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An Exploratory Case Study on the Impacts of Functional Fitness on Physical Functioning, Instrumental Activities of Daily Living and Quality of Life for Adults with Physical Disabilities

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AN EXPLORATORY CASE STUDY ON THE IMPACTS OF FUNCTIONAL FITNESS ON PHYSICAL FUNCTIONING, INSTRUMENTAL ACTIVITIES OF DAILY LIVING AND QUALITY OF LIFE FOR ADULTS WITH PHYSICAL DISABILITIES

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ABSTRACT

The purpose of this study was to explore the specific case of participating in a functional fitness program for adults with physical disabilities. Although there is a growing body of literature concerning the importance of physical exercise for individuals with disabilities, little to no research has been completed specifically concerning the utilization of functional fitness. This study defines functional fitness as a physical exercise program, and explores the phenomenon of impacts to functioning for the participants who were involved. Through the means of case study methodology, this study assessed the impacts of functional fitness participation on physical functioning, instrumental activities of daily living, and quality of life among adults with physical disabilities.

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Chapter 1

Introduction

Of the 19% of the U.S. population that reports having a disability, 26% report being physically inactive despite national public health efforts stressing the importance of daily physical activity (Centers for Disease Control and Prevention, 2007). Research findings from the CDC (2007) indicate that individuals with a disabling health condition can decrease their risks of experiencing secondary health conditions and negative life factors such as depression and anxiety through active participation in physical activity. It is likely that decreasing these negative life factors could increase overall functioning, including physical, social, and emotional. With the growing interest in exploring exercise modalities that can be utilized by individuals with disabilities, research that explores a variety of exercise modalities is valued. Questions remain as to which physical exercises are most beneficial at enhancing the overall functioning of individuals with disabilities. This study will highlight functional fitness, a modality that was developed from a popular fitness trend, CrossFit.

CrossFit, created by Greg Glassman, a former gymnast and fitness coach, is a fitness program that consists of "constantly varied functional movements performed at high intensity" based on gymnastic movements, Olympic weightlifting, and classic strength and conditioning (CrossFit Inc., 2018, para. 2). The global network of over 13,000 CrossFit affiliates around the world follow the same hour long program format that is focused on the workout of the day, also referred to as the WOD (CrossFit Inc., 2018). According to CrossFit Inc. (2018), all workouts have universal scalability, meaning individuals can participate regardless of experience and ability. A typical WOD

includes two exercise options: exercise as prescribed, and scaled exercises. Exercise as prescribed means participants complete exercises as they were initially intended, whereas scaled exercises are alternative options to the prescribed exercise. For example, the exercise as prescribed may be a pull up. If a person is unable to do a traditional pull-up they have the option to choose from alternative exercises that utilize the same movements (e.g. push or pull movements). In this example, a person could substitute pull-ups with static hanging bar rows, or static hanging ring rows. The purpose of scaling, according to Jeremy Gordon (2015), a head coach and CEO of a CrossFit gym (a.k.a. CrossFit Box), is for participants to maintain intended stimuli regardless of ability of fitness levels. Scaling is meant to allow a progressive path for participants to work towards performing workouts as prescribed (Gordon, 2015).

This fundamental element of adaptability has provided individuals with a disability an opportunity to participate in CrossFit exercise programs. While there is no official *Adaptive CrossFit*, the current approach to fitness allows for modifications to be made to the movements in order to maximize an individual's ability to complete the WOD. As an individual gains strength, flexibility, and endurance, they can progress from completing scaled WODs to prescribed WODs. Although some people may never complete a WOD as prescribed, regardless of whether they have a physical impairment, they are still able to fully participate due to the adaptability of CrossFit workouts.

CrossFit Inc. describes the movements of CrossFit as the core movements of life. Proper squat form is not merely a movement utilized to gain strength in the muscles of the lower body, but is the safe movement that should be used to achieve life tasks such as lifting a couch. The fundamental movements within CrossFit are not only easily adapted

to the ability levels of participants but are also easily applied to life situations and functioning such as the example of lifting a couch. Functional fitness programs, whose aims are to improve functioning in life domains, can easily arise from the CrossFit model and the fundamental movements that mirror core life movements (CrossFit Inc., 2018).

There have been numerous studies completed to support the positive benefits of physical activity for those with a disability (Baatile, Langbein, Weaver, Maloney, & Jost, 2000; Centers for Disease Control and Prevention, 2007; Dodd, Taylor, & Damiano, 2002; Teixeira-Salmela, Olney, Nadeau, & Brouwer, 1999). However, there is limited research that utilizes functional fitness as an exercise modality for individuals with physical or cognitive disabilities. Because there is deficient research pertaining to functional fitness for individuals with physical disabilities, the main purpose of this study is to provide empirical data of the impacts that are manifested through participation in functional fitness. This study will assess the impact of functional fitness on: 1) physical functioning, 2) instrumental activities of daily living (IADL), and 3) quality of life. This data can be utilized by professionals within multiple fields such as, but not limited to, Recreational Therapy, Occupational Therapy, Physical Therapy, and Personal Training. The intent of providing valid data for these supporting services is to enhance therapeutic inventory in order to provide individualized, effective therapy that elevates physical, emotional and psychological functioning for individuals with physical disabilities.

Purpose Statement

The purpose of this study is to explore the impact of participation in functional fitness on physical functioning, instrumental activities of daily living (IADL), and quality of life among individuals who have a physical disability. This research is being

conducted to 1) introduce the use of a functional fitness program stemming from CrossFit to the body of literature, and 2) to explore the impacts of functional fitness on adults with physical disabilities in order to a) provide an intervention options to assist in better functioning for adults with disabilities, b) provide clinicians with additional evidence-based practices that can be utilized to improve functioning, and c) contribute to the limited literature highlighting specific exercise modalities utilized to improving functioning for adults with physical disabilities.

Research Question

Specific Aim 1: To explore the impacts of participating in functional fitness on physical functioning**,** IADL and quality of life.

Definition of Terms

1. *Activities of Daily Living:* Basic activities of hygiene and personal care, and instrumental activities of daily living (IADLs) (Spector & Fleishman, 1998).

2. *Activity:* The execution of a task or action by an individual (World Health Organization, 2013).

3. *Disability:* An umbrella term for impairments, activity limitations and participation restrictions. It denotes the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors) (World Health Organization, 2013).

4. *Physical Disability:* A condition of the body (impairment) that makes it more difficult for the person with the condition to do certain activities (activity limitation) and interact with the world around them (participation restrictions) (Centers for Disease Control and Prevention, 2017)

5. *Functional Fitness:* The use of fitness (including exercise, movement, play etc.) to improve capability, competency, and efficiency of doing real-life activities in real-life settings (Kloo, personal communication, December 30, 2017).

6. *Functioning:* To perform a specified action or activity; work; operate (Function [def. 8], 2018).

7. *Health:* A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (World Health Organization, 2013).

8. *Instrumental Activities of Daily Living (IADLs):* Basic activities necessary to reside in the community, such as shopping, managing finances, housekeeping, and meal preparation (Spector & Fleishman, 1998).

9. *International Classification of Functioning, Disability, and Health:* (As cited in World Health Organization, 2013) A framework for organizing and documenting information on functioning and disability (WHO, 2001).

10. *Physical Exercise:* A subcategory of physical activity that is planned, structured, repetitive, and purposive in the sense that the improvement or maintenance of one or more components of physical fitness is the objective (Rimmer, Chen, McCubbin, Drum, & Peterson, 2010).

11. *Quality of Life:* An individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (World Health Organization, 1998).

12. *World Health Organization:* The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health (World Health Organization, 1976).

Chapter 2

Literature Review

The following literature review will cover the population of interest related to the study, the conceptual framework that this study was modeled from, and the specific modality that was explored in this study.

Individuals with Disabilities

The United States is comprised of more than 53 million individuals with disabilities (Courtney-Long et al., 2017; U.S. Census Bureau, 2012). The World Health Organization (2013) describes disability as an umbrella term that includes impairments, activity limitations, and participation restrictions, all of which interfere with an individual's ability to preform an activity at a level perceived as normal (i.e., work, take care of family, live independently, etc.). Disability is not merely the presence of a health condition; the extent to which an individual experiences a disability depends on the interaction between the individual with a health condition and their personal and environmental factors (World Health Organization, 2013). The impairments associated with a disability can manifest across all life domains, are unique to each individual, are generally specific to their diagnosis, and can impact their lives in a variety of ways. Besides the typical ways in which a disability impacts an individual (i.e., decreases in physical, psychological, cognitive, or social functioning), disparities are apparent in other areas of their lives. For example, research has shown that individuals with a disability are more likely to be unemployed, have lower educational levels, and are more likely to have secondary health conditions than those without a disability (Courtney-Long et al., 2015).

There are many ways to describe and define a person's level of functioning. The International Classification of Functioning, Disability and Health (ICF) will be utilized to help guide the domains of functioning that will be investigated in this study. The use of this framework will provide a systematic and structured way to organize the domains of a person's life as a result of participating in an intervention.

International Classification of Functioning, Disability and Health Model

The International Classification of Functioning, Disability and Health (ICF) is a conceptual framework used for describing and understanding functioning in relation to disability (World Health Organization, 2013). Through the application of the ICF, individuals with disabilities are classified based on their functioning in various areas, also taking into consideration the impact of environmental and personal factors on their overall health (Jelsma, 2009; World Health Organization, 2013). The ICF provides an alternative and holistic approach to assessing and describing an individual's health status and functioning outside of the restricting medical approach that focuses solely on the health condition (World Health Organization, 2013). The ICF views health through the lens of body structures and functions, activities and participation, and contextual factors (i.e., environmental and personal factors)(World Health Organization, 2013).

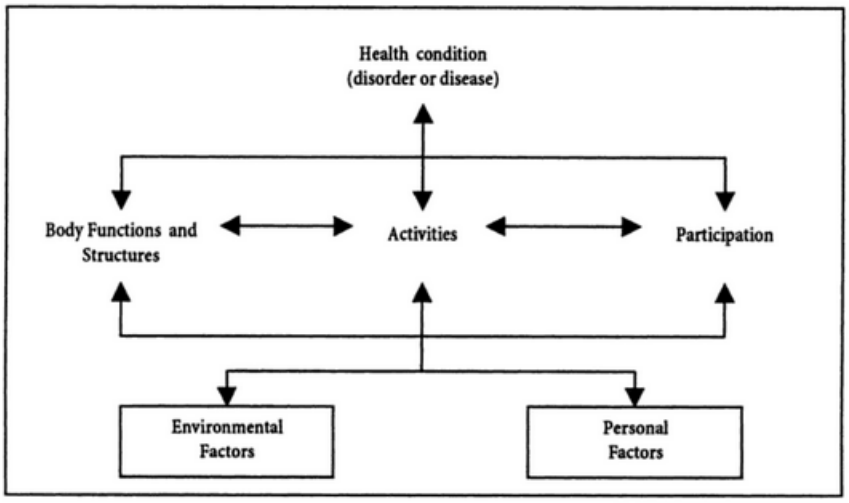

Figure 1. International Classification, Disability and Health Model (ICF; World Health Organization , 2013)

Body functions and structures. Body functions and structures refers to the physiological functioning of the body and the anatomical parts of the body. Structures are the specific parts of the body such as organs or limbs, while body functions refers to differing body systems like the circulatory system that are impacted by a specific health condition or injury (Stucki, 2005; World Health Organization, 2013). Within the ICF, the purpose is not to diagnose or treat the impairment of the body structure that is impacting it's function, but in turn to describe and classify the body structures and functions (Stucki, 2005) For example, the spine is the body structure affected for an individual with a spinal cord injury. As a result, the function of the spinal cord is compromised by this injury and the individual's ability to send signals from the brain, down the spinal cord to the lower portion of their body is hindered. This person would experience limitations in the body functions that the spinal cord is responsible for, such as signaling to the brain the sensations of feeling touch, pain or temperature to their lower extremities. The signals from the brain through the spinal cord to the lower extremity muscles would also be

hindered and would prevent the individual's ability to voluntarily contract or extend the muscles that assist in mobility.

