriate example of stress, the primary researcher initiated the second step of the screening process, in which participants were provided pictures of water glasses with varying amounts of water in each (see Appendix I). The first glass was empty and represented “no water”, the second glass represented “a little” water, the third glass represented “a medium” amount of water, the fourth glass represented “a lot” of water. Participants were asked to identify which water glass was representative of each amount of water (i.e., which glass has “a little” water in it?). The amount of water in each glass was intended to gauge participants understanding of “none”, “a little”, and “a lot” as these amounts mirror the LSI Likert scale answer options (Hartley & MacLean, 2005). Participants who correctly matched the answer options
“none”, “a little”, etc.) to the water glass representative of that amount of water advanced to the third step in the screening process.

Step three. To further confirm participant’s cognitive understanding of the LSI Likert scale answer options, during step three of the screening process, participants were asked to match terms representative of “no stress”, “a little stress”, a “medium amount” of stress, and “a lot of stress” to the water glass representative of “a little”, “a lot”, etcetera (see Appendix I). Participants who passed steps one through three of the screener were eligible to participate in the LSI and the semi-structured interview. If participants only passed step one of the screener, they were eligible to participate in the semi-structured interview but were excluded from completing the LSI.

Setting

The seven-and-a-half week yoga intervention occurred in a large multipurpose room at Clemson University. The yoga instructor set-up mats at the front of the room; participant mats and/or chairs (for those participating from a seated position) were set-up so that participants were facing, and could visibly see the yoga instructor. Yoga blocks, straps, and bolsters were placed next to each participant’s mat or chair. Fluorescent lights were dimmed, to promote a sense of natural lighting throughout the yoga intervention. Participants were provided with a hands-on assist card at their mat, in which they could indicate whether they were comfortable with a yoga instructor or research team member providing hands-on assistance to ensure safe and successful completion of each pose or posture. Participants who did not indicate being comfortable with hands-on assistance,
were provided verbal prompts to assist in their safely and successfully completing poses or postures.

**Intervention**

Twelve 60-minute yoga sessions were offered on Mondays and Wednesdays, from 10:00-11:00am for seven-and-a-half weeks, beginning January 2019 and concluding March 2019. The seven-and-a-half week yoga intervention occurred in a multipurpose room, and all necessary yoga equipment was provided to participants. Each yoga session was planned and facilitated by a certified yoga teacher (e.g., RYT-200), or a certified yoga therapist (e.g., C-IAYT). In addition to the primary yoga instructor, a second research team member demonstrated modified poses and postures for participants to utilize at their discretion. A third research team member demonstrated poses and postures from a seated position for those completing the sequences in chairs to model after; a fourth research team member circulated around the room as needed throughout each session to provide 1:1 hands-on or verbal assistance to participants. The primary researcher also attended sessions and provided assistance to participants or yoga instructors as needed. The seven-and-a-half week yoga curriculum was reflective of Hatha yoga, a form of yoga that focus on postures, breathing exercises, and relaxation (Van Puymbroeck, Payne, & Hsieh, 2007). Postures, poses, and breathing exercises increased in difficulty throughout the seven-and-a-half weeks.

**Data Collection**

Data was collected from participants before and after the seven-and-a-half week yoga intervention. Quantitative data was collected before and after the yoga intervention
to determine participants’ stress levels, and self-reported mood. Qualitative data was collected after the yoga intervention concluded, to learn more about participants’ coping strategies, and whether they considered yoga a coping strategy.

Quantitative data collection.

Demographics questionnaire. To gain a better understanding of participants’ background, demographic information including age, gender, race, and diagnosis was collected from participants’ LAR (see Appendix E).

Lifestress Inventory. Stress was measured using the Lifestress Inventory (LSI), a standardized 30-item questionnaire intended to measure stress among individuals with IDD (Bramston & Bostock, 1994; Hartley & MacLean, 2005; 2008; 2009). For each item (see Appendix F), the LSI produced two scores: a frequency score representative of the number of stressors individuals experienced in the past two weeks, and an impact score representative of the extent to which the identified events had been stressful (0=no stress; 3=a lot of stress) in the past two weeks (Hartley & MacLean, 2005). The LSI also produced scores for three subdomains based on the type or cause of stress represented in each item: general worry, negative interpersonal relations, and competency concerns. The LSI has been used with individuals with mild intellectual disabilities, defined as individuals with an IQ ranging from 55 to 70 (Hartley & MacLean, 2005). The LSI has an inter-reliability score of .87 and internal reliability of .68 as well as a test-retest reliability score of .80 within a two-week period (Bramston & Bostock, 1994; Hartley & Maclean, 2005). For the subdomains, general worry has an inter-reliability score of .80, negative interpersonal relations has a score of .78, and competency concerns has a score
of .73 (Fogarty, Bramston, & Cummins, 1997).

The LSI was administered with participants as an audio- and video-recorded interview. After providing participants a definition of stress, the primary researcher read each LSI item aloud to participants. For each LSI item, participants were asked whether the event identified in the LSI item was a stressor they had experienced within the last two weeks. If the participant indicated the statement was not a stressor, the primary researcher proceeded to the next LSI item. If the participant indicated that the LSI item was representative of a stressor they had experienced, the primary researcher asked the participant to indicate to what extent it had been a stressor in the past two weeks.

Participants were given visual pictures of drinking glasses with varying amounts of water in them (i.e., the first glass was empty and represented “no stress”; the second glass had very little water in it and represented “a little” stress; third glass represented a “medium” amount of stress; the fourth glass was almost full of water and represented “a lot” of stress). Participants were asked to select the water glass that best represented the extent to which the LSI item read was a stressor for them. It is important to note that the answer option for the third glass was changed from “a fair bit” to a “medium amount” of stress for the purpose of using terminology that may be more easily understood by participants when distinguishing between different amounts of stress. This modified terminology was first introduced by Hartley and MacLean (2005). Also, the LSI protocol indicates that questions could be reworded or rephrased as needed, to provide clarification to participants. See Appendix G for a list of rephrased questions and communication cards the primary researcher used as needed, to clarify LSI questions for study participants.
**Feelings chart.** A feelings chart was used to gather information about participant’s mood before and after each 60-minute yoga session (see Appendix H). The purpose of the feelings chart was to gather information about participants’ mood to determine whether yoga participation served as an emotion-focused coping strategy, particularly as it relates to mood enhancement. Participants indicated how they were feeling before the yoga session and immediately after. Specifically, the feelings chart asked participants to respond to the question “How do you feel right now?” by placing a sticky note on the emotion that best aligned with their current mood. Seven answer options (i.e., happy, sad, mad, excited, worried, relaxed/calm, and tired), reflective of positive and negative emotions were provided using written words and visual images to accommodate participants with communication difficulties (Kroese, Gillott, & Atkinson, 1998). The feelings charts were placed at each participant’s yoga mat before the start of each yoga session. At the beginning, and immediately following each yoga class, participants were verbally prompted by the primary researcher and/or yoga instructor to indicate their mood on the feelings chart. The primary researcher collected participants’ pre- and post-feelings chart at the end of each yoga session.

**Qualitative data collection.** Upon completing the seven-and-a-half week yoga intervention, participants were invited to participate in a 1:1 semi-structured interview with the primary researcher (see Appendix I). The purpose of the interview was to better understand the potential influence of yoga on participants’ stress and coping processes. Each interview was audio- and video-recorded and took place at the participants’ recreation program facility. When possible, qualitative interviews occurred with each
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participant the day after they had completed the post-LSI. In doing so, the researcher could ask about coping strategies immediately following participants having discussed their stress. The primary researcher had communication cards (see Appendix I) with visual images that could be used to help clarify questions and provided example answer options to accommodate individuals who were non-verbal or had trouble understanding the meaning of the questions asked. If individuals had trouble verbally answering a question, the primary researcher would ask if they would like to write down their response.

Bracketing and reflexivity. Due to the primary researcher’s previous experience in working with individuals with IDD, and adults from the recreation program during a previous yoga study, bracketing and reflexivity was used throughout the data collection and analysis process (Babbie, 2011; Creswell & Creswell, 2018). The primary researcher bracketed biases and assumptions related to the sample population and yoga prior to the start of data collection. The primary researcher maintained a self-reflective journal throughout data collection by bracketing after each participants’ LSI assessment and after each individual yoga session during the seven-and-a-half week yoga intervention. The primary researcher also bracketed during post-intervention data collection.

Data Analysis

Quantitative analysis. Pre- and post-feelings chart data were entered and analyzing in Microsoft Excel. Demographic variables, and pre- and post-LSI scores were entered into Statistical Package for Social Sciences (SPSS) software Version 25. Descriptive statistics were used to describe participants’ demographic information. A
Shapiro-Wilk test was conducted to determine whether data were normally distributed. After finding the distribution to be non-normal (p=.046), a Wilcoxon signed-rank test was used to determine whether significant change in participants’ pre- and post-LSI scores occurred following the seven-and-a-half week yoga intervention (Zimmerman & Zumbo, 1993). Percent change scores \([(\text{Time 2} - \text{Time 1})/\text{Time 1})\times 100\] were also calculated to determine whether there were any trends in participants’ pre- and post-LSI frequency and impact scores. A Friedman test was used to determine whether there were significant differences in participants pre-LSI subdomain stress scores, and post-LSI subdomain stress scores (i.e., general worry, negative interpersonal relations, and competency concerns) (Hartley & MacLean, 2005; Zimmerman & Zumbo, 1993).

Quantitative data excluded. After completing descriptive and nonparametric statistical analysis (see Appendix J for a summary of LSI results), the primary researcher elected to exclude participants’ quantitative data from the study due to concerns regarding the validity and reliability of the data. Concerns about the accuracy of the data occurred as a result of participants, who based on observation had the cognitive abilities to understand the concept of stress, were excluded from the LSI due to their performance on the three-step cognitive screener. In contrast, several participants who successfully passed the three-step cognitive screener seemed to have difficulty understanding and responding to LSI questions. Also, based on observation, data collected using the feelings charts was inaccurate. For example, one participant who had been emotionally upset and crying during a yoga session indicating feeling “happy” on their feelings chart. Due to the
primary researcher being unable to confirm the accuracy of participants’ quantitative results were eliminated from the study.

**Qualitative analysis.** Audio- and video-recorded interviews were transcribed verbatim, de-identified, and analyzed using deductive directed content analysis (Hsieh & Shannon, 2005). Pre-determined categories based on Crowe et al.’s (2016) yoga as leisure-stress coping framework were identified and guided deductive analysis. To begin analysis, the primary researcher thoroughly read all transcribed interviews to increase familiarity and understanding of qualitative content. For the second step, the primary researcher re-read all interviews and began generating codes based on the pre-determined categories reflective of Crowe et al.’s (2016) yoga as leisure-stress coping framework, identifying content related to yoga as problem- and emotion-focused coping. Three categories were used to reflect emotion-focused coping: palliative coping, social companionship, and mood enhancement. After completing deductive directed content analysis, the primary researcher reviewed the codes to determine if they aligned with the a priori categories used for deductive analysis (Hsieh & Shannon, 2005).

**Credibility and trustworthiness.** To increase the credibility and trustworthiness of the analysis and interpretation of qualitative results, a secondary researcher completed deductive directed content analysis. After both the primary and secondary researcher had completed analysis separate from one another, they met to determine levels of agreement in final qualitative codes and categories. The primary and secondary researcher met to compare one another’s codes and categories, and reached 100% agreement regarding deductive qualitative findings (Creswell & Creswell, 2018).
CHAPTER FOUR

Manuscript

FEASIBILITY OF USING YOGA AS PROBLEM- AND EMOTION-FOCUSED COPING FOR ADULTS WITH INTELLECTUAL AND DEVELOPMENTAL DISABILITIES

This article will be submitted to the:

Annual in Therapeutic Recreation

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Abstract

Individuals with intellectual and developmental disabilities (IDD) are at a greater risk for experiencing stress, particularly stress associated with negative interpersonal relations, in comparison to individuals without disabilities. The purpose of this study was to: (1) explore whether participation in yoga served as a coping strategy for adults with IDD; and (2) determine the feasibility of researching stress and yoga as coping among individuals with IDD. Using a multi-method research design, participants completed a quantitative assessment before and after the seven-and-a-half week yoga intervention, and a semi-structured interview post-intervention. Qualitative findings suggest that yoga can serve as an emotion-focused coping strategy for adults with IDD, as it may increase participants’ mood and enhance their perceived social support. Future research should evaluate yoga as a form of coping for adults with IDD, and identify best practices for conducting stress and coping-related research with adults with IDD.

Keywords: Intellectual and developmental disabilities, yoga, stress, coping, recreational therapy
As of 2012, an estimated 4.7 million individuals living in the United States had an intellectual and developmental disability (Larson et al., 2014). Intellectual and developmental disabilities (IDD) is a term used to represent individuals diagnosed with a health condition before age 22 that results in impaired physical, cognitive, and/or adaptive functioning. Deficits in physical functioning may include visual impairment or motor deficits, while limitations in cognitive functioning may include difficulties with learning math or language skills, or challenges with problem solving, decision making, and abstract thinking (American Psychiatric Association [APA], 2013; University of Minnesota Institute on Community Integration, 2018). Impairments in adaptive functioning include deficits in conceptual skills, social skills, and practical skills required for independent self-care (American Association of Intellectual and Developmental Disabilities, 2016; APA, 2013; National Institutes of Health, 2018). Examples of IDD include autism spectrum disorder, Down syndrome, and Fragile X syndrome (APA, 2013; The Arc, 2015).

**Stress among Individuals with IDD**

While individuals with IDD have reported experiencing stressors similar to the general population (Bramston, Fogarty, & Cummins, 1999; Bramston & Mioche, 2001), research indicates that individuals with IDD may be at risk for experiencing more stress than individuals without a disability (Hartley & MacLean, 2005). Researchers attribute the additional stress of individuals with IDD to negative interpersonal relations (i.e., being teased or bullied), decreased communication and social skills, and lack of coping skills for successfully navigating stressful events (Bramston et al., 1999; Hartley &
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MacLean, 2005). In a study specific to stress and coping processes of individuals with mild IDD (Hartley & MacLean, 2005), avoidant coping was the coping strategy participants reported most often using in response to negative interpersonal relations. Avoidant coping strategies can be maladaptive as individuals need to learn to actively resolve stressful situations (Hartley & MacLean, 2005). Increased stress and the use of maladaptive coping strategies can also increase individuals’ risk for experiencing symptoms of depression, behavioral issues, and mental health conditions for individuals with IDD (Hartley & MacLean, 2005; 2009; Lunsky, 2003; Scott & Havercamp, 2014). Thus, it is important to consider how complementary and integrative health approaches, such as yoga, might assist individuals in managing stress.

**Therapeutic Benefits of Yoga**

Yoga, an ancient Indian practice, uses postures, breathing, and meditation to increase physical, cognitive, and emotional health (National Center for Complementary and Integrative Health, 2013; Ross & Thomas, 2010). Research has shown yoga to have therapeutic benefits for various populations with and without disabilities, including: healthy young adults (Pascoe & Bauer, 2015; Tracy & Hart, 2013); older adults (Schmid, Van Puymbroeck, & Koceja, 2010); individuals with Parkinson’s disease (Hawkins et al., 2018; Sharma, Robbins, Wagner, & Colgrove, 2015); individuals who have experienced a stroke (Schmid, Miller, Van Puymbroeck, & DeBaun-Sprague, 2014; Van Puymbroeck, Allsop, Miller, & Schmid, 2014); and individuals with intellectual disability (Hawkins, Stegall, Weber, & Ryan, 2012). Results from various studies have shown yoga participation can improve quality of life and frequency of exercise (Hawkins et al., 2012);
Yoga as coping. In an effort to explain the psychosocial benefits of yoga, Crowe, Van Puymbroeck, and Schmid (2016) proposed yoga as a form of leisure-stress coping suggesting that yoga has the capacity to serve as a problem- or emotion-focused coping strategy. Using yoga as a problem-focused coping strategy, an individual attempts to decrease their stress through active engagement in yoga poses and breathing exercises. For example, individuals who experience stress related to a fear of falling can participate in yoga as a means to actively improve their balance; thus decreasing their stress and anxiety related to falling (Crowe et al., 2016). As an emotion-focused coping strategy, yoga can help individuals with cognitively rework how they perceive stressors. For example, engagement in yoga poses and breathing exercises may increase participants’ mood and facilitate their having a more optimistic perspective regarding their ability to manage stress (Crowe et al., 2016).

Within Crowe and colleagues’ framework (2016), yoga as an emotion-focused coping strategy includes three sub-categories: yoga as social companionship, yoga as mood enhancement, and yoga as palliative coping. As previously indicated, participation in group yoga programs can serve as social companionship, facilitating individuals feeling supported as they work through their stress. Yoga as coping through mood enhancement occurs when individuals experience an increase in positive thoughts and a
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decrease in negativity following yoga participation, resulting in individuals being in a better mindset, and better equipped to navigate stress. As palliative coping, yoga participation can provide individuals an opportunity to take a break from their stressor. As a result of this brief reprieve, individuals exit yoga with a renewed sense of energy and attitude regarding their stressor and/or their ability to manage their stressor.

Yoga as coping for individuals with IDD. Crowe et al.’s (2016) framework has not been evaluated with individuals with IDD. However, there is evidence to suggest that yoga has the potential to serve as a problem- or emotion-focused coping strategy for individuals with IDD. For example, individuals with IDD have an increased risk for becoming obese. Obesity and/or the pressure to lose weight to avoid the onset of obesity can be a stressor for individuals with IDD (Burk & Sharaievska, 2017; Martinez-Zaragoza, Campillo-Martinez, & Ato-Garcia, 2015; Heller, McCubbin, Drum, & Peterson, 2011; Johnson, 2009). Using yoga as a problem-focused coping strategy, an individual with IDD may learn and continually practice yoga poses and postures as a means to engage in a healthy lifestyle and decrease their risk of obesity, thereby decreasing stress associated with their health and weight.

Also, studies have shown that individuals with IDD have stressors related to negative interpersonal relations, and consider their disability to be a stressor (Bramston et al., 1999; Bramston & Mioche, 2001; Hartley & MacLean, 2005). Using yoga as an emotion-focused coping strategy, individuals with IDD may experience a sense of connectedness when sharing about stressors related to negative interpersonal relations with peers with IDD. In sharing with peers who have likely experienced similar stressors,
participants feel supported, and can provide support to peers as they understand what one
another is experiencing. As a result, individuals may perceive their stress and their ability
to manage it more positively through the support of others (Crowe et al., 2016). The
primary purpose of this study was to explore whether yoga participation served as a
problem- or emotion-focused coping strategy for adults with IDD. This study also aimed
to determine the feasibility of researching stress and yoga as coping among individuals
with IDD.

Methods

Using a multi-method design, quantitative and qualitative data related to stress
and coping were collected from participants. Qualitative data served as the primary data
strand used to address the research question; quantitative data served as the secondary
data strand and was used to support qualitative data (Morse, 2003). However, quantitative
data was analyzed prior to qualitative data so that the researcher could understand the
context of participants’ stress before evaluating participants’ coping strategies, and their
perceptions of yoga as coping. Based on Crowe et al.’s (2016) framework, a deductive
approach was used to evaluate whether adults with IDDs’ participation in yoga served as
problem- or emotion-focused coping strategy for managing stress.

Selection of Subjects

Following Institutional Review Board approval, purposive sampling was used to
recruit participants who: (a) were age 18+; (b) had an IDD; and (c) participated in a
recreation program for individuals with IDD in the southeast region. Individuals who met
the inclusion criteria, provided verbal assent to participation in the study, and obtained
consent from their legally appointed representative (LAR) were included in the study sample. Participants were excluded from the study if it was determined that it was not safe for them to engage in physical activity, as indicated by their score on the Physical Activity Readiness Questionnaire (PAR-Q; Strohle, 2009; Thomas, Reading, & Shephard, 1992). A “yes” response to any of the eight PAR-Q items suggests that physical activity may be contraindicated. Participants with IDD who had one or more “yes” responses were excluded from the study, unless documentation from their physician indicating it was safe for them to take part in yoga and the study was received. Participants were also excluded from the study if it was determined that they did not comprehend concepts of stress and coping based on results of participants’ three-step cognitive screener (Hartley & MacLean, 2005; 2008; 2009).

The first step of the cognitive screener asked participants to provide an example of a stressful event, after being provided a definition of stress. Participants who were not immediately able to provide an example of a stressful event were provided a communication card with written words and matching visual images reflective of positive and negative events (e.g., scoring a touchdown in football, being in a crowded place). Using the communication card as a prompt, participants who correctly selected a negative stressor from the communication cards proceeded to step two of the screener. Participants who were not able to identify a stressor on their own, or using the communication card prompts did not proceed to step two.

For the second step, participants were provided pictures of water glasses with varying amounts of water in each. The first glass was empty and represented “no water,”
the fourth glass was full and represented “a lot” of water. Participants were asked to identify which water glass was representative of each amount of water (i.e., which glass has “no water” or “a little” water in it?), to determine whether participants understood the Lifestress Inventory (LSI) Likert scale answer options (i.e., “none”, “a little”, “a lot”) (Hartley & MacLean, 2005). The third step required participants match the terms “no stress,” “a little stress,” “a medium amount stress,” and “a lot of stress” to the corresponding water glass (“no water”, “a little”) to further confirm participants’ understanding of LSI Likert scale answer options. Participants who passed all three steps of the cognitive screener completed the LSI and the semi-structured interview. Participants who passed only the first step of the screener were eligible to participate in the semi-structured interview, but did not complete the LSI.

**Intervention**

Twelve, 60-minute yoga sessions were offered over seven-and-a-half weeks. Each yoga session was planned and facilitated by a yoga teacher or a certified yoga therapist. A second researcher demonstrated modified postures for participants; a third researcher demonstrated postures from a seated position; a fourth researcher provided participants 1:1 hands-on or verbal assistance throughout each yoga session as needed. The Hatha yoga curriculum, which progressed in difficulty each week, included postures, meditation, breathing exercises, and relaxation.

**Data Collection**

**Quantitative data collection.** Stress was measured using the Lifestress Inventory (LSI), a standardized 30-item questionnaire intended to measure stress among individuals
with IDD (Bramston & Bostock, 1994; Hartley & MacLean, 2005; 2009). For each item, the LSI produced two scores: a frequency score representative of the number of stressors individuals had experienced in the past two weeks, and an impact score representative of the extent to which the identified event had been stressful (0= no stress; 3= a lot of stress) in the past two weeks (Hartley & MacLean, 2005). The LSI was administered as an interview with participants before and after the yoga intervention. The LSI has an inter-reliability score of .87 and internal reliability of .68 as well as a test-retest reliability score of .80 within a two-week period (Bramston & Bostock, 1994; Hartley & Maclean, 2005).