Activities and participation. The term activity refers to an individual executing tasks (World Health Organization, 2013). These tasks could include things such as jumping, squatting, or throwing a ball. A person may have limitations within the execution of a specific task, and therefore, would have activity limitations (World Health Organization, 2013). For example, a person with a spinal cord injury may experience an activity limitation when doing abdominal exercises due to limited core strength and stability. Participation, according to the World Health Organization (2013) concerns the individual's level of involvement in life situations. While running and kicking a ball are both considered activities, playing soccer with friends, would be classified as participation. If an individual has limitations in life situations, this is referred to as participation restrictions (World Health Organization, 2013). For example, an individual with a spinal cord injury participating in a cycling workout class may experience participation restrictions and have to utilize a hand cycle to accommodate for the inability to utilize their legs on a standing cycle.

Personal and environmental factors. Personal and environmental factors make up the contextual factors of an individual's life. "Gender, race, ethnicity, age, social and educational background, past and current experiences and life events, character styles, behavior patterns, and psychological assets" are all considered personal factors, and may influence an individual's functioning or activity participation (World Health Organization, 2013, p. 40). An individual's functioning can also be influenced by the environmental factors in their life. The World Health Organization (2013) defines

environmental factors as the "social, attitudinal and physical environment in which people live and conduct their lives" (p. 5). Personal and environmental factors have the ability to impact a person's life in a positive or in a negative way. For example, if an individual loses their job, their confidence, stress levels, relationships, financial status, and overall functioning may be negatively impacted. In contrast, an individual who loses their job may see this change as an opportunity to get a new job; therefore they are positively influenced by the environmental change.

The ICF is a useful way to understand an individuals' functioning across various domains, and provides a systematic way to measure it. There are numerous activities that can be used to foster participation in life, and improve an individual's health and functioning. One such activity is physical exercise.

Physical Exercise

Physical exercise is defined as a form of physical activity that is distinguished by its necessity of being planned, structured and repetitive, as well as being done with the intentions of improving health or fitness (Rimmer et al., 2010). In order to fully grasp the definition of physical exercise, it is essential to elaborate on the terms activity, health and fitness included in this definition.

Physical activity. Physical activity is distinguished by an increase in energy expenditure that exceeds the basal level due to "any bodily movement produced by the contraction of skeletal muscle" (Rimmer et al., 2010, p. 250). Physical exercise is considered to be physical activity, but not all physical activities can be considered physical exercise. For example, a person may decide to walk up the stairs to their apartment instead of taking the elevator. This results in the contraction of skeletal muscle,

which is a key component of Rimmer's (2010) definition of physical activity. In contrast, an individual signs up for a walking club, in an attempt to decrease the amount of inactive minutes occurring while at work. The walking club is an organized, daily event where coworkers walk around the property of their workplace. When comparing the two examples, both involve bodily movement and muscle contractions, but the second scenario introduces the element of physical exercise in that the walking club is planned, structured, and intentionally facilitated for decreasing inactivity.

Health. Health focuses on a holistic view of the person, not only the health condition (World Health Organization, 2013). For example, a person with a spinal cord injury may be considered healthy due to their balanced eating habits, regular exercise, and intimate relations with friends and family, while an individual with no disability or disease may be considered unhealthy as a result of inactivity and poor eating habits. Conceptually, a person's health can be comprehended as a continuum, with the ability to fluctuate between low and high levels of health throughout a person's life (Rimmer, 1999).

Fitness. Fitness in the context of the body is "a set of attributes that are either health- or skill-related", which can be measured through the use of specific tests to identify the degree one has these attributes (Caspersen, Powell, & Christenson, 1985, p. 126). Based upon these definitions, physical exercise is an activity that one participates in with the intentions of increasing health and or fitness.

There are a multitude of physical activities for people to participate in, in order to improve physical health and fitness levels, that may encompass different domains of exercise such as aerobic exercise (i.e., running), strength training (i.e., weight lifting),

aquatic exercise (i.e., lap swimming), or a combination of more than one approach (i.e., running in place in a pool) (Rimmer et al., 2010). Physical activities may be completed individually, with a trainer or instructor, or within a group setting. Scientific evidence has established an understanding that regular participation in physical activity helps to improve physical and psychological health within the general population (Rimmer et al., 2010). In spite of this knowledge, less than half of all Americans meet the basic standards (applicable for all ability levels) for being physically active by exercising 150 minutes at moderate intensity, or 75 minutes at vigorous intensity per week (Centers for Disease Control and Prevention, 2007; Courtney-Long et al., 2017; Office of Disease Prevention and Health Promotion, 2018,). Much of this group of inactive Americans is comprised of individuals with disabilities, who have demonstrated a decrease in health in recent years (Centers for Disease Control and Prevention, 2007; Kuhn, 2013; Ploeg, Beek, Woude, & Mechelen, 2004).

Functional fitness. The term functional fitness is defined as the utilization of "fitness (including exercise, movement, play, etc.) to improve capability, competency, and efficiency of doing real-life activities in real-life settings" (Kloo, personal communication, December 30, 2017). Viewing functional fitness through the lens of the ICF enables a deeper understanding of the definition, which will be further expanded upon in the following example.

Beginning with the health condition (e.g., a spinal cord injury), an individual's functioning can be understood by examining the body structure and function, activity and participation, and contextual factors in light of that health condition. The body structure that is affected could be the spinal cord, at L2. The functioning of the individual's lower

extremities is affected and limitations on muscle contraction and extension in the legs are experienced. Activity limitations may include an inability to jump, which would limit their participation in a fitness program where jumping rope or box jumps are required.

If one considers the individual's positive contextual factors of being resilient and determined, the activity limitations may not deter their participation in the fitness program. As a result, they may experience increases in their strength and endurance, as well as growth within their contextual factors. They may find they have more endurance when preforming other tasks within their life, such as moving at a quick pace while at work. This application of gained endurance while participating in a functional fitness program to endurance in a real-life setting, is what differentiates the definition of functional fitness from terms such as *working out*.

Impacts on physical functioning. The literature strongly supports the positive influence that participating in physical exercise can have on individuals with various disabilities (Centers for Disease Control and Prevention, 2007; Dodd, Taylor, & Damiano, 2002; Ploeg et al., 2004; Rimmer et al., 2010; Rimmer, Wang, & Smith, 2008). Ploeg (2004) and Rimmer (2008) both stress the importance of participation in physical exercise for individuals with disabilities in order to experience increases in physical functioning, as well as decreased potential for developing secondary conditions.

Physical benefits vary depending on the modality used as well as the population involved. Within numerous studies, individuals with disabilities who participated in a physical exercise program demonstrated measureable differences in their physical functioning. Smith (1999) reported that individuals with stroke experienced improvements in their hamstring strength and their spastic reflexes as a result of

participation in a low intensity exercise program where they walked on treadmills three times a week for three months. Similarly, Scremin (1999), found that individuals with spinal cord injuries experienced increased muscle mass as a result of the exercise program they participated in where functional electrical stimulation was combined with resistive exercises. Weightlifting has been shown to increase neuromuscular functioning, lean body mass, coordination, and balance as well as decreasing body fat (Hendrick, Allen, & Wada, 2008). Outcomes of participating in specific physical activities vary based on the population involved as well. For example, a study involving individuals with Parkinson's participating in a PoleStriding exercise program, showed improvements in physical functioning (Baatile, Langbein, Weaver, Maloney, & Jost, 2000). These are merely a few examples among many that support positive impacts on physical functioning for individuals with disabilities participating in exercise programs.

Impacts on Instrumental Activities of Daily Living (IADLs). Activities of daily living (ADL) occur on a daily basis and are required for basic functioning. One must participate in ADL in order to care for themselves and contribute to independence levels. Examples of ADL include eating, bathing and using the restroom. Instrumental activities of daily living (IADL), in comparison, relate to independent living and a broader functioning within society, and include activities such as cooking, shopping, or driving. IADL can be grouped into three categories: 1) productivity, 2) social relations, and 3) community involvement (Whiteneck et al., 2011).

Participating in physical exercise positively impacts physical functioning, and individual's ability to participate in IADL (Brach & VanSwearingen, 2002; Chou, Hwang, & Wu, 2012; Ginsberg, Hammerman-Rozenberg, Cohen, & Stessman, 1999).

For example, an individual who has had a stroke and sustained hemiplegia (paralysis on one side of their body) may have limitations in their grip strength and fine motor control on that one side of their body, which may make carrying groceries difficult. As a part of their fitness routine, they may have incorporated exercises that focus on developing their grip strength. Over time, the muscles in the effected hand, forearm, and bicep may become stronger allowing them to carry those groceries from their car to their house more successfully (i.e., not making multiple trips, or dropping bags).

Impacts on quality of life. The World Health Organization defines quality of life as "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (World Health Organization, 1998, p. 551). When assessing quality of life, it is integral that the subjectivity that coincides with quality of life be considered. As the WHO's definition states, the perceptions of the influence of present contextual factors play a large role into how a person's quality of life is determined.

Exploration into the literature quickly presents the extent of the complexity in defining quality of life, and can be highlighted by examining the domains included in four different studies on quality of life. Each study, although related in the research topic, explored different elements under the umbrella of quality of life. In two studies focused on exercise impacting quality of life for children, the elements include *activity limitations, symptoms related to a diagnosis, emotional functioning*, *physical/psychological well-being, mood, self perception, autonomy, relationships, school environment, bullying* and *financial resources* (Basaran et al., 2006; Gillison, Standage, & Skevington, 2006). Exploring a study pertaining to adult cancer survivors

and the effects of exercise on their quality of life, the elements specified were *life satisfaction, fatigue, anxiety, depression,* and *physical fitness* with the subcategories of *physical, functional, emotional* and *social/family* well-being (Courneya et al., 2003). Lastly as an example drawn from a study on older adults' physical exercise and quality of life, the elements identified were *freedom of disease, engagement with life,* and *physical/mental competence* (Spirduso & Cronin, 2001). These examples are only four studies that contribute to the extensive body of literature that focuses on how exercise impacts quality of life and the complexity of understanding this phenomenon.

In light of this complexity, research has established a clear relationship between physical exercise and quality of life. One potential benefit to increased quality of life is increased levels of life satisfaction. Thirty three percent of individuals with disabilities in the U.S. report being very satisfied with their life, meanwhile 67% of individuals without disabilities report high levels of life satisfaction (National Organization on Disability, 2002). Increased physical exercise could result in increased quality of life, and consequently life satisfaction. Increased quality of life due to participation in physical exercise can assist in minimizing the disparities among individuals with disabilities and those without. Many individuals with disabilities are more likely to experience secondary health conditions and negative life factors such as depression, anger, and limited mobility (Centers for Disease Control and Prevention, 2007). Many of the negative aspects that coincide with having a disability can decrease as physical exercise increases along with levels of quality of life.

Conclusion

Because of the plethora of existing literature, it has become common knowledge that participation in regular exercise can enhance functioning (Rimmer et al., 2010; De Vries et al., 2012). One facet of this research that has developed is the stressed importance for individuals with disabilities to achieve appropriate amounts of physical exercise in order to decrease secondary health conditions and increase overall functioning (Centers for Disease Control and Prevention, 2007; Cooper et al., 1999; Courtney-Long et al., 2015; Ploeg et al., 2004; Rimmer, 1999). The impacts of increased exercise among individuals with disability are as vast at the life domains that are affected by disability. Although a multitude of research studies support and stress the need for individuals to be adequately active, further questions arise from the findings that require investigation. For example, which modalities should be used, and which populations will benefit best from these modalities. More research is needed to help further the existing knowledge on effective exercise modalities that increase functioning in multiple life domains in order to enhance the advanced intervention approaches that can be utilized to improve functioning for individuals with disabilities. This study will provide evidence to better understand functional fitness as a means for increased exercise participation that impacts physical functioning, IADL, and quality of life for individuals with physical disabilities.