**Qualitative data collection.** Upon completing the yoga intervention, participants were invited to participate in a 1:1 semi-structured interview with the primary researcher at the participants’ recreation program facility. The focus of the interview was to understand the potential influence of yoga on stress and coping processes among adults with IDD. There were five primary interview questions; each question had two to three follow-up questions or semi-structured probes. For example, one primary question asked participants to comment on whether yoga would be an activity they would do to feel less stressed. The primary researcher followed-up with probing questions, to gather more information from participants about why yoga would or would not be an activity that they would engage in to feel less stressed.

The interviews were audio- and video-recorded to capture participants’ verbal and nonverbal responses. Communication cards with generic photos or clip art with corresponding phrases at the bottom were used to help clarify questions and provide
example answer options for participants. For example, when asked to comment on why yoga would “be an activity you would do to feel less stressed”, a picture of a smiley face with “I enjoyed it” written underneath as an answer option on the communication card. Other answer options included a picture of a group of people with “I got to hang out with my friends”, a picture of an individual completing a yoga pose with “I got to learn yoga” underneath, and so forth (see Appendix I for semi-structured interview protocol and communication cards).

Data Analysis

Five of the 13 consented study participants successfully completed all three steps of the cognitive screener and completed the LSI. Four participants passed step one of the cognitive screener and were eligible for completing the semi-structured interview; four participants did not pass step one of the cognitive screener and were excluded from participation in the LSI or semi-structured interview.

Quantitative analysis. Upon completion of descriptive and nonparametric statistical analysis, researchers decided to exclude quantitative data from the study due to unreliable data. As a result of the cognitive screener, there were participants screened into the LSI that should have been excluded based on observed cognitive ability; there were also participants screened out of the LSI that should have been included based on observed cognitive ability. As a result, several participants seemed to have difficulty understanding and responding to LSI questions. Researchers elected to exclude the data as the credibility of the data could not be confirmed.
Qualitative analysis. Using pre-determined categories based on Crowe et al.’s (2016) framework, the primary research completed directed content analysis (Hsieh & Shannon, 2005). The primary researcher thoroughly read all transcribed interviews to increase familiarity and understanding of qualitative content. Using Crowe et al.’s (2016) framework proposing yoga as a type of leisure-stress coping, four a priori categories were used to code interview data: yoga as problem-focused coping and the three subcomponents of emotion-focused coping; yoga as mood enhancement; yoga as social companionship; and yoga as palliative coping. After establishing codes, the primary researcher reviewed the codes to identify which codes conceptually fit into the a priori categories (Hsieh & Shannon, 2005) based on the components of Crowe et al.’s (2016) framework. To increase the credibility and trustworthiness of data analysis and interpretation, a secondary researcher completed deductive directed content analysis independent of the primary researcher. The primary and secondary researcher met to compare one another’s codes and categories, and reached 100% agreement regarding qualitative findings.

Results

Nine participants completed post-intervention interviews, however, three participants’ interview data were excluded from analysis due to the participants’ difficulty with understanding the interview questions. For example, when asked “Do friends or family help you work through stress?” a participant responded “I don’t know”, or would begin discussing subject matter unrelated to stress.
Qualitative findings are representative of six participants’ perspectives, and supported two of the four a priori categories used for analysis: (a) yoga as mood enhancement; and (b) yoga as social companionship.

**Yoga as mood enhancement.** According to Crowe et al.’s (2016) framework, mood enhancement is a type of emotion-focused coping, in which yoga participation has the potential to increase participants’ positive emotion and/or decreased negative emotions. All six participants reported mood enhancement as an outcome of their yoga participation. For example, when asked how yoga made them feel, participant #4 stated “I feel relaxed…I can say I’m calm, happy…and excited too…[yoga] help me feel not to worry about it anymore…give me motivation…make me feel good…cause when I do good things, [yoga] makes me feel good.” Similarly, participant #3 shared feeling “…happy…cause I’m around all my friends,” and participant #1 said “I feel relaxed and calm to rest my head [in yoga].”

**Yoga as social companionship.** According to Crowe et al.’s (2016) framework, social companionship is a type of emotion-focused coping, in which yoga participation has the potential to facilitate an individual experiencing a sense of support as a result of interactions with others during yoga. Five of six participants shared experiences that aligned with social companionship during their interview. For example, when asked whether friends or research team members helped them feel less stressed during yoga, participant #2 said “…[friends and team members] make me feel confident…that I can do yoga”. Participant #1 shared “…[Clemson team member] inspires me, she inspired me a lot…every time I get mad or whatever, she calmed me down.”
Discussion

The primary purpose of the study was to explore whether participation in yoga served as a problem- or emotion-focused coping strategy for adults with IDD. Participants’ interview responses suggest that yoga has the potential to serve as an emotion-focused coping strategy, but that yoga did not facilitate problem-focused coping in this population. Specifically, participants’ expressed that yoga served as a form of coping and decreased stress because it enhanced their mood, and provided them with a sense of social companionship. These findings suggest that yoga participation and the relationships established during the group yoga session were meaningful to participants. However, if the intervention had not occurred in a group setting, it is possible that participants would not have found yoga to facilitate coping related to social companionship.

The secondary purpose of the study was to determine the feasibility of researching stress and yoga as coping among individuals with IDD. Researchers encountered several challenges in collecting quantitative and qualitative data that accurately reflected participants’ perspectives and experiences regarding stress and yoga as coping. These challenges contributed to the limitations of the current study, and have implications for future research focused on yoga, stress, and coping among adults with IDD related to: sampling procedures, screeners and assessments, yoga curriculum, and data collection methods.

Sampling Procedures
A purposive criterion-based sampling strategy was used to obtain the sample in this study. While this strategy worked well, it is recommended that alternative criterion be used for future studies. Specifically, study eligibility should require participants provide formal documentation from their physician indicating what type of disability or health condition they have, and whether they have mild, moderate, severe or profound IDD. By obtaining this detailed information, more appropriate standardized assessments that account for participants’ cognitive abilities can be selected for evaluating change in participants’ stress and coping processes.

Screeners and Assessments

Prior to collecting data, a three-step cognitive screener was used to assess individuals’ understanding of the concept of stress, and their understanding of the LSI Likert scale answer options. While two of the three steps of the screener had been validated for use with individuals with mild IDD in two previous studies (Hartley & MacLean 2005; 2008), researchers in the current study did not find that the screener accurately evaluated participants’ cognitive understanding of stress and answer option responses. For example, while the research team did not know participants’ formal health diagnoses or IDD severity level, researchers had observed and interacted with participants during two seven-week yoga interventions prior to the current study. Based on participants’ observed functioning, there were participants who seemed to have mild IDD who were excluded from the LSI due to their inability to pass the screener. In contrast, there were participants who did not seem to understand complex concepts during conversations suggesting that they may have moderate or severe IDD, who passed
the screener. However, their LSI data was later excluded from the study due to their difficulty with understanding the questions asked during the LSI assessment.

Researchers concluded that the cognitive screener was not adequately sensitive to assess the cognitive capacity of individuals with varying levels of IDD (i.e., mild, moderate, severe, or profound). In the future, researchers should select a screening tool to globally assess participants’ cognitive abilities rather than selecting a screener that is assessment-specific (i.e., the cognitive screener used in this study only inquired about stress, and participants’ understanding of LSI answer options). Researchers might consider using the Woodcock-Johnson Tests of Cognitive Abilities (Woodcock, McGrew, & Mather, 2001). The Woodcock-Johnson Tests of Cognitive Abilities, part of the Woodcock-Johnson Test III, is intended for use with individuals ages 2 and up, and assesses participants’ global cognitive functioning based on test results related to participants’ comprehension, memory, reading-writing ability, and processing speed (Woodcock et al., 2001).

Based on screener results and participants’ cognitive abilities, researchers could select a standardized assessment of stress and coping for use with individuals with mild or moderate IDD, while a different standardized assessment or proxy data could be used to evaluate stress and coping among individuals with severe or profound IDD. Screener results could be cross-checked with participants’ formally documented diagnosis to determine the sensitivity and accuracy of the screener. It is recommended that researchers pilot the Woodcock-Johnson Tests of Cognitive Abilities (Woodcock et al., 2001), or other screeners used to determine cognitive abilities of participants. Similarly, the use of
different standardized assessments to collect participants’ stress and coping data should also be piloted to confirm the feasibility and appropriateness of the measure(s).

**Yoga Curriculum**

The yoga curriculum used in the current study did not include content related to stress and coping. Instead, the curriculum was reflective of a traditional yoga class and included breathing techniques, postures, and guided relaxation. As a result, data collected specific to stress and coping did not align with the content of the intervention as participants were not purposefully exposed to any knowledge or skill development related to stress management and coping processes. For example, during data collection participants were asked whether yoga served as a coping strategy for them without being introduced to coping, or yoga as a potential coping strategy during the intervention. Future studies involving yoga as a potential coping strategy for adults with IDD should involve curriculums that directly address stress and coping.

If the yoga curriculum does not directly involve stress and coping concepts, it is recommended that yoga be used as an intervention within a larger stress management program. Incorporating stress and coping concepts into the curriculum could increase participants’ understanding of stress and coping concepts, and aid their understanding of how skills learned during yoga (e.g., breathing exercises, guided meditation) might serve as a coping strategy for stress in day-to-day life.

**Data Collection Methods**

While researchers were able to inquire about participants’ stress and coping, it was not reflective of outcomes related to the yoga intervention. Also, there was
misalignment in the quantitative and qualitative data collected as the LSI assessed participants’ global stressors (e.g., being in crowded places, family/friend being seriously ill), and semi-structured interviews inquired solely about participants’ yoga experience, and their perceptions of yoga as coping. In addition to selecting assessments that measure the targeted outcomes of the intervention, researchers should also consider participants’ ability to recall information over time. Based on cognitive ability, it is possible that participants are able to think more clearly about life circumstances that occur in the present moment, versus being asked to reflect on what has occurred within the last two weeks. Thus, researchers should consider obtaining data reflective of participants’ current stressors (i.e., what has been a stressor today) rather than asking participants about global life stressors.

Communication cards with verbal and corresponding visual cues were intended to support participants who were nonverbal in responding to assessments questions. They were also used when verbal participants had difficulty understanding what was being asked. However, the use of communication cards limited the answer options available for participants and may not have been representative of participants’ true perspective. It was also unclear if participants interpreted the visual and verbal cues as they were intended in relation to the questions being asked. In the future, using communication cards that are individualized to each participant (i.e., use personal pictures that have meaning to participants) rather than using generic photos or clipart is suggested (Cambridge & Forrester-Jones, 2003). Photovoice has also been suggested for use in research with individuals with IDD (Jurkowski, 2008). It is also recommended that researchers collect
proxy data (Balboni, Coscarelli, Giunti, & Schalock, 2013; Emerson, Felce, & Stancliffe, 2013) from participants’ parents/guardians, teachers or day program staff to better understand what types of stress participants’ may be experiencing outside of the yoga intervention, and the coping strategies separate from yoga participants utilize to navigate stress. Collecting proxy data, in addition to participants’ data would allow researchers to triangulate data (Emerson et al., 2013).