Chapter 3

Methods

This section will outline the following information: (a) study design; (b) site of study; (c) selection of subjects; (d) recruitment of subjects; (e) data collection procedures; (f) instrumentation (g) data analysis; and (h) study limitations.

Study Design

This study employed an intrinsic, exploratory multi-method case study that explored the impacts of participating in functional fitness on physical functioning, IADL, and quality of life among adults with physical impairments**.** Three prongs of data collection were utilized and include 1) quantitative data, 2) field notes, and 3) qualitative data. An intrinsic case study reflects that the researcher has a genuine interest in the case being researched (Stake, 1995). Specifically in relation to this study, the primary researcher has an interest based on personal and professional connections to the fitness industry. An exploratory approach reflects research that involves deeply evaluating situations and cases (Yin, 2003). This is a "broad-ranging, intentional, systematic data collection designed to maximize discovery of generalizations based on description and direct understanding of an area of social or psychological life" (Given, 2008, p.327).

Project Momentum

Project Momentum is a non-profit organization that was designed for individuals with disabilities seeking to enhance their fitness and health through functional fitness. The organization is affiliated with multiple CrossFit boxes and gyms around the Charlotte, North Carolina area. These partnering boxes and gyms provide functional fitness training opportunities for people with disabilities. Project Momentum was

developed in order to provide a means for improved health and quality of life through fitness that is modified based on the abilities and needs of each client.

Most individuals who become a Project Momentum client have been referred to the program by other Project Momentum clients, or members of the affiliated boxes and gyms. In some cases, other sources such as social media and Project Momentum trainers have influenced individuals to get involved in Project Momentum. The majority of clients have neurological or neuromuscular impairments such as stroke, cerebral palsy, and muscular dystrophy. Some participants also have paraplegia, orthopedic impairments, and intellectual or cognitive impairments.

Currently, Project Momentum has around 50 clients across the affiliated CrossFit boxes and gyms in the Charlotte area with ages ranging from four years old to 74 years old. Due to the variety of ability levels among the clients, each training plan is individualized. An initial fitness assessment is used to establish baseline functioning in physical domains such as flexibility, balance, and mobility through the use of a functional assessment. This initial assessment, in addition to assisting with goal setting, helps to establish the clients' baseline and facilitates the development of their individualized training plan.

There is one primary trainer for Project Momentum, in addition to qualified trainers at the affiliated boxes and gyms. In order to work with Project Momentum clients, trainers must meet the following criteria: (a) attend one Project Momentum training course, (b) shadow the primary trainer three or four times as she trains clients; (c) have the primary trainer observe three or four training sessions being implemented by the

trainer; (d) and attend a Project Momentum refresher training course after six months of independent training.

In attempts to maintain consistency in training to all CrossFit boxes and gyms associated with Project Momentum, the primary trainer attends training sessions at the affiliates roughly every six weeks. The trainers are strongly encouraged to attend Crossroads Adaptive Athletic seminars, WheelWOD seminars, Adaptive CrossFit seminars, or any other similar fitness seminars focused on working with individuals with adaptive fitness needs. In terms of certification requirements, trainers are to follow the regulations laid out by the specific CrossFit box or gyms where they are employed. These requirements could include basic level certifications such as CrossFit Level 1 Trainer certification, American Council on Exercise (ACE) Personal Trainer certification, and American College of Sports Medicine (ACSM) certification, in addition to specialized training certifications as well.

Selection of Subjects

Once IRB approval was obtained (see Appendix A), the selection of subject process began. All participation in the study was voluntary and was not incentivized. The sample size for this study consisted of six clients from Project Momentum, all with varying disabilities. The aim for the selection of subjects was to explore the cases where clients were experiencing the greatest impact. The primary researcher, with the guidance and professional opinion of the lead trainer of Project Momentum, selected participants that were then recruit for this exploratory case study. In attempts to explore the phenomenon of Project Momentum impacting functioning, each participant had to meet the following inclusion criteria: 1) each subject must have a physical disability, 2) must

be an active Project Momentum client that has held an active membership for at least one year at the CrossFit box where the lead trainer is located, and 3) must be 18 years or older. The intention was that selecting participants who were most knowledgeable about Project Momentum would provide the study with participants who were able to speak in depth about their experiences with the program.

Recruitment of subjects. Selected clients of Project Momentum received information about the study via email from the primary trainer at Project Momentum (see Appendix B). The email included contact information for the primary researcher and general information about the study. Project Momentum clients interested in participating in the study contacted the primary researcher and then received an informational email (see Appendix C) that included a link to the retrospective pre-test portion of the quantitative surveys. The survey link navigated the participants first to the consent form. The consent form included the following: 1) the purpose of the study, 2) what participating in the study entails, 3) the time commitment of the study, and 4) any risks associated with participation. Prior to any involvement in the study, all participants provided consent.

Data Collection Procedures

With this study being an intrinsic case study, prior to any data collection, the primary researcher bracketed biases in order to be aware of preconceived thoughts and experiences (Tufford & Newman, 2012). All clients continued with their current level of involvement with Project Momentum while involved in this study. As part of the data collection, clients participated in one 30-minute training session with the researcher present. The study included both quantitative and qualitative data collection approaches

to provide pre-/post-data, all of which contribute to the exploration of the impacts Project Momentum has had on participant's physical functioning, IADL, and quality of life.

Quantitative data collection procedures: The quantitative data was collected with the use of an online platform called Qualtrics, spanning a month's timeframe. Since participants were already involved in training at Project Momentum and a true baseline of functioning was not attainable, the pre-test surveys were asked in a retrospective format, to reflect their perceptions of their functioning prior to beginning their training with Project Momentum. Post-test surveys asked the study participants to reflect on their perceptions of their current levels of functioning since beginning their Project Momentum training. Retrospective approaches are utilized in studies where the outcomes have already occurred (McCarthy, Addington-Hall, & Altmann, 1997; Offord, Turner, & Cooper, 2006; Radcliffe & Lester, 2003). In the case of this study, the participants have been active members in Project Momentum for at least a year and therefore must retrospectively reflect on the impacts that they have or have not experienced. In other studies that have used a retrospective approach, the study design was identified as a limiting factor due to the accuracy of recall by the participants (Offord et al., 2006). Although retrospective studies have limitations, they also have the potential to enrich data. Willing (2001) (as cited in Offord, Turner & Cooper, 2006) identifies that the reality that is important to record, is the reality that is perceived by the study subjects. Due to the nature of retrospective studies, participants have had time to reflect and process the situation being explored, allowing for a potentially more balanced and reflective account of their experience (Offord et al., 2006).

Quantitative instruments: After contacting the primary researcher, receiving the informational email (see Appendix C), and providing consent, study participants were navigated directly into the retrospective pre-test portion of the quantitative survey. The Participation Assessment with Recombined Tools-Objective (Whiteneck et al., 2011) is a 17-item instrument (see Appendix D) that measures participation in IADL as conceptualized by the ICF framework. The domains of life participation covered in this measure are productivity, social relations, and community involvement. Productivity is further broken down to work, school, and homemaking. Social relations are further broken down to friends, family, emotional support, Internet use, spouse, intimate relationship, and close friends. Community involvement breaks down further to days out, eating out, shopping, engaging in sports, attending movies, attending sports, and attending church. Under the different domains of life participation, scores are given based off of participation according to hours, times, or days. Scoring instructions are provided to calculate the three domains of life participation that are being assessed. The scores given for each category under the three domains are added up and divided by the number of categories (Whiteneck et al., 2011). The higher scores are interpreted as more involvement for each domain.

The World Health Organization Quality of Life-BREF is an abbreviated version of the WHOQOL-100 quality of life assessment (see Appendix E) (World Health Organization, 1998). The WHOQOL-100 and the WHOQOL-BREF both display discriminant and content validity as well as test-retest reliability (World Health Organization, 2014). The four subdomains that make up the WHOQOL-BREF are: 1) overall quality of life and general health; 2) physical health; 3) psychological; 4) social

relationships; and 4) environment. The WHOQOL-BREF is made up of six demographic questions (which will not be utilized for this study), 26-core items, and three closing questions. The 26-core items are scored on a scale from one to five, where one is the least valued, and five is the highest. Questions are grouped under the categories of *how much*, *how completely*, *good or satisfied* and *how often*. Within each question domain, the scales are adapted in order to appropriately match the domain (i.e. under the section pertaining to *how much* an experience has occurred, 1 = *not at all*, 2 = *a little*, 3 = *a moderate amount*, 4 = *very much*, and 5 = *an extreme amount*) (World Health Organization, 1998).

In order to better understand the individuals participating in this study, demographics were collected as a part of the pre-test survey. The demographic questions included general questions such as gender, age, and health condition, as well as questions related to Project Momentum participation and other therapeutic services. These questions included duration and frequency of participation in Project Momentum, and a history of treatment services designed to improve physical functioning. If they were receiving other services, the participant was then asked the type of service and how many sessions they receive on a weekly basis. The retrospective survey and demographic questions were completed remotely on an electronic device that has access to the information email sent by the primary researcher, which included the survey link. Quantitative measures (not including demographic questions) were administered a second time (post-test), via iPad, following the Project Momentum training session (see Appendix D and E to view the pre-/post measures).

Qualitative data collection procedures: Those who contacted the primary researcher arranged a time to complete their training session and interviews in-person at

the CrossFit box where the main trainer of Project Momentum works with clients. The data collection occurred over the course of two days. All portions of the study were individual, meaning there was only one participant at a time working with the primary researcher.

During the training session the primary researcher observed clients and recorded field notes. The field note methodology reflects appropriate qualitative design procedures and are commonly used in case study methodology (Merriam, 2009). This approach highlights six main areas to consider while observing and recording field notes, including: 1) the physical setting (i.e. presence or absence of music); 2) the participants (i.e., behaviors); 3) activities and interactions; 4) conversation; 5) subtle factors ; and 6) your (the observer's) own behavior.

Qualitative interviews: To gather in depth information on the impacts on physical functioning, IADL, and quality of life as a result of participation in Project Momentum, the primary researcher conducted individual semi-structured interviews (see Appendix F) with the participants following their training session. Qualitative interviews enhanced the information gathered through the quantitative data for IADL and quality of life in addition to providing in-depth information related to physical functioning. All interviews were recorded and transcribed verbatim.

The participants were verbally asked a series of semi-structured interview questions (see Appendix F) about the impact of Project Momentum training on their functioning. Currently there is no appropriate quantitative assessment that focuses exclusively on physical functioning which can be rephrased into a retrospective

perspective. Because of this, retrospective interview questions were used in place of a quantitative measure of physical functioning.

The questions related to physical functioning included retrospective questions about functioning prior to participating in Project Momentum. This data was considered the pre-data since the study participants were reflecting back on their functioning prior to participating in Project Momentum. The participants were then asked the same question but phrased in the present tense, (e.g. *Now that you have been a Project Momentum client, how has your physical functioning in these same areas been impacted?).* A reference list (see Appendix G) was provided for the participants to help initiate responses related to multiple categories of physical functioning. The categories were drawn from the ICF and include a) motor control, b) range of motion, and c) strength (World Health Organization, 2001). In addition to the questions pertaining to impacts on physical functioning, inquiries were also made about the impacts Project Momentum has made on IADL, and quality of life.

Data Analysis

Quantitative data analysis: The retrospective quantitative data was compared to the present status data to assess impacts from participating in Project Momentum. The difference between the scores from the retrospective survey to the present perspective survey were analyzed to determine changes over time.