Finally, assessments administered via interview were audio- and video-recorded. Researchers video-recorded data collection to ensure non-verbal behaviors of participants who were nonverbal were captured. While this effectively captured responses, participants were distracted by seeing themselves being video-recorded, which resulted in discussions that were off-topic during data collection (e.g., participants would make movements or make faces in the camera). Future studies should audio-record, but only video-record data collection if the camera can be placed out-of-sight of participants.

Limitations

Due to the small sample size and limited participant data, results of the study are not generalizable. Data was excluded from the study due to concerns regarding the accuracy of participants’ data and their understanding of stress and coping concepts asked about. Researchers did not obtain participants’ formal diagnosis or information related to their IDD severity level. Having this information would have facilitated more appropriate selection of data collection methods. It is also possible that social desirability impacted participants’ responses, as it is generally known that stress is “bad” and yoga is “good”. Thus, the qualitative results presented in this study are exploratory. Also, data specific to
stress was collected before and after the yoga intervention. Data specific to coping was only collected post-intervention. Thus, it is difficult to know how or why participants’ perception of coping may have changed as a result of yoga, and/or as individual’s stress levels changed.

**Implications for Recreational Therapy**

When working with adults with IDD, recreational therapists should use screeners to determine clients’ level of cognitive ability so that standardized assessments that have been validated with individuals with their level of IDD (e.g., mild, moderate, severe, or profound) can selected. In doing so, recreational therapists will increase the likelihood of accurately assessing clients’ strengths and needs, and measure functional outcomes that result following recreational therapy intervention. Recreational therapists should also collect proxy data from clients’ legally appointed representative(s) to better understand the context of clients’ everyday life experiences and routines outside of the recreational therapy treatment setting. Lastly, when using yoga to help clients with IDD cope with stress, it is recommended that intentional content related to stress and coping concepts be addressed as part of the yoga curriculum.

**Conclusion**

The primary purpose of the study was to explore whether participation in yoga served as a problem- or emotion-focused coping strategy for adults with IDD. Findings suggest that yoga has the capacity to serve as an emotion-focused strategy for adults with IDD, potentially through mood enhancement and social companionship. Further research is needed to understand the influence of yoga as problem- or emotion-focused coping
strategies for individuals with IDD. The second purpose of the study was to determine the feasibility of researching stress and yoga as coping among individuals with IDD. Challenges specific to capturing accurate data from participants suggest that additional research is needed to identify what standardized cognitive screeners could be used to assess participants’ cognitive abilities. Researchers should also identify which standardized assessments could be used to assess stress and coping among individuals with IDD, based on their cognitive functioning and level of IDD (e.g., mild, moderate, severe, or profound).
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CHAPTER FIVE

Conclusion

Based on Crowe, Van Puymbroeck, and Schmid’s (2016) yoga as leisure-stress coping framework, the primary purpose of the study was to explore whether participation in a seven-and-half week yoga intervention served as problem- or emotion-focused coping for adults with IDD. Specific to emotion-focused coping, the study explored whether yoga served as social companionship, palliative coping, or mood enhancement for adults with IDD. In order to understand how individuals with IDD cope with stress, data related to participants perceived stress was also collected. A second purpose of the study developed as a result of challenges encountered during data collection: to determine the feasibility of researching stress and yoga as coping among adults with IDD.

Summary of Major Findings

Participants’ qualitative data suggested that yoga served as an emotion-focused coping strategy as participants reported it improved their mood, and provided a sense of social support. Quantitative results were excluded from the study due to concerns regarding the validity and reliability of quantitative data collected from participants. As a result, the primary researcher gained insight regarding the feasibility of researching stress and yoga as coping among adults with IDD, and was able to recommend improvements specific to how and what data is collected from adults with IDD in future studies. The researcher identified that future researchers should obtain formal documentation of participants’ health condition(s), as knowing participants’ exact diagnoses could inform a more appropriate selection of standardized assessments. For example, knowing whether a
participant has a mild, moderate, severe, or profound IDD would facilitate the researcher better understanding participants’ cognitive abilities to determine whether quantitative or qualitative data should be collected directly from participants or their proxy. A majority of standardized assessments have been used and validated with individuals with mild IDD. Researchers should pilot these assessments with participants who have moderate, severe, or profound types of IDD to determine whether participants cognitively understand the questions being asked. Similarly, data collected through participants’ proxy should also be piloted.

The researcher also learned that the curriculum used for the yoga intervention needed to have more overtly addressed stress and coping concepts, or the yoga intervention should have been offered to participants as part of a larger stress management program. In the current study, the yoga curriculum did not directly incorporate stress and coping concepts. Instead, the curriculum was reflective of a traditional yoga class and included breathing techniques, postures, and guided relaxation. As a result, data collected specific to stress and coping did not align with the content of the intervention as participants were not purposefully exposed to any knowledge or skill development related to stress management and coping processes. For example, during data collection participants were asked about whether yoga served as a coping strategy for them, without their having had been introduced to coping, or yoga as a potential coping strategy during the intervention. Not knowing the extent to which participants understood stress and coping concepts prior to the study, it would have been beneficial for the researcher to have educated participants on these concepts. If participants are
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provided education regarding stress and coping, they may better understand how yoga postures or breathing exercises could be used in everyday life to help them relax or feel less worried.

Finally, the researcher recognized the importance of having data collection measure and intervention content reflect one another. Unfortunately, the quantitative LSI assessment asked about global life stressors (e.g., being in crowded places); the qualitative interviews asked about participants’ perceptions of yoga and yoga as coping specific to the seven-and-a-half week intervention; and the intervention did not directly address stress or coping. Future researchers should obtain multiple data points on the same topic, so that triangulation of results can occur. Also, based on participants’ cognitive functioning, and potential difficulty with recalling stress or coping strategies used over a long-period of time (e.g., over the last two weeks), researchers should obtain participant data that is reflective of current stress or coping (e.g., what has been a stressor today, or what did you do when today to feel less worried). In doing so, researchers may obtain more reliable data that accurately captures participants’ thoughts and experiences.

Contributions and Implications

Results of this study support Crowe et al.’s (2016) yoga as leisure-stress coping framework suggesting yoga has the potential to serve as an emotion-focused coping strategy for adults with IDD. However, the yoga curriculum implemented in this study was not specifically tailored to address stress and coping. It is recommended that future researchers evaluate yoga interventions that have been developed as part of stress management programs. Also, the results of this study are not generalizable due to the
small sample size and lack of credible data collected. Further research is needed to determine whether yoga can serve as a problem- or emotion-focused coping strategy for adults with IDD.

Due to challenges encountered when trying to capture accurate qualitative and quantitative data related to stress and coping concepts from participants, future research should focus on identify what cognitive screeners accurately indicate participants’ cognitive abilities, so that standardized measure that appropriately match participants’ abilities can be used during data collection. Future research should also evaluate how collecting proxy data could benefit researchers’ understanding of participant perceptions and experiences regarding stress and coping.

**Challenges and Limitations**

It is important to understand adults with IDDs’ stress and coping processes, however, it can be challenging to accurately assess due to variations in participants' cognitive abilities, and the lack of standardized assessments available for use with this population.

**Cognitive functioning.** One of the biggest challenges in completing data collection was accurately assessing participants’ cognitive ability. Participants’ formal diagnoses, type of IDD, and level of severity of IDD was not obtained as part of data collection. Thus, it was difficult to determine whether participants understood the concepts of stress and coping addressed in this study, and whether they understood the meaning of questions asked in quantitative and qualitative assessments. As a result, participants’ quantitative data, and several participants’ qualitative data was excluded.
from analysis, as the researcher could not verify that the data was accurate and reflective of participants’ perspectives or experiences.

In an effort to determine whether participants understood the concept of stress, a cognitive screener adapted from Hartley and MacLean (2005; 2008; 2009) was used in this study. However, based on observation of participants’ cognitive abilities, the researcher determined screener results were not a reliable indicator of participants understanding the concept of stress, or their understanding of LSI Likert scale answer options. Future studies should pilot any cognitive screeners being considered for use, to determine whether they are appropriate for the study sample, and the research topic being addressed.

Communication cards were also used during data collection to assist participants who were non-verbal or having trouble understanding questions asked. While this was an appropriate accommodation, several individuals began to rely heavily on the communication cards and wanted to use them throughout data collection, before even hearing the questions asked. This was problematic in that the answer options provided on the cards were limited, and may not have reflected how participants’ would have answered if they had not seen the pre-determined answer options. It was also difficult to determine whether participants were selecting answer options on the communication cards because it was truly reflective of their answer, or because they liked the visual picture that accompanied the answer option best. Additionally, to accurately capture participants pointing to their response on the communication card, interviews were video-
recorded. However, several participants had a difficult time remaining engaged in the interview discussion due to their being distracted by the video recorder.

**Assessment selection.** The lack of standardized cognitive screeners and assessments specific to adults with mild, moderate, profound, and severe IDD made it difficult to determine which assessments were most appropriate for evaluating stress and coping with the study sample. Also, questions asked in the LSI did not align with interview questions as the LSI discussed global stressors and interview questions discussed stress and coping specific to the seven-and-a-half week yoga intervention. The LSI asked broadly about stress, and stressful events experienced by participants in their everyday lives. The qualitative interview focused primarily on coping, and participants experience in the yoga intervention. Thus, the researcher could not triangulate participants’ data. This was problematic because it prevented the researcher from being able to cross-compare data to determine its credibility. In hindsight, more than one source of data related to stress, and more than one source of data related to coping should have been collected to allow for triangulation. For example, rather than obtaining data related to everyday stressors, the primary researcher should have collected quantitative pre-/post-data related to coping, and qualitative post-intervention data related to coping to allow for cross-comparison of qualitative and quantitative data.

The feelings chart was originally used to gather information regarding participants’ mood or emotional state (i.e., happy, sad, tired) before and after each 60-minute yoga session to determine whether yoga served as mood enhancement, a form of emotion-focused coping in Crowe et al.’s (2016) framework. However, the data collected
was unreliable and excluded from the study as the researcher was unable to determine whether participants were providing accurate responses. For example, one participant had been crying throughout a yoga session, but at the conclusion of the class indicated that they were “happy” on their feelings chart. Similarly, another participant who had consistently demonstrated behaviors associated with anger or frustration indicated that they felt “calm/relaxed” at the conclusion of a yoga session.

The LSI was also excluded from the study due to the researcher being unsure of the credibility of the data. Participants completed a cognitive screener to determine their ability to understand the concept of stress and the LSI answer options. However, the screener results did not accurately include or exclude participants from participation in the LSI. As a result, it was difficult to determine whether accurate, valid data was being collected from participants. In the future, it is recommended that researchers first identify participants’ cognitive ability, so that appropriate, standardized assessments that match participants’ functional abilities can be selected.
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References


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Clipart Station (n.d.) I don’t know clip art [Image]. Retrieved from https://clipartstation.com/i-don-t-know-clipart/


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APPENDICES
Appendix A: Legally Appointed Representative Consent Form

Substitution Decision Maker Informed Consent Form
Clemson University

The Effects of Yoga Participation on Physiological and Psychosocial Functioning among Adults who Have Intellectual and Developmental Disabilities

Description of the Study and Your Part in It

Dr. Brandi Crowe is inviting the person for whom you are a substitute decision maker (SDM) to take part in a research study. Dr. Crowe is an assistant professor in the Recreational Therapy program at Clemson University. The purpose of this study is to explore the effects of yoga participation on physical functioning (balance, upper- and lower-extremity strength, flexibility, and waist circumference) and on psychological functioning (e.g. stress and coping processes).

Participants in the study will complete assessments prior to and immediately following the seven-week yoga program. Over the course of seven-weeks, biweekly, 60-minute classes will be offered at Clemson University. Classes will be photographed and video-recorded with your permission, photos may be used in presentations and conferences. Videos will only be used to analyze yoga instructor’s facilitation of each session, and participant’s response to instructor’s facilitation of yoga; videos will not be used in presentations. A separate media/photo/video release form will be given to you.

If participants choose, they may also participate in semi-structured interviews prior to and immediately following the seven-week yoga program. The purpose of the interviews will be to better understand stress, and the potential role of yoga in serving as a coping strategy for stress. We do intend to audio-record and video-record the interviews, to ensure we (the research team) accurately capture what is verbally and/or non-verbally shared with us. The audio recordings will be transcribed for data analysis; following transcription the recordings will be destroyed. Following data analysis, the video recordings will also be destroyed.

Risks and Discomforts

Yoga is a low-intensity physical activity that requires participants complete postures and poses from standing and seated positions. As with any physical activity, there are certain risks or discomforts that participants might expect if they take part in this research. They include muscular soreness or discomfort. Risks for muscular soreness and discomfort will be minimized over time by regularly participating in the yoga classes. Yoga instructors and research team members will monitor the participants during the yoga sessions. We will ask participants to let one of us know if they feel any discomfort during the sessions.
Modified poses that will allow for participants to complete postures and poses in a less difficult manner and/or from a seated position will also be provided to participants. Participants may take a break or leave the session at any time.

There is a potential risk for the loss of confidentiality in this (and any) study. This risk will be minimized by assigning participants a number. Data collected from participants will be de-identified, and will only have the participant number on it. The list matching the names and numbers will be on the password-protected computer of the principal investigator (Dr. Crowe). All identifiable information collected will be stored in Dr. Crowe’s locked office, and kept for no more than two years (while data analysis is completed, and results of the study are finalized).

**Possible Benefits**

The research team believes participation in this research may help participants improve upper- and lower-extremity strength, balance, and waist circumference. Additionally, it may help us to understand participants’ thoughts about yoga, and the potential role yoga plays in reducing stress by serving as a coping strategy.

**Protection of Privacy and Confidentiality**

The information collected may be used to inform future studies. Audio files and photographs will be kept for two years following the study. The results of this study may be published in scientific journals, professional publications, or educational presentations. However, participant names or contact information will not be used in any presentations or publications. Results of the study may also be shared with the Anderson County Special Population Recreation Program staff, who supervise participants during day program activities.

The research team might be required to share the information we collect with the Clemson University Office of Research Compliance and the federal Office for Human Research Protections. If this happens, the information would only be used to find out if we ran this study properly and protected participants’ rights in the study.

**Choosing to Be in the Study**

The person for whom you are a SDM does not have to be in this research study. The participant will not be punished in any way if you decide not to let him/her be in the study or if you stop him/her from continuing in the study; participation in current or future programs at Anderson County Special Population Recreation Program will not be affected by any decision made about taking part in the study.

We will also ask the potential participant if he/she wants to take part in this study. They will be able to refuse to take part or to quit being in the study at any time. If the
individual for whom you are a SDM chooses to stop taking part in this study, the information he/she has already provided will be used in a confidential manner.

Contact Information

If you have any questions or concerns about this study or if any problems arise, please contact Dr. Brandi Crowe at Clemson University at 864-656-3771.

If you have any questions or concerns about the rights of the person for whom you are a SDM, in regards to this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-0636 or irb@clemson.edu. If you are outside of the Upstate South Carolina area, please use the ORC’s toll-free number, 866-297-3071. The Clemson IRB will not be able to answer some study-specific questions. However, you may contact the Clemson IRB if the research staff cannot be reached or if you wish to speak with someone other than the research staff.

Consent

I have read this form and have been allowed to ask any questions I might have. I give permission for the individual identified below to be in this study.

SDM’s signature: ___________________ Date: ____________

SDM’s printed name: ____________________________

Participant’s Name: ____________________________

A copy of this form will be given to you.
Appendix B: Physical Activity Readiness-Questionnaire (PAR-Q)

Physical Activity Readiness-Questionnaire (PAR-Q)

The purpose of this questionnaire is to screen individuals for potential contraindications and/or adverse physical effects in response to physical exertion.

Please read each question carefully, and answer every question honestly.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>1) Does your physician recommend that you not exercise due to chronic hypertension?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>2) Does your physician recommend that you not exercise due to coronary artery disease or previous heart attack(s)?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>3) Do you currently lose consciousness or lose your balance because of dizziness?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>4) When you do physical activity, do you feel abnormal pain in your chest?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>5) Does your physician recommend that you not exercise due to a joint or bone problem that may be made worse by a change in your physical activity?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>6) Does your physician recommend that you not exercise due to carotid artery disease or previous stroke(s)?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>7) Does your physician recommend that you not exercise due to insulin dependent diabetes?</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>8) Does your physician recommend that you not exercise due to other health problems?</td>
</tr>
</tbody>
</table>

A “yes” to any of the above questions will prohibit participation in the study titled “The effects of yoga participation on physical and psychosocial functioning among adults with intellectual and developmental disabilities”.

If you honestly answered “no” to all of the above questions, you can be reasonably positive that you can safely participate in the study titled “The effects of yoga participation on physical and psychosocial functioning among adults with intellectual and developmental disabilities”.

If your health changes so you then answer “yes” to any of the above questions, please notify the research team immediately to cease participation and seek guidance from a physician.

<table>
<thead>
<tr>
<th>Participant Signature:</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Witness Signature:</td>
<td>Date</td>
</tr>
</tbody>
</table>
Appendix C: Participant (Verbal) Assent

Clemson University
Assent to Be in a Research Study

The Effects of Yoga Participation

You are being invited to be in a research study by Dr. Brandi Crowe, an assistant professor in the Recreational Therapy program at Clemson University.

What is a research study?
Research studies help us learn new things. We can test new ideas. First, we ask a question. Then we try to find the answer.

Why are we conducting this research study?
The purpose of this study is to learn more how yoga might make you feel: (a) stronger in your arms, legs, or belly; (b) that you can stand or move without feeling like you might fall; and/or (c) like you are able to better handle difficult situations or stressful events when the occur.

What would happen if I join this research study?
• We will ask you to answer questions about stress and coping, and do tasks (e.g., stand on one foot for 20 seconds) before and after the seven-week yoga classes.
• If you choose, you may also take part in an interview before and after the seven-week yoga class. The interview will take place with a team member. You will be asked to share your thoughts about what causes you to feel worried or stressed, what you do when you are worried, and whether you think yoga helps you feel less worried or stressed.
• It will take you about 8 weeks (week 1=questions, weeks 2-7 = yoga, week 8=questions) to be in this study.
• If you agree, we will take pictures and video-record you during the yoga classes.
• If you agree we will audio- and video-record you during the questions.

Are there any potential harms or risks if I take part in the research study?
Some of the tasks we ask you to do might make you uncomfortable, or the questions might be hard to answer. Also, after you do some of the yoga poses, you might be a little sore or tired. We will try to make sure that you are as comfortable as possible. We will monitor you during the sessions. Let one of us know if you feel any discomforts during the yoga session. You can take a break and rest during if needed during the yoga classes.
Are there any benefits if I take part in the research?
We think being in this study may help improve your strength, balance, and health. It may also help you feel more relaxed, less worried, and more confident in expressing your thoughts and making decisions.

Will I receive any gifts for taking part in the research study?
No, you will not be paid or receive any gifts for being in the study.

Do I have to take part in the research study?
- You get to decide if you want to take part in the study.
- You can say ‘No’ or you can say ‘Yes’.
- No one will be upset if you say ‘No’.
- If you say ‘Yes’, you can always say ‘No’ later.
- You can say ‘No’ and stop taking part in the study at any time.

What if I have questions?
You can ask questions at any time. If you have questions please ask/call:
- Brandi Crowe (Phone: 864-656-3771)

Is there anything else?
If you want to be in the study after we talk, please write your name below. This shows we talked about the study and that you want to take part.

Participant’s signature: ____________________________ Date: ____________________
Printed name of participant: ____________________________

Research Team Member’s signature: ____________________________ Date: ____________________
Printed name of research team member: ____________________________
Appendix D: Three-Step Cognitive Screener

A three-step screening process will be implemented with participants, prior to their completing the Lifestress Inventory (LSI), to ensure participants understand the meaning of “stress” or “stressful event”, and to confirm their understanding of the LSI Likert Scale answer options (Hartley & Maclean, 2005; Hartley & Maclean, 2009). Only participants who are able to confirm their understanding of “stress” terminology used in LSI questions (step 1), and LSI answer options (step 2 & 3) will be asked to complete the pre-/post-LSI questionnaire. The Three-Step pre-LSI Cognitive Screener will be implemented as follows:

**Step 1: Participants will be asked to confirm their understanding of the term “stress” or “stressful event”, by providing an example of a (negative) stress or stressful event.**

The primary researcher will welcome participants to the LSI pre-test screening by saying “Hello, thank you for meeting with me today. I would like to begin by providing you a definition of “stress”. After reading you a definition of stress, I will ask you to respond, by giving me an example of stress or a stressful event. Do you have any questions before we begin?

The primary researcher will verbally provide participants the following definition: “Stress is feeling uncomfortable or worried when you feel like you can’t handle a problem” (Hartley & Maclean, 2005, pg. 289; Kids Health, 2015, para.2)

After providing the participant the definition of stress, the primary researcher will ask the participant: “Can you give me a definition or stress or provide me an example of stress or a stressful event?”

Participants will then give an example of stress, or a stressful event. Potential participant responses might include losing an object, getting sick, getting a bad grade, getting in a fight with a friend, etc.

Note: For individuals who are non-verbal, there will be two positive and negative options placed in front of them where they are to identify which answer option most aligns with of an example of a stressful event: a) being worried about losing your keys, b) getting a reward at special Olympics c) being in a crowded place d) scoring a touchdown in football.

Participants unable to verbally define stress, provide an example of stress or a stressful event, or appropriately select an answer representative of stress from the communication card will be excluded from the LSI questionnaire at this time. If they have been excluded from the study the primary researcher will say “Thanks so much for your participation...
today, this concludes our questions”.

Participants able to verbally define stress, provide an example of stress or a stressful event, or appropriately select an answer representative of stress from the communication card will be asked to complete step 2. The primary researcher will say, Great job, let’s move on to the next question”.

Step 2 Likert Scale: Participants are to match the water buckets that have various amounts by quantity of water correctly.

The primary researcher will present a communication card with four glasses of water without the phrases attached to the participant. Four cards with the phrases “no water”, “a little”, “medium amount”, “a lot”, will also be given to the participant.

The primary researcher will read each phrase aloud in random order to participants, and ask them to identify the glass of the water that best represents the phrase (indicating quantity of water in each glass).

“Can you point to the glass that has no water in it?”
“Can you point to the glass that has a little water in it?
“Can you point to the glass that has a medium amount of water in it?
“Can you point to the glass that has a lot of water in it?”