Qualitative data analysis: The transcribed qualitative interviews were reviewed by the primary researcher. Phrasal grouping was utilized and a deductive and inductive analysis process was completed by the primary researcher. The deductive thematic analysis was completed separately by the primary researcher, and a member of the

research committee. The two analyses were then compared for commonalities. The deductive analysis consisted of phrasal grouping where the primary researcher intentionally identified content that related to the study aim (i.e. physical functioning, IADL, and quality of life). A second round of inductive coding was also preformed individually by the primary researcher and the same secondary member of the research team. The deductive coding was used in order to explore the anticipated themes that stemmed from the study aim, in order to assist in the understanding of the phenomenon of participating in Project Momentum related to the specific areas addressed in the semi-structured interviews. The deductive coding was used in order to explore the anticipated themes that stemmed from the study aim in order to assist in the understanding of the phenomenon of participating in Project Momentum related to the specific areas addressed in the semi-structured interviews. The inductive coding and phrasal grouping assisted in revealing additional factors that contributed to the phenomenon of participating in Project Momentum.

Specific Aim1: To explore the impacts of participating in Project Momentum on physical functioning, IADL, and quality of life.

Study Limitations

This study will be limited by the following factors:

A. This study will be an exploratory study limited only to a few participants who meet the specific inclusion criteria, therefore generalizations cannot be made to Project Momentum participants, or other individuals with physical disabilities, beyond this study.

B. The retrospective data is limited to the recall accuracy of the participants as well as any bias that may have formed since becoming a Project Momentum participant.

Chapter 4

Article 1

An Exploratory Case Study on the Impacts of Functional Fitness for Adults with Physical Disabilities

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This article will be submitted to:
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Keywords:
Functional Fitness; Instrumental Activities of Daily Living; International Classification of Functioning, Disability and Health; Physical Functioning; and Quality of Life

Abstract

The purpose of this study was to explore the specific case of participating in a functional fitness program for adults with physical disabilities. Although there is a growing body of literature concerning the importance of physical exercise for individuals with disabilities, little to no research has been completed specifically concerning the utilization of functional fitness. This study defines functional fitness as a physical exercise program, and explores the phenomenon of impacts to functioning for the participants who were involved. Through the means of case study methodology, this study assessed the impacts of functional fitness participation on physical functioning, instrumental activities of daily living, and quality of life among adults with physical disabilities.

Introduction

Of the 19% of the U.S. population that reports having a disability, 26% report being physically inactive despite national public health efforts stressing the importance of daily physical activity (Centers for Disease Control and Prevention, 2007). Research findings from the CDC (2007) indicate that individuals with a disabling health condition can decrease their risks of experiencing secondary health conditions and negative life factors such as depression and anxiety through active participation in physical activity. With the growing interest in exploring exercise modalities that can be utilized by individuals with disabilities, research that explores a variety of exercise modalities is valued. Questions remain as to which physical exercises are most beneficial at enhancing the overall functioning of individuals with disabilities. This study will highlight functional fitness, a modality that was developed from a popular fitness trend, CrossFit.

There have been numerous studies done to support the positive benefits of physical activity for those with a disability (Baatile et al., 2000; Centers for Disease Control and Prevention, 2007; Dodd et al., 2002; Teixeira-Salmela et al., 1999). However, there is limited research that utilizes functional fitness as an exercise modality or intervention for individuals with physical or cognitive disabilities. Because there is deficient research pertaining to functional fitness for individuals with physical disabilities, the main purpose of this study is to provide empirical data of the impacts that are manifested through participation in functional fitness. This study will assess the impact of functional fitness on: 1) physical functioning, 2) instrumental activities of daily living (IADL), and 3) quality of life.

Literature Review

Individuals with Disabilities

The United States is comprised of more than 53 million individuals with disabilities (Courtney-Long et al., 2017; U.S. Census Bureau, 2012). The World Health Organization (2013) describes disability as an umbrella term that includes impairments, activity limitations, and participation restrictions, all of which interfere with an individual's ability to preform an activity at a level perceived as functional. The ICF is a conceptual framework used for describing and understanding functioning in relation to disability (World Health Organization, 2013). Through the application of the ICF, individuals with disabilities are classified based on their functioning in various areas, also taking into consideration the impact of environmental and personal factors on their overall health (Jelsma, 2009; World Health Organization, 2013). The ICF views health through the lens of body structures and functions, activities and participation, and contextual factors (i.e., environmental and personal factors)(World Health Organization, 2013).

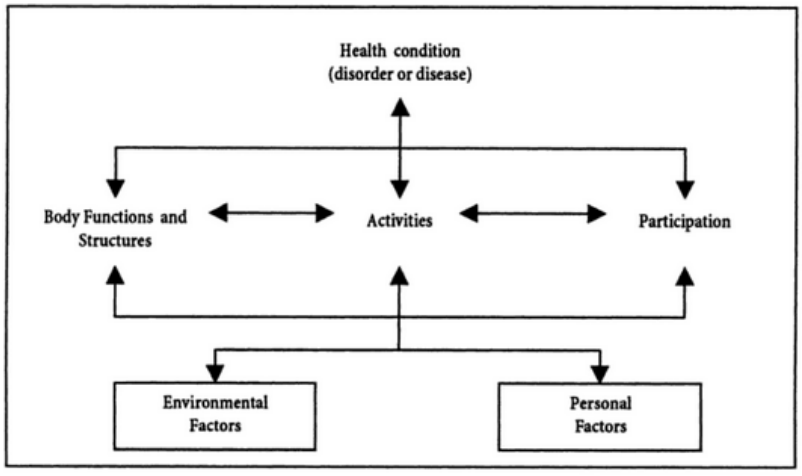

Figure 1. International Classification, Disability and Health (ICF; World Health Organization , 2013)

Body functions and structures refers to the physiological functioning of the body and the anatomical parts of the body. Structures are the specific parts of the body such as organs or limbs, while body functions refers to differing body systems like the circulatory system that are impacted by a specific health condition or injury (Stucki, 2005; World Health Organization, 2013). The term activity refers to an individual executing tasks (World Health Organization, 2013). These tasks could include things such as jumping, squatting, or throwing a ball. Participation concerns the individual's level of involvement in life situations (World Health Organization, 2013). While running and kicking a ball are both considered activities, playing soccer with friends, would be classified as participation.

Personal and environmental factors make up the contextual factors of an individual's life. "Gender, race, ethnicity, age, social and educational background, past and current experiences and life events, character styles, behavior patterns, and psychological assets" are all considered personal factors, and may influence an individual's functioning or activity participation (World Health Organization, 2013, p. 40). An individual's functioning can also be influenced by the environmental factors in their life, which are defined as the "social, attitudinal and physical environment in which people live and conduct their lives" (World Health Organization, 2013, p. 5). Personal and environmental factors have the ability to impact a person's life in a positive or in a negative way.

The ICF is a useful way to understand an individuals' functioning across various domains, and provides a systematic way to measure it. There are numerous activities that can be used to foster participation in life, and improve an individual's health and

functioning such as functional fitness, which is defined as the utilization of "fitness (including exercise, movement, play, etc.) to improve capability, competency, and efficiency of doing real-life activities in real-life settings" (Kloo, personal communication, December 30, 2017).

Impact of Physical Activity on Physical Functioning, IADL, and Quality of Life

The literature strongly supports the positive influence that participating in physical exercise can have on individuals with various disabilities (Centers for Disease Control and Prevention, 2007; Dodd, Taylor, & Damiano, 2002; Ploeg et al., 2004; Rimmer et al., 2010; Rimmer, Wang, & Smith, 2008). Specifically, participation can contribute to increased physical functioning and quality of life, and decreased potential for developing secondary conditions (Ploeg, 2004; Rimmer et al., 2008). Within the literature, studies assessing the impacts of physical activity on performances in ADL (Brach & VanSwearingen, 2002; Chou et al., 2012; Penninx et al., 2001) and IADL (Ginsberg et al., 1999; Nascimento et al., 2014) provide evidence of a positive correlation between being active and better performances in ADL and IADL. Research has indicated positive relationships between physical activity and quality of life (Silva, da Silva, da Silva, Souza, & Tomasi, 2010), and many of the negative aspects that coincide with having a disability can decrease as a result of physical exercise, thereby further contributing to increased quality of life (James H. Rimmer et al., 2010). The knowledge that enhanced functioning occurs through the means of participation in regular exercise has become common knowledge as a result of a growing body of literature (Rimmer et al., 2010; Vries et al., 2012).

One facet of this research that has developed is the stressed importance for individuals with disabilities to achieve appropriate amounts of physical exercise in order to decrease secondary health conditions and increase overall functioning (Centers for Disease Control and Prevention, 2007; Cooper et al., 1999; Courtney-Long et al., 2015; Ploeg et al., 2004; Rimmer, 1999). The impacts of increased exercise among individuals with disabilities are vast. More research is needed to help further the existing knowledge on effective interventions that increase functioning in multiple life domains in order to enhance the intervention approaches that can be utilized to improve functioning for individuals with disabilities. Therefore, the purpose of this study was to understand the impact of functional fitness on: 1) physical functioning, 2) instrumental activities of daily living (IADL), and 3) quality of life.

Methods

This section will outline the following information: a) study design; b) site of study; c) selection of subjects; d) recruitment of subjects; e) data collection procedures; f) instrumentation g) data analysis; and h) study limitations.

Study Design

This study employed an intrinsic, exploratory multi-method case study to explore the impacts of participation in functional fitness on physical functioning, IADL, and quality of life among adults with physical impairments**.** Three prongs of data collection were utilized and include 1) quantitative data, 2) field notes, and 3) qualitative data. Both quantitative and qualitative data were collected in an effort to understand the complexities of involvement in physical exercise and associated outcomes.

Project Momentum

Project Momentum is a non-profit organization that was designed for individuals with disabilities seeking to enhance their fitness and health through the means of functional fitness. The organization is affiliated with multiple CrossFit boxes and gyms around the Charlotte, North Carolina area. These partnering boxes and gyms provide functional fitness training opportunities for people with disabilities. Project Momentum was developed in order to provide a means for improved health and quality of life through fitness that is modified based on the abilities and needs of each client.

Most individuals who become a Project Momentum client were referred to the program by other Project Momentum clients, or members of the affiliated boxes and gyms. In some cases, other sources such as social media and Project Momentum trainers have influenced individuals to get involved in Project Momentum. The majority of clients have neurological or neuromuscular impairments such as stroke, cerebral palsy, and muscular dystrophy. Some participants also have paraplegia, orthopedic impairments, and intellectual or cognitive impairments.

Currently, Project Momentum has around 50 clients across the affiliated CrossFit boxes and gyms in the Charlotte area with ages ranging from four years old to 74 years old. Due to the variety of ability levels among the clients, each training plan is individualized. An initial fitness assessment is used to establish baseline functioning in physical domains such as flexibility, balance, and mobility through the use of a functional assessment. This initial assessment, in addition to assisting with goal setting, helps to establish the clients' baseline and facilitates the development of their individualized training plan.

There is one primary trainer for Project Momentum, in addition to qualified trainers at the affiliated boxes and gyms. In order to work with Project Momentum clients, trainers must meet the following criteria: (a) attend one Project Momentum training course, (b) shadow the primary trainer three or four times as she trains clients; (c) have the primary trainer observe three or four training sessions being implemented by the trainer; (d) and attend a Project Momentum refresher training course after six months of independent training.

In attempts to maintain consistency in training to all CrossFit boxes and gyms associated with Project Momentum, the primary trainer attends training sessions at the affiliates roughly every six weeks. The trainers are strongly encouraged to attend Crossroads Adaptive Athletic seminars, WheelWOD seminars, Adaptive CrossFit seminars, or any other similar fitness seminars focused on working with individuals with adaptive fitness needs. In terms of certification requirements, trainers are to follow the regulations laid out by the specific CrossFit box or gyms where they are employed. These requirements could include basic level certifications such as CrossFit Level 1 Trainer certification, American Council on Exercise (ACE) Personal Trainer certification, and American College of Sports Medicine (ACSM) certification, in addition to specialized training certifications as well.

Selection of Subjects

All participation in the study was voluntary and was not incentivized. The primary researcher, with the guidance and professional opinion of the lead trainer of Project Momentum, selected participants to recruit for this exploratory case study based on their active involvement in Project Momentum. Active involvement means that the

participants have been a Project Momentum for at least a year and have consistently attended at least one-30-minute training session per week over the course of their membership. In attempts to explore the phenomenon of Project Momentum, each participant was required to meet the following inclusion criteria: 1) each subject must have had a physical disability, 2) must have been an active Project Momentum client with an active membership for at least one year at the CrossFit box where the lead trainer is located, and 3) must have been 18 years or older. This combination of factors created a sample of participants who were most knowledgeable about Project Momentum, and were able to speak in depth about the program.

Data Collection Procedures

With this study being an intrinsic case study, prior to any data collection, the primary researcher bracketed biases in order to be aware of preconceived thoughts and experiences (Tufford & Newman, 2012). All clients continued with their current level of involvement with Project Momentum while involved in this study. All participants provided consent before beginning the study. As part of the data collection, clients participated in one typical 30-minute training session at their Crossfit box with the researcher present.

Quantitative data collection procedures: The quantitative data was collected via iPad in a retrospective format, to reflect their perceptions of their functioning prior to beginning their training with Project Momentum (since participants had been training for at least a year and a true baseline of functioning was unable to be collected). Post-test surveys asked participants to reflect on their perceptions of their current levels of functioning since beginning their training. Retrospective approaches are utilized in

studies where the outcomes have already occurred (McCarthy et al., 1997; Offord et al., 2006; Radcliffe & Lester, 2003), giving participants time to reflect and process the situation being explored, allowing for a potentially more balanced and reflective account of their experience (Offord et al., 2006).

The Participation Assessment with Recombined Tools-Objective (PART_O) (Whiteneck et al., 2011) is a 17-item instrument that measures participation in instrumental activities of daily living as conceptualized by the ICF framework. Domains of life participation covered in this measure included productivity, social relations, and community involvement. In each domain, scores are calculated based off of participation according to hours, times, or days. Responses for each category in the domains are summed and divided by the number of categories (Whiteneck et al., 2011). Higher scores are reflective of more involvement in each life domain.

The World Health Organization Quality of Life-BREF (WHOQOL-BREF) is a 26-item abbreviated version of the WHOQOL-100 quality of life assessment (World Health Organization, 1998, 2014), and consists of four sub domains: 1) overall quality of life and general health; 2) physical health; 3) psychological; 4) social relationships; and 4) environment. The 26-items are scored on a scale from one to five, where one is the least valued, and five is the highest. Questions are grouped under the categories of *how much*, *how completely*, *good or satisfied* and *how often*. Within each question domain, the scales are adapted in order to appropriately match the domain (i.e. under the section pertaining to *how much* an experience has occurred, 1 = *not at all*, 2 = *a little*, 3 = *a moderate amount*, 4 = *very much*, and 5 = *an extreme amount*) (World Health Organization, 1998).

Demographic questions were also collected and included general questions such as gender, age, and health condition, as well as questions related to frequency and duration of Project Momentum participation and other therapeutic services.

Qualitative data collection procedures: Individual semi-structured interviews were performed in-person at the CrossFit box for Project Momentum sessions, and were recorded and transcribed verbatim. The participants were verbally asked a series of questions about the impact of Project Momentum training on their functioning. Currently there is no appropriate quantitative assessment that focuses exclusively on physical functioning which can be rephrased into a retrospective perspective. Because of this, retrospective interview questions were used in place of a quantitative measure of physical functioning.

The questions related to physical functioning included retrospective questions about functioning prior to participating in Project Momentum. This data was considered the pre-data since the study participants were reflecting back on their functioning prior to participating in Project Momentum. The participants were then asked the same question but phrased in the present tense, (e.g. *Now that you have been a Project Momentum client, how has your physical functioning in these same areas been impacted?).* A reference list (see Appendix G) was be provided for the participants to help initiate responses related to multiple categories of physical functioning. The categories were drawn from the ICF and included a) motor control, b) range of motion, and c) strength (World Health Organization, 2001). In addition to the questions pertaining to impacts on physical functioning, inquiries were made about the impacts Project Momentum has made on IADL, and quality of life.

Data Analysis

Triangulation was utilized to help capture and explore the different dimensions of the same phenomenon of participation in Project Momentum. The three prongs that were utilized were 1) quantitative measures, 2) field notes, and 3) qualitative interviews. The retrospective quantitative data was compared to the present status data to assess impacts from participating in Project Momentum. The difference between the scores from the retrospective survey to the present perspective survey were analyzed to determine changes over time. The transcribed qualitative interviews were reviewed by the primary researcher. Phrasal grouping was utilized and a deductive and inductive analysis process was completed by the primary researcher. A deductive thematic analysis was completed by the primary researcher and a member of the research team. The deductive analysis consisted of phrasal grouping where the primary researcher intentionally identified content that related to the study aim (i.e. physical functioning, IADL, and quality of life).The two analyses were compared for commonalities. A second round of inductive coding was also preformed by the primary researcher and the same member of the research team. The deductive coding was used in order to explore the anticipated themes that stemmed from the study aim in order to assist in the understanding of the phenomenon of participating in Project Momentum related to the specific areas addressed in the semi-structured interviews. The inductive coding assisted in revealing additional unique factors.

Findings

Individual semi-structured interviews were conducted with six Project Momentum participants. Of the six participants, one was male and five were female. Participants'

ages ranged from 25 to 65. Participants' disabilities included spina bifida, cerebral palsy, knee injury, spinal cord injury, and stroke. It should be noted when reviewing the findings that one participant did not complete the quantitative measures and this data was excluded in the quantitative findings. Because this participant did complete the qualitative pieces of the study, their contributions to the qualitative data was included. See Table 1 for detailed information about frequency of sessions.

Table 1. *Demographic Information*

	N	MEAN	SD	MIN	MAX
Age	5.00	54.20	12.79	34	65.00
Time of Involvement (in years)	5.00	1.30	0.44	1.00	2.00
ProMo Sessions (per week)	5.00	1.60	0.54	1.00	2.00
Other Therapeutic Sessions (per week)	3.00	1.67	0.57	1.00	2.00

Quantitative Findings

Descriptive statistics were calculated for both the retrospective pre and post-test data collection for the PART-O and the WHOQOL-BREF (refer to Tables 2 and 3). All domain scores for the PART-O and the WHOQOL-BREF statistically increased when comparing scores across time points except for productivity from the PART-O and psychological for the WHOQOL-BREF. In other words, participants reported overall positive changes in their execution of IADLs and quality of life over time.

Table 2. *Descriptive Statistics for the PART-O*

		N	MEAN	SD	MIN	MAX
Productivity	Pre	5.00	3.09	0.72	2.43	4.29
	Post	5.00	1.67	1.65	0.33	4.33
Social Relations	Pre	5.00	1.89	1.18	0.61	3.71
	Post	5.00	3.29	0.69	2.57	4.29
Community Involvement	Pre	5.00	1.93	1.88	0.00	4.33
	Post	5.00	2.03	0.56	1.25	2.71
Part-O Total	Pre	5.00	2.30	1.08	1.22	3.78
	Post	5.00	2.33	0.84	1.43	3.67

Table 3. *Descriptive Statistics for the WHOQOL-BREF*

		N	MEAN	SD	MIN	MAX
Physical	Pre	5.00	11.20	2.24	9.14	14.86
	Post	5.00	13.26	1.48	11.43	15.43
Psychological	Pre	5.00	11.20	0.87	10.00	12.00
	Post	5.00	10.40	2.52	6.00	12.00
Social Relations	Pre	5.00	12.27	3.45	9.33	16.00
	Post	5.00	14.93	1.12	13.33	16.00
Environment	Pre	5.00	15.10	2.04	13.00	17.50
	Post	5.00	16.30	2.14	13.00	18.50
QOL Total	Pre	5.00	11.20	5.40	6.00	20.00
	Post	5.00	16.80	1.79	16.00	20.00

Field Notes

Field notes were taken by the primary researcher in order to help establish and capture Project Momentum. The physical setting, participant, activities, conversations, subtle factors, and observer's own behavior were considered during the field note documentation (Merriam, 2009). Overall the field notes painted a picture of an upbeat, music filled, community focused atmosphere. The gym was filled with noises of people working out, encouraging one another, sharing of life details through conversation, and a sense of community. Although the study participants worked one-on-one with the primary trainer of Project Momentum, many times their sessions occurred simultaneously with the group fitness classes. This dynamic allowed the participants to receive specific training but were still associated with the larger group/community.

Qualitative Findings

After the completion of deductive and inductive thematic analysis, three primary themes were identified, as well as four secondary themes. The primary themes emerged from the deductive analysis and include 1) *physical impacts, 2) independence in IADL,* and *3) quality of life impacts*. Secondary themes emerged from the inductive analysis and

include *1) addressing fear and pain, 2) perceptions of disability, 3) limitations and future goals,* and *4) the elements of Project Momentum.*

Primary themes. The primary themes were identified through deductive analysis and stemmed from the questions based on the elements of the ICF. One of the primary themes that arose was about the physical impacts that occurred in relation to participation in Project Momentum. Although the physical impacts differed form participant to participant, they all spoke of physical impacts that they associated with their involvement. The main impact was feeling physically stronger than before starting Project Momentum. Other elements of physical functioning were mentioned as well, including improvements in balance, gait, strength, and energy (see Table 4).

One participant stated "I'm so much stronger, and I feel stronger". The benefits of improving physical functioning translates to important life functioning. For example, this same participant was told by her doctors that she would never be able to lift more than five pounds. This was devastating news to her because she has 13 grandchildren and this strength limitation would mean she could not pick up her grandchildren. With active training through Project Momentum, she is now lifting 30 lbs and picking up her grandchildren.

The second primary theme concerns impacts on IADLs. During the interviews many examples of daily life factors improving, such as caring for self and household with decreased assistance, getting out more, and being able to execute work (in the community and at home) were described. Some participants expressed that executing seemingly insignificant daily acts were impacted, and in a way that was significant to them. For example, one participant spoke of being able to take a bath again after working with the

Project Momentum trainers. Sitting up with one's legs fully extended may seem insignificant, but to this participant it meant independence in bathing and increasing the desired leisure activity of taking a bath. The improvements in IADLs seem to stem from improvements in the physical functioning domain; for example, increased strength, flexibility, and balance facilitate the execution of many of the tasks of daily living (e.g. bathing, working, etc.) (see Table 4).

The third primary theme reflected impacts on quality of life. The following quote depicts the greater impact that Project Momentum made on their life; "I had a purpose. Even if it was just to get stronger. And I had something daily to look forward to. It wasn't just living, it was accomplishing. And showing other people that I could accomplish it". For this participant and others, involvement in Project Momentum was the common denominator identified in their quality of life improvements. Other comments about quality of life included expressions of hope, mental endurance, and improved mental health. Table 4 provides the components of the primary themes and supporting quotes.