As a participant points to the each glass, the researcher will place the card with the corresponding phrase with the glass – this will allow participants to know which glasses they have already selected, and which remain as answer options as they progress through the four questions.

After participants completes this task, Interviewer says “Thank you for completing this task, you have completed the two-step protocol”.

Step 3 Likert Scale in relation to Stress: Participants are to match the water buckets that have various amounts by quantity of water correctly to stress.

The primary researcher will present a communication card with four glasses of water without the phrases attached to the participant. Four cards with the phrases “no stress”, “a little stress”, “medium amount of stress ”, “a lot of stress”, will also be given to the participant.

The primary researcher will read each phrase aloud in random order to participants, and ask them to identify the glass of the water that best represents the phrase (indicating amount of stress).

“Can you point to the glass that would identify no stress?”
“Can you point to the glass that would identify a little amount of stress?”
“Can you point to the glass that would identify medium amount of stress?”
“Can you point to the glass that would identify a lot of stress?”

As a participant points to the each glass, the researcher will place the card with the corresponding phrase with the glass – this will allow participants to know which glasses they have already selected, and which remain as answer options as they progress through the four questions.
Three-Step Cognitive Screener Communication Card
(FRONT SIDE)

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Yes

No

I’m not sure
Three-Step pre-LSI Cognitive Screener Communication Card
(BACK SIDE)

*Images obtained from Fogarty, Bramston, & Cummins, 1997*

0  
No water

1  
A little water

2  
A medium amount of water

3  
A lot of water

0  
No stress

1  
A little stress

2  
A medium amount of stress

3  
A lot of stress
Which of these scenarios is an example of a stressful event?

- Being worried about losing your keys
- Getting a reward at Special Olympics
- Being in a crowded place
- Scoring a touchdown in football
- I’m not sure
Appendix E: Demographic Questionnaire

Please answer the following questions on behalf of your family member/loved one.

1. What is your family member/loved one’s age? _____ years old

2. What is your family member/loved one’s gender? _____ Male
   _____ Female

3. What is the highest level of formal education your family member/loved one has completed?
   _____ Grades 7-12
   _____ Some college
   _____ Bachelor’s degree
   _____ High school graduate
   _____ Technical or vocational
   _____ Graduate degree
   _____ Other (please specify): _________________________________________

4. What is your family member/loved one’s current marital status?
   _____ Single
   _____ Married
   _____ Widowed or Widower
   _____ Partner or Significant other

5. Which single racial group best describes your family member/loved one?
   _____ African American or Black
   _____ American Indian or Alaska Native
   _____ Asian
   _____ Hispanic or Latinx
   _____ White
   _____ Native Hawaiian or Pacific Islander
   _____ Other (please specify): _________________________________________

6. How would you rate your love one’s overall health?
   _____ Excellent
   _____ Fair
   _____ Very Good
   _____ Poor
   _____ Good

7. What type(s) of disability or health condition does your family/member loved one have?
   _________________________________________________________________

8. Has your family member/loved one participated in the yoga program with Clemson University previously? (Please check all that apply)
   _____ No
   _____ Yes, during Spring 2018
   _____ Yes, during Fall 2018
Appendix F: Lifestress Inventory

The Lifestress Inventory

Title of Questionnaire
The Lifestress Inventory

Authors
Bramston, P. & Fogarty, G.J.

Institutional affiliation
School of Psychology and Counselling, University of Southern Queensland, Toowoomba, QLD, 4350, Australia

Corresponding author
Emeritus Professor Gerard Fogarty: email fogarty@usq.edu.au

Purpose of Questionnaire

The Lifestress Inventory can be used to measure general anxiety, negative interpersonal interactions, and lack of skills and coping behaviours. This scale is suitable for administration to a wide range of people, including the mildly intellectually handicapped. Administration instructions are given after the listing of test items. Note the special instructions for administration to people with a mild intellectual handicap.

This scale has been translated into the Dutch language.

Lifestress Inventory

The latest version of the Lifestress Inventory contains 30 items. They are listed below.

1. Do you get to choose things that are important to you?
2. Do you get enough privacy/time to yourself?
3. Have you heard people you know arguing?
4. Do people treat you as though you are different?
5. Do people respect your rights?
6. Has someone you know been seriously ill or died?
7. Have you been getting on with your partner/girlfriend/boyfriend?
8. Do you get on well with your family?
9. Do people listen to you when you have something to say?
10. Do you feel you can't do things properly or quickly enough?
11. Can you understand other peoples' instructions or directions?
12. Can people understand you?
13. Does anyone bully or hit you?
14. Do people interrupt you when you are busy?
15. Do people tease you or call you names?
16. Do you get on well with your supervisor/teacher?
17. Do people make you do things you don't really want to do?
18. Have you had any arguments or fights with anyone?
19. Can you do the things people want you to do?
20. Can you get enough help when you want or need it?
21. Have you recently been in any really crowded places?
YOGA AS COPING FOR ADULTS WITH IDD

22. Have you ever been in a difficult situation where you didn't know what to do?
23. Do people around you let you know what's going on?
24. Will you always be able to have/find a job?
25. Do you feel confident handling money and counting change?
26. Do you like living where you live at the moment?
27. Have you been in trouble lately?
28. Do you have enough friends?
29. Do people think you can't do things when you think you can?
30. Do people like talking to you?

Response Format

Using a self-report format, respondents are first asked to indicate whether they have experienced a stressor. If they have not, they select the response category “0” and move on to the next item. From this information, a frequency score can be computed that indicates the range of stressors a respondent has experienced. The higher the frequency score, the more stressors experienced.

If respondents have experienced a stressor, they select one of the other four points to indicate the impact of the stressor where 1 = no stress, 2 = a little stress, 3 = a fair bit of stress, and 4 = a great deal of stress.

Scoring

The frequency score can be used to gain some indication of the types of stressors to which this population is susceptible.

The impact score is used to estimate the degree of stress being experienced by individuals. To calculate the impact score, collapse the “0” (Not experienced) and “1” (Experienced but caused no stress) categories so that they are both scored as “1” then add all the items to form a total score. Thus, a person who indicated that he or she did not experience a particular stressor and a person who indicated that he or she experienced the stressor but that it caused no stress would both receive a score of “1” for that item.

As well as a total score, the Lifestress Inventory can yield subscale scores for General Worry, Negative Interpersonal Relations, and Competency Concerns. The last factor did not always emerge in our validation studies but the first two are robust.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Worry</td>
<td>1, 2, 5, 7, 9, 16, 20, 23, 24, 25, 26, 28, 30</td>
<td>.80</td>
</tr>
<tr>
<td>Negative Interpersonal Relations</td>
<td>3, 6, 13, 14, 15, 17, 18, 21, 27</td>
<td>.78</td>
</tr>
<tr>
<td>Competency Concerns</td>
<td>4, 8, 10, 11, 12, 19, 22, 29,</td>
<td>.73</td>
</tr>
</tbody>
</table>

The Pearson Product Moment correlation between General Worry (GW) and Negative Interpersonal Relations (NIR) is .52, the correlation between GW and Competency Concerns (CC) is .30, and the correlation between NIR and CC is .42.

Other statistics can be found in the publications listed on page 4.
**Procedure**

The questions in the Lifestress Inventory are designed to be read aloud in an interview situation by a trained assessor, preferably an experienced psychologist. A simple definition of stress — ‘the things that happen to you that you can’t cope with’ — is given at the start of the interview. To reduce “yea saying” and “nay saying” tendencies, some questions have a positive whilst others have a negative orientation. The aim in all cases is to establish whether the subject of the question is a source of stress for the individual. Questions can be repeated or re-worded if necessary to ensure clarity. Whenever the respondent indicates that a stressor has been experienced, it is standard procedure to ask for more information to ensure that the response has been correctly coded. Using this procedure with trained interviewers, we were able to achieve inter-rater reliabilities as high as .87 (see references).

A visual aid showing a series of buckets empty through to full can also used with the intellectually disabled population to improve understanding of the Likert-type options.

![Visual aid](image)

0. No stress
1. A little
2. A fair bit
3. A lot

**Related Publications:**


   A pre-publication version can be downloaded at: [http://eprints.usq.edu.au/948/](http://eprints.usq.edu.au/948/)


Appendix G: Lifestress Inventory Protocol

**Read aloud definition of stress:** “Stress is feeling uncomfortable or worried when you feel like you can't handle a problem.” (Hartley & Maclean, 2005, pg.289; Kids Health, 2015, para.2)

1-30: Standardized LSI original questions/items

*a-c: Possible rephrasing for clarification of question*

*i: If participant responds to this as stressor (some questions are negatively phrase so can be yes or no), then participant is asked to think of stressor in regard to scale.*

1. **Do you get to choose things that are important to you?**
   a. Do you get to make your own decisions?
   b. Do you get to make your own choices about where you want to live, what you want to eat, what you want to wear, who you want to hang out with?
      i. If no, think of a situation in the last two weeks where you did not get to choose things that are important to you, on a scale of 0-3 (Prompt to look at water glasses now) how stressed did you feel about that?

2. **Do you get enough privacy/time to yourself?**
   a. Do you get time away from people?
   b. When you need time alone, do you get it?
      i. If no, think of a situation in the last two weeks where you did not get enough time/privacy to yourself, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

3. **Have you heard people you know arguing?**
   a. Have you heard people you know (family or friends) fighting with each other?
   b. Have you heard people you know (family or friends) disagreeing with each other?
      i. If yes, think of a situation in the last two weeks where you have heard people arguing, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

4. **Do people treat you as though you are different?**
   a. Do people treat you differently?
   b. Do people treat you as though there is something different about you?
      i. If yes, think of a situation in the last two weeks where people have treated you differently, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

5. **Do people respect your rights?**
   a. Do people treat you the way you like to be treated?
   b. Do people (such as your friends and family) give you the same rights as they would get?
      i. If no, think of a situation in the last two weeks where people did not respect your rights, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?
6. Has someone you know been seriously ill/died?
   a. Has someone you know gotten very sick?
   b. Has someone you know been sick and in the hospital?
   c. Has someone you know gotten very sick and passed away?
   d. If yes, think of this situation in the last two weeks where someone has gotten seriously ill, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about this?
7. Have you been getting on with your partner/girlfriend/boyfriend?
   (will move on to next question if they do not have partner/girlfriend/boyfriend)
   a. Have you been getting along with your partner/girlfriend/boyfriend?
      i. If no, think of a situation in the last two weeks where you did not along with your partner/boyfriend/girlfriend, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?
8. Do you get on with your family?
   a. Do you get along with your family (mom, dad, sister and/or brother)?
   b. Do you enjoy time with your family (mom, dad, sister and/or brother)?
      i. If no, think of a situation in the last two weeks you didn’t get along with your family, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?
9. Do people listen when you have something to say?
   a. When you are trying to talk, do people listen to you?
      i. If no, think of a situation in the last two weeks where people did not listen when you had something to say, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?
10. Do you feel you can’t do things properly or quick enough?
    a. Do you think you can’t get tasks (such as doing your working, taking out the trash, doing the dishes) done quickly?
    b. Do you think you can’t get tasks dome right/the correct way?
       i. If yes, think of a situation in the last two weeks you could not do things properly or quick enough, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?
11. Can you understand other people’s instructions or directions?
    a. When people give you a set of instructions to do something, can you do them?
    b. Can you follow instructions or directions given by someone else (such as a staff member like Kathy, Molly, or your parent)?
       i. If no, think of a situation in the last two weeks where you did not understand people’s directions or instructions, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?
12. Can people understand you?
    a. When you talk to someone (such as a friend), do they understand what you are saying?
    b. Can people understand you when you are talking or writing things down?
i. If no: think of a situation in the last two weeks where people did not understand you, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

13. Does anyone bully or hit you?
   a. Does anyone hurt you?
   b. Has anyone done anything to hurt your feelings?
      i. If yes: think of a situation in the last two weeks where someone bullied or hit you, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

14. Do people interrupt you when you are busy?
   a. When you are busy doing something, do people interrupt you?
   b. When you are busy doing something, do people stop you before you have finished the task?
      i. If yes, think of a situation in the last two weeks where you were interrupted when you were busy, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

15. Do people tease you or call you names?
   i. If yes, think of a situation in the last two weeks where you were teased or called you names, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

16. Do you get on well with your supervisor/teacher (such as Kathy or Molly)?
   a. Do you get along well with your supervisor/teacher/person in charge?
   b. Do you enjoy working with the person in charge?
      i. If no, think of a situation in the last two weeks where you did not get along with a teacher or the person in charge, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

17. Do people make you do things you don’t really want to do?
   a. Do you do things you don’t like because of other people?
   b. Have you been forced to do something you don’t want to do?
      i. If yes, think of a situation in the last two weeks where you had to do something for someone that you did not want to do, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

18. Have you had any arguments or fights with anyone?
   a. Have you argued or had a fight with someone you know?
   b. Do you get in to disagreements with others?
      i. If yes, think of a situation in the last two weeks where you have an argument with someone, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

19. Can you do the things people want you to do?
   a. When someone wants you to do something for them, can you do it?
   b. If someone asks you for help with something, would you be able to help them?
i. If no, think of a situation in the last two weeks where you couldn’t do what people wanted you to do, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

20. Can you get enough help when you want or need it?
   a. If you were in need, can you get help from others (family, friends, Rainbow Gang staff)?
   b. If you had a problem, could you get help from others (family, friends, Rainbow Gang staff)?
      i. If no, think of a situation in the last two weeks where you couldn’t get help, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

21. Have you recently been in any really crowded places?
   a. Have you attending any events or programs where there are a lot of people, or large groups?
   b. Thinking of recent times, have you been in a place, and felt that it was crowded/had too many people?
      i. If yes, think of a situation where you were in a crowded place, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

22. Have you ever been in a difficult situation where you didn’t know what to do?
   a. Have you ever had a problem, and you did not know what to do/how to make it go away?
   b. Have you ever had a problem that you did not know how to handle?
      i. If yes, think of a difficult situation in the last two weeks where you didn’t know what to do, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

23. Do people around you let you know what going on?
   a. Do people (family, friends, Rainbow Gang staff) tell you what events or activities that are coming up in the next few days, that you will participate in?
      i. If no, think of a situation in the last two weeks where people around you haven’t let you know what’s going on, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

24. Will you always be able to have/find a job?
   a. If you have a job, do you think you will always be able to keep it/have that job?
   b. If you wanted a job, do you think you would be able to get a job?
      i. If no, think of a situation in the last two weeks where haven’t been able to have or find a job, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

25. Do you feel confident handling money or counting change?
   i. If no, think of a situation in the last two weeks where you haven’t been confident in handling or counting change, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

26. Do you like living where you live at the moment?
a. Do you enjoy where you live (e.g., your home, living in Southeast, US, living by yourself/family/friends)?
   i. If no, think of a situation in the last two weeks where you have not liked where you are living currently, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

27. Have you been in trouble lately?
   a. Recently, has someone said that you are in trouble?
      i. If yes, think of a situation in the last two weeks where you were in trouble lately, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

28. Do you have enough friends?
   a. Thinking about the friends you have; do you have a good amount of friends?
      i. If no, think of a situation in the last two weeks where you feel you didn’t have enough friends, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

29. Do people think you can’t do things when you think you can?
   a. When you get a task done, do you think some people were not sure that you could do it?
      i. If yes, think of a situation in the last two weeks where you have done something that people thought you couldn’t have, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

30. Do people like talking to you?
   a. Do you think people enjoy talking to you?
   b. Do people seem happy when they talk to you?
      i. If no, think of a situation in the last two weeks where people have not liked talking about you, on a scale from 0-3 (Prompt to look at water glasses now), how stressed did you feel about that?

(Fogarty, Bramston, & Cummins, 1997)
Communication Card for Questions 1-30 of Lifestress Inventory Protocol (Front Side)

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Yes

No

I’m not sure
Communication Card for Questions 1-30, of Lifestress Inventory Protocol (Back Side)

*Images obtained from Fogarty, Bramston, & Cummins, 1997*

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No stress</td>
</tr>
<tr>
<td>1</td>
<td>A little stress</td>
</tr>
<tr>
<td>2</td>
<td>A medium amount stress</td>
</tr>
<tr>
<td>3</td>
<td>A lot of stress</td>
</tr>
</tbody>
</table>
Appendix H: Feelings Chart

Images obtained from: Clipart Library, n.d.; Iconfinder, n.d.; and Microsoft Word Version 16.16 2018

Participants will be given feeling chart in the form of a two-sided hard copy where each side is identical. Feeling chart will be placed on the participants yoga mat and completed when participant entered the yoga session and then again once the yoga session ends. Research team members will give verbal prompts when participants enter the yoga session and before the participant leaves saying, “If you have not completed your feelings chart, please do so now”. Researcher will collect feelings chart after every session.

How are you feeling right now?

Happy | Sad
---|---
Mad | Excited
Worried | Relaxed/Calm
Tired
Appendix I: Post-Yoga Semi 1:1 Structured Interview Questions

Semi-Structured interviews will take place the day after the LSI. Researcher will state the purpose of the interview, how long it should take, and encourage participant to speak honestly before the interview begins.

*Today we will be discussing your thoughts about yoga, and your participation in the yoga classes these past seven weeks. I would like to ask a few questions about what makes you feel worried or stressed, what you do when you are worried, and whether you think yoga helps you feel less worried or stressed. The interview should take about 30 minutes. Also, before we begin, it is important that you know that it is okay for you to be honest when sharing your thoughts and feelings about what makes you worried, what you do when you are worried, and what you think or feel (good or bad) about yoga. Do you have any questions before we begin?*

1. What did you enjoy most about participating in yoga this semester?
2. What did you least enjoy about participating in yoga this semester?

*Interviewer will now read aloud the definition of stress: “Stress is feeling uncomfortable or worried when you feel like you can’t handle a problem” (Hartley & Maclean, 2005, pg.289; Kids Health, 2015, para.2)*

3. Can you give me an example of something that has caused you stress in the last two weeks?
   (If unable to provide a stressor, based off of LSI Stress Inventory top three answers from results of the day prior, interviewer will give examples of stressors as probe and ask them to identify with one)
   a. Can you tell me about what you did to handle or work through that stressor (name/refer to stressor that participant shares)?
      i. What makes you feel better (less worried or concerned) when you are stressed?
         1. Can you give me an example of something that makes you happy, that helps you feel less stressed?
            a. Why does (refer to the thing that makes them happy) make you feel happy and less stressed?
      ii. Do friends or family help you work through stress?
         1. Thinking about the friends you have in yoga (such as participants from Rainbow gang or Clemson team members), do they help you work through the stress? If yes, why/how?
4. Would yoga be an activity you would do to feel less stressed (refer to their named stressor as an example if needed)?
   a. Why would yoga be an activity you would do to feel less stressed?
   b. Why would yoga not be an activity you would do to feel less stressed?

5. “I am going to give you scenarios to identify with, please identify which response you identify with”.
   a. During yoga I feel… Happy, Sad, Mad, Excited, Worried, Relaxed/Calm, Tired
      i. “Looking at your Feelings Chart over the last seven weeks your mood has been (identify positive or negative trend based on preliminary analysis) after the yoga sessions, would you agree”?
   b. During yoga what do you think about?
      i. During yoga, do you think about…the stressor you just named (refer to earlier answer from LSI), yoga, friends/family, nothing, other, or you’re not sure?

That is the end of the questions I had today. Do you have any questions, or anything else that you would like to share?

Thank you for talking with me today, I appreciate your participation!
Communication Card for Question 1

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

What did you enjoy most about participating in yoga this semester?

- Doing Yoga
- Friends
- Getting Exercise
- Getting healthier
- Coming to Clemson
- Other
- I’m not sure

None of these, I’d like to give another answer
Communication Card for Question 2

*Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018*

**What did you least enjoy about participating in yoga this semester?**

- It doesn’t make me feel relaxed
- Each session is too long
- The session is too short
- Too many people
- Coming to Clemson
- The poses are too hard/too easy

**Other**

None of these, I’d like to give another answer

I’m not sure
Communication Card for Question 3

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Can you give me an example of something that has caused you stress in the last two weeks? (If unable to provide a stressor, based off of LSI Stress Inventory top three answers from results of the day prior, interviewer will give examples of stressors as probe and ask them to identify with one)

Getting in an argument Not being able to do something

Not having time alone Someone you know getting sick/Getting sick

I'm not sure

I have not experienced a stressor in the last two weeks

None of these, I'd like to provide another answer

Other

I’m not sure
Communication Card for Question 3a

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Can you tell me about what you did to handle or work through that stressor (name/refer to stressor that participant shares)?

- Talking to friends/family
- Go for a walk
- Do yoga
- Take a nap
- Listen to music
- Other
- None of these, I’d like to give another answer
- I’m not sure
Communication Card for Question 3ai

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

What makes you feel better (less worried or concerned) when you are stressed?

Talking to friends/family

Go for a walk

Do yoga

Take a nap

Listen to music

Other

I’m not sure

None of these, I’d like to give another answer
Can you give me an example of something that makes you happy, that helps you feel less stressed?

- Talking to friends/family
- Go for a walk
- Do yoga
- Take a nap
- Listen to music
- Other

I’m not sure
Communication Card for 3ai, 1a

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Why does (refer to the thing that makes them happy) make you feel happy and less stressed?

- I enjoy the activity
- I do the activity with friends
- I feel calm/relaxed
- I feel healthier
- I get away from stress during the activity
- Other
- None of these, I’d like to give another answer
- I’m not sure
Communication Card for Question 3aii

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Do friends or family help you work through stress?

Yes          No

I’m not sure
Communication Card for Question 3aii,1

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Thinking about the friends you have in yoga (such as participants from Rainbow gang or Clemson team members), do they help you work through the stress? If yes, why/how?

- They motivated/encouraged me in yoga
- Told me they had the same stressor
- They taught me something new about yoga

None of these, I’d like to give another answer

Other

I’m not sure
Would yoga be an activity you would do to feel less stressed (refer to their named stressor as an example if needed)?

Yes  No  I’m not sure
Communication Card for Question 4a

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Why would yoga be an activity you would do to feel less stressed?

I enjoyed it

I got to hang out with my friends

I got to learn yoga

I got to exercise

It was calming

None of these, I’d like to give another answer

Other

I’m not sure
Communication Card for Question 4b

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

Why wouldn’t yoga be an activity you would do to feel less stressed?

I did not enjoy it

I felt more stressed

My friends don’t do yoga

I did not feel supported in my stress

It wasn’t a good time of the day

It was not relaxing

None of these, I’d like to give another answer

I’m not sure

Other
Communication Card for Question 5


“\textit{I am going to give you scenarios to identify with, please identify which response you identify with}”. 