Table 4. *Components of Primary Themes and Supporting Quotes*

Physical Impacts	**Supportive Quotes**
Strength	*"I notice my muscles were just weak. There was no strength whatsoever before I started Project Momentum. And it has increased tremendously"*
Balance	*"At first I couldn't get up without having to hold on to something. And now I can stand straight up without holding on to anything and that was a wonderful thing"*
Gait	*"I was going to one side. All the time one side, and that was a challenge. But now I walk in a straight line"*

Range of Motion	*"At first I couldn't get this arm above my head because of the stroke … and now I can get my arm over my head"*
Energy	*"You know I would get tired. You know I would be done after I got the groceries into the house and put them away. I would have to sit down. I was exhausted … But now I get tired, but I recover so much quicker from doing [Project Momentum]."*
IADL Impacts	**Supportive Quotes**
Self Care	***"****I used to be able to not dress myself at all and now I can take my shirt off and put it back on and a year ago I wasn't able to do that, and I think it comes back to this"*
Home Care	*"I know that's kind of an odd thing, but I had trouble before Project Momentum of just standing and prepping food and washing dishes and things for a long period of time."*
Getting Out	*"And therefore when I got to feeling better and started thinking that I could do other things. I could go to church. I could be a part of a bible study. I could go shopping."*
Work	*"I'm getting stronger all the time. We make our own hay. We feed probably about 4,000 bales; We've got 25 horses on the farm. I used to take care of the farm. I'd do the books and I would clean the stalls and you know bring the horses in and out. You know I pretty much scheduled everything. Anyway, I'm slowly getting back to that"*
Quality of Life Impacts	**Supportive Quotes**
Hope	*"I wish you could interview my children, and my husband, because they can see a big difference in me and my attitude and of life"*

Mental Endurance	*"Before Project Momentum I didn't have the emotional strength or guidance to know that I could do things physically"*
Mental Health	*"This is big for me … people are seeing a difference in me and I'm not saying just physically I'm saying like even mentally and stuff like that. And I feel like I can get a lot, like I get a lot more done because my mood is better"*

Secondary themes. Unlike the interview questions that were drawn from the ICF and elicited responses related to specific topics, the secondary themes were unanticipated content that enriched the data related to the impacts of Project Momentum. The secondary themes emerged during the inductive analysis and include 1) *addressing fear and pain, 2) perceptions of disability, 3) limitations and future goals,* and *4) the elements of Project Momentum.*

The first secondary theme that emerged from interviews was about experiencing fear and pain prior to participating in Project Momentum. Some participants expressed having fears of trying things, failing, or becoming injured due to their disability. The participants attributed gaining confidence from overcoming difficult tasks (e.g., deadlifting for the first time) during training sessions to the decreased fear they now experience. One participant said, "I was always afraid of tripping and falling and I don't feel that fearfulness like I used to". This reduced fear was reflected in many comments from other participants as well. Pain was another constraint that participants talked about in addition to experiencing fear. For some of the participants, pain is a part of their everyday life. Although pain has not completely gone away for the participants, they spoke of thinking about the pain less often and not experiencing it as actively (See Table 5 for supportive quotes).

An additional secondary theme that arose through the inductive analysis was more complex; perceptions of disability. Participants spoke of other therapeutic services and how these services did not meet their needs, especially in a holistic or long-term manner. They compared other services with Project Momentum and said things like, "I've struggled with mental illness for all of my adult life … I go to therapy every week and this is just as helpful as my therapy honestly, sometimes more so" and "I've always gone to physical therapy and that was more about, how do I say this, disability stuff". Project Momentum was identified as a therapeutic outlet that was serving them more effectively than their traditional therapeutic services. These services, according to the participants, were focused on *fixing* aspects of the participant's bodies or lives instead of capitalizing on their strengths. Project Momentum was the positive outlet that showed many of the participants what they could do versus what they could not do because of their disability. Statements like, *"*I just never felt strong, and felt disabled [before]" were followed with statements on empowerment and identifying with strengths both physically and emotionally. The narratives expressed by the participants described a shift in mindset from disabled and requiring therapeutic services to empowered and able. One participant said "I don't see [having a disability] as defining anymore".

As people discussed feeling stronger and that they had grown in their confidence, they also spoke about things they still could not do and things they wanted to accomplish in the future. The following quote captures the positive tone that participants spoke with even when talking about their current barriers;

> I can't go grocery shopping. There is something about pushing a cart-full of groceries I still can't quite maneuver. And walking for long periods of time, I still can't do that. But I found myself feeling better for one thing. And that

> made me feel like I could go out and do more things. Go to a birthday party, or go to church, or go out to eat.

Even though there are still things participants have not achieved, they are positive about the future and are setting goals to strive after (see Table 5).

The last secondary theme that was most prominently discussed were the elements of Project Momentum and what this meant for their experience. One particular participant said, "I'm kind of at a loss for words but this has been the best program I've ever been in". Other statements described Project Momentum as something that was unique and effective. The most prominent element of Project Momentum that was discussed was the primary coach. The primary coach has a disability and, therefore, brought forth a unique and relatable perspective that all of the participants spoke to with comments such as, "because she's been there, done that, has the t-shirt". In addition to being relatable, she was also described as an effective coach who takes a holistic approach and "goes beyond just the physical because it is more than just physical. It's everything. You know? The whole emotional … even spiritual". The following quote describes how impactful the primary coach's story has been to her:

> [Coach] is just so inspiring to me. Makes it seem like everything I want to obtain, getting married, having kids, getting a job, all that, is obtainable because every person I meet you know is abled bodied. You know I haven't come across people, a lot of people who are like me, and those that are usually are in homes or you know they live with their parents when they are 50. [Coach] is not like that. And that's so rare, and it just reminds me that everything I want, it is possible.

Table 5 offers supporting quotes that expand upon each of the secondary themes.

Table 5. *Components of Secondary Themes and Supporting Quotes*

Addressing Fear and Pain	**Supportive Quotes**

Improving Pain	*"It's helped me with my pain. I have chronic pain, its definitely helped with that"*
Distraction from Pain	*"Before Project Momentum I found myself, because I wasn't socializing, I wasn't getting out, I wasn't doing anything, feeling the pain more … Coming to Project Momentum helped me to not think of the pain"*
Overcoming Fear	*"I don't have that fear of feeling like I'm going to hurt myself if I try or do stuff."*
Perceptions of Disability	**Supportive Quotes**
New-Found Confidence	*"Each session built up my confidence more and more; that it's not a disability, its a frame of mind"*
Other Services Not Meeting Needs	*"They don't give you that [emotional] support after surgery. Physical therapy doesn't even do that. You know you're in and out in physical therapy. They are working on the physical. They are not working on the other part"*
Future Goals	**Supportive Quotes**
Optimism About the Future	*"So I'm looking to get 100% any which way that I can. I will do absolutely anything. You know stick to the program, you know work my butt off to get there"*
Setting Goals	*"The only thing I can't do that I'm really, this is on my to do list, is be able to climb on to my horse myself"*
Elements of Project Momentum	**Supportive Quotes**
Uniqueness of the Program	*"You know it [other fitness programs] just wasn't tailored for me. It was just really difficult to go into a class and try to do what every body else was doing"*
Effectiveness of the Program	*"What they need to do is make Project Momentum a part of rehabilitation afterwards. If I had this the first surgery, I might not of had the second surgery"*

The Primary Coach (Including skills, personal story and relatability)	• *"[Coach] is amazing. She's such an encourager, and she's also a listener"* • *"Hearing coach's story, I knew she had been somewhat where I was"* • *"With [coach] being in situations like her situation herself, she's been there too. She knows that emotional struggle of that fear of pushing beyond but staying safe"*

Discussion

Years of research across multiple professions have produced a vast body of literature that supports the use of exercise to increase health benefits (Baatile et al., 2000; Blair et al., 1989; Centers for Disease Control and Prevention, 2007; Dodd et al., 2002; Ginsberg et al., 1999; Morris, 1994; National Center for Health Statistics - Department of Health and Human Services - Center for Disease Control and Prevention, 2000; J H Rimmer, Braddock, & Pitetti, 1996; Teixeira-Salmela et al., 1999). The purpose of this study was to hone in on a specific case of exercise - that being participation in a functional fitness program by adults with physical disabilities.

Quantitative and qualitative findings paint a positive picture of the impacts of participating in Project Momentum, and contributes to the needed literature on the benefits of physical activity specifically for individuals with disabilities (Abu-Omar & Rütten, 2012; J H Rimmer et al., 1996). The overarching response from subjects was that their lives have been positively impacted by participating in this program. The primary areas of impact were related to physical functioning, participation in IADL and quality of life, although, qualitative findings offer insight about positive impacts in many other areas of their lives as well. This type of data is valuable within the literature as Rimmer

(1996) stresses the need for more research exploring the outcomes of participation in physical exercise in order for professionals (including Recreational Therapists) to make meaningful recommendations for their clients with physical disabilities.

An unexpected finding emerged from the quantitative data specific to the PART-O. Post-test data showed that average *Productivity* scores decreased. This decrease could be attributed to many things, like participants wrongly interpreting the question or to life factors such as loss of a job. The survey questions that related to productivity for the pre-survey were phased as '*prior to your participation in Project Momentum'* and the post-survey was phrased as *'now that you have been a participant in Project Momentum'*. Participants with an acquired injury may have reflected back on their productivity levels prior to their disability when they should have been reflecting on their productivity since acquiring their disability, but before starting their participation in Project Momentum. The literature suggests that people with disabilities are more likely to lead a sedentary lifestyle and potentially experience secondary problems like depression, obesity, heart disease which are all factors linked with decreased in productivity levels (J H Rimmer et al., 1996).

Individuals with disabilities who do experience secondary health conditions may experience a decrease in activity and productivity due to their disability or the associated secondary condition. Research has identified loss of productivity as a common outcome of chronic health conditions, with an average of 16% of employed people being absent from work for more than six days in the previous year, while 50% of people with chronic health conditions miss at least one day of work in the previous year due to that condition (Egede, 2007). The sample size of this study was too small to thoroughly assess the

productivity issue, but given what is known about the relationship between health and productivity, it is possible that the decrease could be attributed to their health condition, regardless of the positive impacts they sustained from involvement in Project Momentum (J H Rimmer et al., 1996). Future research should explore this unique finding in more depth.

Although a very minor decrease (i.e. .8), the *Psychological* domain of the WHOQOL-BREF did decrease (see Table 3). Similar to the potential reasons the productivity levels decreased as provided by the PART-O (see Table 2), the participants may have wrongly interpreted the survey questions or may have experienced a decrease in psychological levels. With the sample size being small and with little other data to help explain this decrease, it is unclear if participation in Project Momentum can be linked to this decrease in scores.

Implication for Practice

Based on the findings from this study, functional fitness is supported as an exercise modality that positively impacted the lives of individuals with physical disabilities who participated in Project Momentum. Recreational Therapists utilizing functional fitness as an intervention should have a CTRS in addition to a relevant and appropriate personal training certification that is nationally recognized (e.g. ACE personal trainer certification or ACSM personal trainer certification). If they do not have a fitness related certification, the CTRS should co-treat with a fitness trainer who is appropriately qualified. As functional fitness programs continue to grow, it is likely that a Recreational Therapist will have access to a local functional fitness program. By researching opportunities in their community, the Recreational Therapist will be able to

provide their patients with beneficial post-discharge resources. These functional fitness programs may help the patients in multiple life domains. The field notes that were taken during this study help to understand the community atmosphere that the participants were experiencing even though their training sessions were one on one with the primary trainer and not technically part of the larger group. Recreational Therapists interested in referring or utilizing functional fitness interventions should consider the importance of the community and group atmosphere of the program/intervention.

The findings from this study show the integral role that the primary coach of Project Momentum played in the success of this functional fitness program. The primary coach had multiple certifications (although not a CTRS), but the coaching element that participants spoke to more prominently was her relatability and the personal experience that she has with functional fitness. Recreational therapists that do not have a disability or the firsthand experience like the primary coach of Project Momentum are not limited in their potential to implement successful functional fitness programs for individuals with physical disabilities. The literature supports the utilization of peer-to-peer support and/or peer mentoring as an effective way to help individuals with disabilities adjust and thrive in their lives (Ljungberg, Kroll, Libin, & Gordon, 2011; Sherman, DeVinney, & Sperling, 2004); the implications being that a CTRS could group-treat or connect clients to peers/mentors that have similar conditions or experiences. Recreational Therapists can also work towards becoming experts in implementing functional fitness interventions by partnering with coaches within the field who do have the personal experience working with people with disabilities in a fitness setting. A Recreational Therapist could also achieve specific certifications in addition to their CTRS such as ACSM's *Exercise is*

Medicine Credential, ACSM/American Cancer Society (ACS) Certified Cancer Exercise Trainer, or ACSM/National Center on Health, Physical Activity and Disability (NCHPAD) Certified Inclusive Fitness Trainer certifications. A CTRS in combination with one of these specialized fitness certifications (which exceeds a basic personal training certification) would provide the Recreational Therapist with the appropriate credentials to independently implement a functional fitness program.

By using the APIED process, a CTRS can maximize the benefits that may arise when implementing functional fitness programming as an intervention for adults with physical disabilities. The primary coach at Project Momentum was not a CTRS and focused primarily on the physical functioning of her clients. What the primary coach implemented should be considered as a program, and not an intervention even though there were therapeutically beneficial outcomes that occurred. As results indicated, much more than just physical impacts occurred due to involvement in Project Momentum. A CTRS, either as a stand-alone trainer and therapist or in a co-treatment situation, could have maximized those additional outcomes by incorporating elements of therapeutic discussion.

A CTRS would have had the knowledge and expertise to conduct an in-depth initial assessment in order to intentionally plan the functional fitness program to maximize the measureable outcomes. A CTRS would learn what the client's specific goals are and structure the functional fitness program in a way that targets these specific goals. For example, upon learning that one of the participants cannot push a grocery cart, but wants to, the Recreational Therapist would strategically implement exercises into the functional fitness training in order to actively work towards achievement of the goal. The

primary trainer of Project Momentum and other fitness professionals without a CTRS focus on their expertise area of fitness and strengthening the clients. Although strength and being physically active produce positive benefits, a CTRS has unique skills and methods to actively target essential elements of functioning that will improve the client's life outside of just getting stronger. A CTRS uses a holistic approach that targets all areas of functioning including physical, social, cognitive, and emotional wellbeing. In addition to maximizing the benefits of functional fitness through the application of Recreational Therapy methods, a CTRS could contribute to the growth of knowledge pertaining to functional fitness through documentation of outcomes and research.

Limitations and Recommendations for Future Research

This study was an exploratory case study limited to a six participants who met the specific inclusion criteria, therefore generalizations cannot be made from Project Momentum participants to other individuals with physical disabilities beyond this study. In addition, the retrospective data is limited to the recall accuracy of the participants as well as any bias that may have formed since becoming a Project Momentum participant (McCarthy et al., 1997; Offord et al., 2006; Radcliffe & Lester, 2003). This data, however, does contribute to the lacking literature that explores functional fitness programs. Currently the literature that exists on *functional fitness* uses this term as an outcome (e.g. functional capacities) instead of the specific type of exercise intervention and is generally focused on the geriatric population (Benichou et al., 1987; Dalgleish et al., 2007; Milanovic et al., 2013). As the phenomenon of functional fitness programs continue to grow in popularity among all populations, the value of research related to this topic will continue to grow. Research exploring functional fitness as an exercise

intervention and not just an outcome, will help to establish this term and make it more well-known within the literature. Future research should also explore the utilization of functional fitness programs as interventions. These findings should document the direct outcomes in order to provide practitioners with validated interventions that target specific outcomes for specific populations.

For future studies, it is recommended that a larger sample size be used, specific disability groups be tested, and non retrospective pre-/post-data be collected in order to increase the generalizability potential for the research collected. Larger sample sizes utilized in a non-case study approach will increase the reliability and generalizability of the data. If groups of people with specific disabilities (such as cerebral palsy or spinal cord injury) are examined instead of the broader group of physical disabilities, practitioners can more accurately prescribe interventions that will benefit their clients based on their specific needs. Rimmer (1996) further supports this by stating that "there is very little information on the physical activity profiles of specific subgroups of persons with disabilities" (para. 19). Lastly it is recommended that future studies include true baseline data in functional domains instead of retrospective perspectives, due to the limitations associated with such methods (McCarthy et al., 1997; Offord et al., 2006; Radcliffe & Lester, 2003).

Conclusion

This study contributes to the ongoing research supporting physical exercise for individuals with disabilities, and provides a specific case of how functional fitness can be used as an exercise modality to impact the lives of adults with physical disabilities. Previous studies have examined other means of physical activity but little to no research

has explored functional fitness programs and the associated impacts. Although the findings cannot be generalized to the greater population, the findings provide Recreational Therapists and other professionals with useful information for understanding how this form of exercise could be beneficial for adults with physical disabilities. Further testing of similar programs need to be conducted in order to better understand the outcomes related to functional fitness programs for individuals with physical disabilities.

Chapter 5

Conclusion

Summary of Major Findings

The specific aim of this study was to explore the impacts of participating in Project Momentum on physical functioning, IADL, and quality of life. The hypothesis was that positive impacts were occurring for Project Momentum participants. Overall the specific aim and hypothesis were supported by quantitative and quantitative findings.

The quantitative results of the PART-O and the WHOQOL-BREF were positive and support impacts on IADL and QOL for all participants. This was further supported through the qualitative findings, as participants spoke about the positive impacts of both IADL and QOL as well as their physical functioning. As a result of the qualitative analysis, three primary themes and four secondary themes were identified. The primary themes related to the elements of the ICF that were inquired on and include physical functioning, IADL, and quality of life impacts as a result of being a Project Momentum participant. The secondary themes developed during the inductive analysis include addressing fear and pain, perceptions of disability, future goals, and elements of Project Momentum.

Contributions and Practical Implications

Growth in the literature highlighting other functional fitness programs and the specific associated outcomes will provide Recreational Therapists with a greater understanding of how functional fitness programs and the unique dynamics can impact individuals with physical disabilities. As more functional fitness programs develop and grow, more people are getting involved including those with disabilities. A CTRS should

capitalize on the trend of functional fitness in order to promote community engagement, getting healthier and increase their client's leisure lifestyle. Within this specific study, it was evident that the intentions of the functional fitness program focused around physical functioning but as the results of this study support, there are potential opportunities for other facets of life to be impacted. A CTRS can intentionally target multiple areas of one's life through the application of their unique qualifications and skills such as intentional assessments, planning, implementation, evaluation and documentation in order to holistically care for their clients.

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Appendix A

IRB Approval Letter

Dear Dr. Townsend,

The Clemson University Office of Research Compliance reviewed the protocol titled "A Mixed Methods Case Study on the Impacts of Functional Fitness on Physical Functioning, Instrumental Activities of Daily Living, and Quality of Life for Adults with Physical Disabilities" using exempt review procedures and a determination was made on May 2, 2018 that the proposed activities involving human participants qualify as **Exempt under category B2** in accordance with federal regulations 45 CFR 46.101.

Please note that Clemson's IRB determination only covers Clemson affiliated researchers on the project. External collaborators will have to consult with their home institution's IRB office to determine what is required for their role on the project.

No further action, amendments, or IRB oversight of the protocol is required except in the following situations:

1. Substantial changes made to the protocol that could potentially change the review level. Researchers who modify the study purpose, study sample, or research methods and instruments in ways not covered by the exempt categories will need to submit an expedited or full board review application.
2. Occurrence of unanticipated problem or adverse event; any unanticipated problems involving risk to subjects, complications, and/or adverse events must be reported to the Office of Research Compliance immediately.
3. Change in Principal Investigator (PI)

All research involving human participants must maintain an ethically appropriate standard, which serves to protect the rights and welfare of the participants. This involves obtaining informed consent and maintaining confidentiality of data. Research related records should be retained for a minimum of three (3) years after completion of the study.

The Clemson University IRB is committed to facilitating ethical research and protecting the rights of human subjects. Please contact us if you have any questions and use the IRB number and title when referencing the study in future correspondence.

All the best,

Nalinee

Nalinee Patin, CIP
IRB Administrator
OFFICE OF RESEARCH COMPLIANCE
Clemson University, Division of Research
391 College Avenue, Suite 406, Clemson, SC 29631, USA
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Appendix B

Recruitment Email

Hello,

We are partnering with Clemson University on a research project about your participation in Project Momentum and how it has impacted your functioning. More specifically, how your physical functioning, ability to participate in daily life activities, and your quality of life has been impacted. You are being contacted because you meet the study participant criteria. If you are willing to participate, you will complete two short surveys, be observed during an individual training session with me, followed up with the second completion of the two short surveys and an individual interview with the lead researcher. The total time commitment should not exceed three hours.

If you are interested in this study or have questions, please contact the lead researcher, Brooke Beidler, directly at bgbeidl@g.clemson.edu or at (864) 401-9965. Brooke will pass along a more detailed email including the purpose of her study, what participating will look like for you, including the time commitment, as well as a consent form and the first set of surveys.

Thank you for potentially assisting with this research project that will help to explore Project Momentum!

Amanda Kloo

Appendix C

Information Letter/Consent Form

Information about Being in a Research Study
Clemson University

A Mixed Methods Case Study on the Impacts of Functional Fitness on Physical Functioning, Instrumental Activities of Daily Living, and Quality of Life for Adults with Physical Disabilities

Description of the Study and Your Part in It

Dr. Jasmine Townsend and Brooke Beidler are inviting you to take part in a research study. Dr. Townsend is a faculty at Clemson University. Brooke Beidler is a student at Clemson University, running this study with the help of Dr. Townsend. The purpose of this research is to explore how your participation in Project Momentum has impacted your functioning. More specifically, how your physical functioning, ability to participate in daily life activities, and your quality of life has been impacted.

Your part in the study will be to complete two short surveys at two different times, complete your regularly scheduled training session with the lead trainer of Project Momentum, and participate in an audio-recorded interview conducted by Brooke Beidler. You will complete the first round of the two surveys prior to the other parts of the study. The surveys will be sent to you via email and should be completed at your convenience prior to your individual training session, second round of surveys, and interview. The training session, second round of surveys and interview will all occur on the same day with Brooke Beidler present. It will take you anywhere from about two to three hours to be in this study.

Risks and Discomforts

As a participant in this study, you may experience emotional discomfort as you reflect on your past levels of functioning. You may also experience physical discomfort while participating in your individual training session with the lead trainer of Project Momentum due to the physical excursion levels that occur while preforming exercises, but this is likely no more than what you already experience in your training sessions. Lastly, as a participant in this study, you may feel uncomfortable sharing personal experiences and information. You only need to share what you feel comfortable with.

Possible Benefits

As a participant in this study, you may experience possible benefits. The benefits may include feelings of pride for assisting in this study and the support of Project Momentum being learned about by others. You may also experience positive emotions while reflecting and expressing your experience as a participant of Project Momentum.

Protection of Privacy and Confidentiality

As a participant, you will provide as much personal information as you desire. Your

identity will remain confidential and will not be included in the publication of any parts of the study. You will provide demographic information as a part of completing the surveys, as well as any voluntary information during the interviews. We will ask for your initials on the surveys, and this will be used only to link your responses together over time. Once all the data is entered and recorded, we will delete and replace the initials with ID numbers. This information will not be linked to your name in any way. The recordings of your interview will only be shared with the research team and will be deleted six months after the study is completed.

The results of this study may be published in scientific journals, professional publications, or educational presentations; however, no individual participant will be identified.

Choosing to Be in the Study

You may choose not to take part and you may choose to stop taking part at any time. You will not be punished in any way if you decide not to be in the study or to stop taking part in the study.

Contact Information

If you have any questions or concerns about your rights in 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 is a group of people who independently review research. 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.

If you have any study related questions or if any problems arise, please contact Dr. Jasmine Townsend at Clemson University at (864) 656-2198.

Contact Information

If you have any questions or concerns about this study or if any problems arise, please contact Jasmine Townsend at Clemson University at 864-656-2198 or jntowns@clemson.edu.

If you have any questions or concerns about your rights in 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.

Clicking on the "agree" button indicates that:

• You have read the above information

- You voluntarily agree to participate
- You are at least 18 years of age

You may print a copy of this informational letter for your files.

Appendix D

Participation Assessment with Recombined Tools-Objective (PART-O)

Retrospective and Present Perspectives

Retrospective Perspective PART-O

First, I am going to ask you questions about your activities in a typical week **prior to your participation in Project Momentum.**

1. In a typical week, how many hours did you spend working for money, whether in a job or self-employed?

Category	**Score**
None	0
1-4 hours	1
5-9 hours	2
10-19 hours	3
20-34 hours	4
35 or more hours	5
Don't know/not sure/refused	9

2. In a typical week, how many hours did you spend in school working toward a degree or in an accredited technical training program, including hours in class and studying?