\textbf{During Yoga I feel….}

\begin{itemize}
\item Happy
\item Mad
\item Worried
\item Tired
\item Sad
\item Excited
\item Relaxed/Calm
\end{itemize}
Looking at your Feelings Chart over the last seven weeks your mood has been (positive or negative) after the yoga sessions, would you agree?

Yes  No  I’m not sure
Communication Card for Question 5b

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

During yoga what are you thinking about?

The stressor I just named

Yoga

Friends or Family

Nothing

Other

None of these, I’d like to give another answer
I’m not sure
Communication Card for Question 5bi

Images obtained from: Clipart Station, n.d. and Microsoft Word Version 16.16 2018

During Yoga I am thinking about…

The stressor I just named

Yoga

Friends or Family

Nothing

Other

None of these, I’d like to give another answer

I’m not sure
Appendix J: Quantitative Data Excluded from the Study

Methods

Quantitative Data Collection

Stress was measured using the Lifestress Inventory (LSI), a standardized 30-item questionnaire intended to measure stress among individuals with IDD (Bramston & Bostock, 1994; Hartley & MacLean, 2005; 2009). For each item, the LSI produced two scores: a frequency score representative of the number of stressors individuals experienced in the past two weeks; and an impact score representative of the extent to which the identified events had been stressful (0 = no stress; 3 = a lot of stress) in the past two weeks (Hartley & MacLean, 2005). The LSI also produced scores for three subdomains based on the type or cause of stress represented in each item: general worry, negative interpersonal relations, and competency concerns. Similar to the LSI, subdomain scores produced a frequency score representative of the number of stressors individuals experienced in the past two weeks; and an impact score representative of the extent to which the identified events had been stressful (0 = no stress; 3 = a lot of stress) in the past two weeks (Hartley & MacLean, 2005). Total LSI scores range between 0-30; general worry subdomain scores range between 0-13, negative interpersonal relations subdomain scores range from 0-9, and competency subdomain scores range from 0-8. Higher scores indicates higher levels of stress. The LSI has been used with individuals with mild intellectual disabilities, defined as individuals with an IQ ranging from 55 to 70 (Hartley & MacLean, 2005). The LSI has an inter-reliability score of .87 and internal reliability of
.68 as well as a test-retest reliability score of .80 within a two-week period (Bramston & Bostock, 1994; Hartley & Maclean, 2005). For the subdomains, general worry has an inter-reliability score of .80, negative interpersonal relations has a score of .78, and competency concerns has a score of .73 (Fogarty, Bramston, & Cummins, 1997).

**Quantitative Data Analysis**

The difference between pre- and post-LSI scores were calculated and used to conduct a Shapiro-Wilk test in order to test for normality. Results indicated that the data was not normally distributed (p=.046), thus non-parametric statistics were used to analyze differences in the LSI scores. A Wilcoxon-Signed Rank test was used to evaluate where there were significant changes in participants’ pre- and post-LSI frequency and impact scores, and subdomain. Percent change (Time 2-Time 1/Time 1)*100 scores were also calculated to determine whether there were any trends in participants’ pre- and post-LSI frequency and impact scores. A Friedman’s test was conducted to determine whether there were any significant differences in LSI subdomain scores prior to, and following the yoga intervention.

**Results**

Five participants of the 13 participants consented for participation in the study successfully completed all three steps of the cognitive screener and completed the LSI. Four participants passed step one of the cognitive screener and were eligible for completing the semi-structured interview; four participants did not pass step one of the cognitive screener and were excluded from participation in the LSI or semi-structured interview.
Participants reported 12 of the 30 stressors reflected in the 30-item LSI during data collection. Ten of 30 stressors were reported prior to participation in the yoga intervention; 11 of 30 stressors were reported following participation in the yoga intervention. The top three stressors most frequently experienced prior to the start of the yoga intervention as: not being able to do things properly (n=4); people arguing (n=3); and being in really crowded places (n=3). The average stress impact score for not being able to do things properly was 1, the average impact score for people arguing was 1.6, and the average stress impact score related to being in really crowded places was 0.6.

The top three stressors most frequently reported by participants post-yoga were: not being able to do things properly (n=4), someone being seriously ill/died (n=4), and being in really crowded places (n=4). The average stress impact score for not being able to do things properly was 1.6. The average stress impact score for someone being seriously ill/died was 2; and being in a really crowded place was 1.6. See Table 1 for a complete summary of participants’ reported stress frequency and impact scores.

Table 1

Self-Reported T1 and T2 Stressors

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Pre-Yoga Stress Frequency n (%)</th>
<th>Pre-Yoga Average Stress Impact Scores</th>
<th>Post-Yoga Stress Frequency n (%)</th>
<th>Post-Yoga Average Stress Impact Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you feel you can’t do things properly or quick enough? <em>CC</em></td>
<td>4 (80%)</td>
<td>1</td>
<td>4 (80%)</td>
<td>1.6</td>
</tr>
<tr>
<td>Have you heard people you know arguing? <em>NIR</em></td>
<td>3 (60%)</td>
<td>1.6</td>
<td>2 (20%)</td>
<td>1</td>
</tr>
<tr>
<td>Has someone you know been seriously ill/died? <em>NIR</em></td>
<td>3 (60%)</td>
<td>1.4</td>
<td>4 (80%)</td>
<td>2</td>
</tr>
<tr>
<td>Have you recently been in any really crowded places? <em>NIR</em></td>
<td>3 (60%)</td>
<td>0.6</td>
<td>4 (80%)</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Have you ever been in a difficult situation where you didn’t know what to do? CC

<table>
<thead>
<tr>
<th></th>
<th>3 (60%)</th>
<th>1</th>
<th>---</th>
<th>---</th>
</tr>
</thead>
</table>
Will you always be able to have/find a job? GW

<table>
<thead>
<tr>
<th></th>
<th>3 (60%)</th>
<th>0.2</th>
<th>1 (10%)</th>
<th>0</th>
</tr>
</thead>
</table>
Do people interrupt you when you are busy? NIR

<table>
<thead>
<tr>
<th></th>
<th>2 (20%)</th>
<th>.80</th>
<th>2 (20%)</th>
<th>.80</th>
</tr>
</thead>
</table>
Do people tease you or call you names? NIR

<table>
<thead>
<tr>
<th></th>
<th>2 (20%)</th>
<th>.20</th>
<th>2 (20%)</th>
<th>1</th>
</tr>
</thead>
</table>
Do you feel confident handling money or counting change? GW

<table>
<thead>
<tr>
<th></th>
<th>2 (20%)</th>
<th>.80</th>
<th>2 (20%)</th>
<th>.20</th>
</tr>
</thead>
</table>
Do people think you can’t do things when you think you can? CC

<table>
<thead>
<tr>
<th></th>
<th>---</th>
<th>---</th>
<th>3 (60%)</th>
<th>.80</th>
</tr>
</thead>
</table>
Can you do the things people want you to do? CC

<table>
<thead>
<tr>
<th></th>
<th>---</th>
<th>---</th>
<th>2 (20%)</th>
<th>.80</th>
</tr>
</thead>
</table>
Have you been in trouble lately? NIR

<table>
<thead>
<tr>
<th></th>
<th>1 (10%)</th>
<th>.60</th>
<th>2 (20%)</th>
<th>1</th>
</tr>
</thead>
</table>

Note: Impact Scores reflective of: 0=no stress, 1=a little stress, 2=a medium amount of stress, 3=a lot of stress. Subdomains: CC=competency concern; NIR= negative interpersonal relationships; GW=general worry.

A Wilcoxon-signed rank test was conducted to evaluate whether there were significant changes in pre- and post-LSI scores following the seven-and-a-half week yoga intervention. Three subscales (general worry, competency concerns, and negative interpersonal relations) were also evaluated for significant changes from pre- and post-intervention. Results showed no significant difference in pre- and post-LSI frequency (p=.414) or impact (p=.080) scores. See Table 2 for complete list of pre- and post-LSI frequency scores. Percent change calculations indicated that the frequency of participants’ overall stress increased by 6%, and the impact of overall stress experienced increased by 38%.

There were no significant changes in two of the pre- and post-subdomain scores: general worry (frequency p=.414; impact p=.465) and competency concerns (frequency p=.317; impact p=.180). See Table 2 for a complete list of pre- and post-subdomain scores.
scores. However, changes in participants’ pre- and post-subdomain scores specific to negative interpersonal relations were significant (frequency p=.083; impact p=.042), indicating participants’ stress levels in this area significantly increased. Percent change calculations showed stress associated with general worry decreased in frequency by 37%, and decreased in impact by 93.3%. In contrast, percent change calculations for stress associated with competency concerns (25% frequency increase; 31% impact increase) and negative interpersonal relations (21% frequency increase; 39% impact increase) increased, indicating the frequency and impact of stress in these areas worsened. See Table 2 for complete list of Wilcoxon Results.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre M + SD</th>
<th>Post M + SD</th>
<th>p-value</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Stress (Frequency)</td>
<td>6 ± 1.87</td>
<td>6.4 ± 2.7</td>
<td>.414</td>
<td>6.67%</td>
</tr>
<tr>
<td>Overall Stress (Impact)</td>
<td>1.47 ± .69</td>
<td>2.03 ± .19</td>
<td>.060</td>
<td>38.09%</td>
</tr>
<tr>
<td>General Worry (Frequency)</td>
<td>1.60 ± 1.34</td>
<td>1 ± 1.3</td>
<td>.414</td>
<td>37.5%</td>
</tr>
<tr>
<td>General Worry (Impact)</td>
<td>1.05 ± 1.17</td>
<td>.7 ± .45</td>
<td>.465</td>
<td>93.33%</td>
</tr>
<tr>
<td>Negative Interpersonal Relations (Frequency)</td>
<td>2.8 ± 2.18</td>
<td>3.4 ± 2.2</td>
<td>.083</td>
<td>21.42%</td>
</tr>
<tr>
<td>Negative Interpersonal Relations (Impact)</td>
<td>1.8 ± .48</td>
<td>2.5 ± .31</td>
<td>.042*</td>
<td>38.88%</td>
</tr>
<tr>
<td>Competency Concerns (Frequency)</td>
<td>1.6 ± .55</td>
<td>2 ± 1.23</td>
<td>.317</td>
<td>25%</td>
</tr>
<tr>
<td>Competency Concerns (Impact)</td>
<td>1.1 ± 1.02</td>
<td>1.44 ± .83</td>
<td>.180</td>
<td>30.90%</td>
</tr>
</tbody>
</table>

*p<=.05

Friedman test results showed no significant difference in the frequency (p=.444) or impact (p=.204) of stress associated with general worry, competency concerns, or negative interpersonal relationships experienced by participants prior to the yoga intervention. Friedman test results showed no significant different in the frequency of stress (p=.056) associated with general worry, competency concerns, or negative
interpersonal relationships experienced by participants after the seven-and-a-half week yoga intervention. However, there was a significant difference in the impact of stress (p=.015) associated with general worry, competency concerns, and negative interpersonal relationships at the conclusion of the study. Dunn-Bonferroni post hoc tests indicated that there were significant differences between the impact of stress of general worry and negative interpersonal relations (p=.013). Differences in the impact of stress related to general worry and competence (p=1.0), and the impact of stress associated with competence and negative interpersonal relations (p=.173) were not statistically significant.