Category	**Score**
None	0
1-4 hours	1
5-9 hours	2
10-19 hours	3
20-34 hours	4
35 or more hours	5
Don't know/not sure/refused	9

3. In a typical week, how many hours did you spend in active homemaking, including cleaning, cooking and raising children?

Category	**Score**
None	0
1-4 hours	1
5-9 hours	2
10-19 hours	3
20-34 hours	4
35 or more hours	5
Don't know/not sure/refused	9

Now, I will ask you how often you did several other activities **prior to your participation in Project Momentum.**

4. In a typical week, how many times did you socialize with friends, in person or by phone? Please do not include socializing with family members.

Category	**Score**
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

5. In a typical week, how many times did you socialize with family and relatives, in person or by phone?

Category	**Score**
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

6. In a typical week, how many times did you give emotional support to other people, that is, listen to their problems or help them with their troubles?

Category	**Score**
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

7. In a typical week, how many times did you use the Internet for communication, such as for email, visiting chat rooms, or instant messaging?

Category	**Score**
None	0
1-4 times	1

5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

8. In a typical week, how many days did you get out of your house and go somewhere? It could be anywhere – it doesn't have to be anyplace "special".

Category	**Score**
None	0
1-2 days	1.25
3-4 days	2.5
5-6 days	3.75
7 days	5
Don't know/not sure/refused	9

Now I have questions on how often you did various activities in a typical month **prior to your participation in Project Momentum.**

9. In a typical month, how many times did you eat in a restaurant?

Category	**Score**
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

10. In a typical month, how many times did you go shopping? Include grocery shopping, as well as shopping for household necessities, or just for fun.

Category	**Score**
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

11. In a typical month, how many times did you engage in sports or exercise outside your home? Include activities like running, bowling, going to the gym, swimming, walking for exercise and the like.

Category	**Score**
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

The next questions also ask about activities in a typical month, but the answer categories are different but should still be related to your involvement **prior to participating in Project Momentum.**

12. In a typical month, how many times did you go to the movies?

Category	**Score**
None	0
1 time	1
2 times	2
3 times	3
4 times	4
5 or more times	5
Don't know/not sure/refused	9

13. In a typical month, how many times did you attend sports events in person, as a spectator?

Category	**Score**
None	0
1 time	1
2 times	2
3 times	3
4 times	4
5 or more times	5
Don't know/not sure/refused	9

14. In a typical month, how many times did you attend religious or spiritual services? Include places like churches, temples, and mosques.

Category	**Score**

None	0
1 time	1
2 times	2
3 times	3
4 times	4
5 or more times	5
Don't know/not sure/refused	9

15. Switching now to a somewhat different kind of question…Did you live with your spouse or significant other PRIOR to participating in Project Momentum? (IF YES, SKIP to QUESTION 17).

Category	**Score**
No	0
Yes	5
Don't know/not sure/refused	9

16. Prior to your participation in Project Momentum, were you involved in an ongoing intimate, that is, romantic or sexual, relationship?

Category	**Score**
No	0
Yes	5
Don't know/not sure/refused	9

17. Not including your spouse or significant other, did you have a close friend in whom you would confide?

Category	**Score**
No	0
Yes	5
Don't know/not sure/refused	9

Present Perspective PART-O

First, I am going to ask you questions about your activities in a typical week **now that you have been a participant in Project Momentum.**

18. In a typical week, how many hours do you spend working for money, whether in a job or self-employed?

Category	**Score**
None	0
1-4 hours	1
5-9 hours	2
10-19 hours	3
20-34 hours	4
35 or more hours	5
Don't know/not sure/refused	9

19. In a typical week, how many hours do you spend in school working toward a degree or in an accredited technical training program, including hours in class and studying?

Category	**Score**
None	0
1-4 hours	1
5-9 hours	2
10-19 hours	3
20-34 hours	4
35 or more hours	5
Don't know/not sure/refused	9

20. In a typical week, how many hours do you spend in active homemaking, including cleaning, cooking and raising children?

Category	**Score**
None	0
1-4 hours	1
5-9 hours	2
10-19 hours	3
20-34 hours	4
35 or more hours	5
Don't know/not sure/refused	9

Now, I will ask you how often you do several other activities **now that you have been a participant in Project Momentum.**

21. In a typical week, how many times do you socialize with friends, in person or by phone? Please do not include socializing with family members.

Category	Score
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

22. In a typical week, how many times do you socialize with family and relatives, in person or by phone?

Category	Score
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

23. In a typical week, how many times do you give emotional support to other people, that is, listen to their problems or help them with their troubles?

Category	Score
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

24. In a typical week, how many times do you use the Internet for communication, such as for email, visiting chat rooms, or instant messaging?

Category	Score
None	0
1-4 times	1
5-9 times	2
10-19 times	3

20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

25. In a typical week, how many days do you get out of your house and go somewhere? It could be anywhere – it doesn't have to be anyplace "special".

Category	**Score**
None	0
1-2 days	1.25
3-4 days	2.5
5-6 days	3.75
7 days	5
Don't know/not sure/refused	9

Now I have questions on how often you do various activities in a typical month **now that you have been a participant in Project Momentum.**

26. In a typical month, how many times do you eat in a restaurant?

Category	**Score**
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

27. In a typical month, how many times do you go shopping? Include grocery shopping, as well as shopping for household necessities, or just for fun.

Category	**Score**
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

28. In a typical month, how many times do you engage in sports or exercise outside your home? Include activities like running, bowling, going to the gym, swimming, walking for exercise and the like.

Category	Score
None	0
1-4 times	1
5-9 times	2
10-19 times	3
20-34 times	4
35 or more times	5
Don't know/not sure/refused	9

The next questions also ask about activities in a typical month, but the answer categories are different and **are still related to you being a participant in Project Momentum now.**

29. In a typical month, how many times do you go to the movies?

Category	Score
None	0
1 time	1
2 times	2
3 times	3
4 times	4
5 or more times	5
Don't know/not sure/refused	9

30. In a typical month, how many times do you attend sports events in person, as a spectator?

Category	Score
None	0
1 time	1
2 times	2
3 times	3
4 times	4
5 or more times	5
Don't know/not sure/refused	9

31. In a typical month, how many times do you attend religious or spiritual services? Include places like churches, temples, and mosques.

Category	Score
None	0
1 time	1
2 times	2
3 times	3

4 times	4
5 or more times	5
Don't know/not sure/refused	9

32. Switching now to a somewhat different kind of question…Do you live with your spouse or significant other **now that you have been a participant in Project Momentum? (IF YES, SKIP to QUESTION 17).**

Category	**Score**
No	0
Yes	5
Don't know/not sure/refused	9

33. Are you currently involved in an ongoing intimate, that is, romantic or sexual, relationship?

Category	**Score**
No	0
Yes	5
Don't know/not sure/refused	9

34. (Not including your spouse or significant other), do you have a close friend in whom you confide?

Category	**Score**
No	0
Yes	5
Don't know/not sure/refused	9

Appendix E

World Health Organization Quality of Life-BREF (WHOQOL-BREF)

Retrospective and Present Perspectives

Retrospective Perspective WHOQOL-BREF

WHOQOL-BREF

The following questions ask how you feel about your quality of life, health, or other areas of your life. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **prior to participating in Project Momentum.**

		Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life **prior to participating in Project Momentum?**	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2.	How satisfied were you with your health **prior to participating in Project Momentum?**	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things **prior to participating in Project Momentum.**

		Not at all	A little	A moderate amount	Very much	An extreme amount
3.	To what extent do you feel that physical pain prevented you from doing what you needed to do **prior to participating in Project Momentum?**	5	4	3	2	1
4.	How much did you need any medical treatment to function in your daily life **prior to participating in Project Momentum?**	5	4	3	2	1
5.	How much did you enjoy life **prior to participating in Project Momentum?**	1	2	3	4	5

6.	To what extent did you feel your life to be meaningful **prior to participating in Project Momentum?**	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7.	How well were you able to concentrate **prior to participating in Project Momentum?**	1	2	3	4	5
8.	How safe did you feel in your daily life **prior to participating in Project Momentum?**	1	2	3	4	5
9.	How healthy was your physical environment **prior to participating in Project Momentum?**	1	2	3	4	5

The following questions ask about **how completely** you experienced or were able to do certain things **prior to participating in Project Momentum**.

		Not at all	A little	Moderately	Mostly	Completely
10.	Did you have enough energy for everyday life **prior to participating in Project Momentum?**	1	2	3	4	5
11.	Were you able to accept your bodily appearance **prior to participating in Project Momentum?**	1	2	3	4	5
12.	Did you have enough money to meet your needs **prior to participating in Project Momentum?**	1	2	3	4	5
13.	How available to you was the information that you needed in your day-to-day life **prior to participating in Project Momentum?**	1	2	3	4	5
14.	To what extent did you have the opportunity for leisure activities **prior to participating in Project Momentum?**	1	2	3	4	5

		Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well were you able to get around **prior to participating in Project Momentum?**	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16.	How satisfied were you with your sleep **prior to participating in Project Momentum?**	1	2	3	4	5
17.	How satisfied were you with your ability to perform your daily living activities **prior to participating in Project Momentum?**	1	2	3	4	5
18.	How satisfied were you with your capacity for work **prior to participating in Project Momentum?**	1	2	3	4	5
19.	How satisfied were you with yourself **prior to participating in Project Momentum?**	1	2	3	4	5
20.	How satisfied were you with your personal relationships **prior to participating in Project Momentum?**	1	2	3	4	5
21.	How satisfied were you with your sex life **prior to participating in Project Momentum?**	1	2	3	4	5
22.	How satisfied were you with the support you get from your friends **prior to participating in Project Momentum?**	1	2	3	4	5
23.	How satisfied were you with the conditions of your living place **prior to participating in Project Momentum?**	1	2	3	4	5
24.	How satisfied were you with your access to health services	1	2	3	4	5

	prior to participating in Project Momentum?					
25.	How satisfied were you with your transport **prior to participating in Project Momentum?**	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things **prior to participating in Project Momentum.**

		Never	Seldom	Quite often	Very often	Always
26.	How often did you have negative feelings such as blue mood, despair, anxiety, and depression **prior to participating in Project Momentum?**	5	4	3	2	1

Present Perspective WHOQOL-BREF

WHOQOL-BREF

The following questions ask how you feel about your quality of life, health, or other areas of your life. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **now that you have been a participant in Project Momentum.**

		Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life **now that you have been a participant in Project Momentum?**	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2.	How satisfied are you with your health **now that you have been a participant in Project Momentum?**	1	2	3	4	5

The following questions ask about **how much** you experience certain things **now that you have been a participant in Project Momentum.**

		Not at all	A little	A moderate amount	Very much	An extreme amount
3.	To what extent do you feel that physical pain prevents you from doing what you need to do **now that you have been a participant in Project Momentum?**	5	4	3	2	1
4.	How much do you need any medical treatment to function in your daily life **now that you have been a participant in Project Momentum?**	5	4	3	2	1

5.	How much do you enjoy life **now that you have been a participant in Project Momentum?**	1	2	3	4	5
6.	To what extent do you feel your life to be meaningful **now that you have been a participant in Project Momentum?**	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7.	How well are you able to concentrate **now that you have been a participant in Project Momentum?**	1	2	3	4	5
8.	How safe do you feel in your daily life **now that you have been a participant in Project Momentum?**	1	2	3	4	5
9.	How healthy is your physical environment **now that you have been a participant in Project Momentum?**	1	2	3	4	5

The following questions ask about **how completely** you experience or are able to do certain things **now that you have been a participant in Project Momentum.**

		Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life **now that you have been a participant in Project Momentum?**	1	2	3	4	5
11.	Are you able to accept your bodily appearance **now that you have been a participant in Project Momentum?**	1	2	3	4	5
12.	Did you have enough money to meet your needs **now that you have been a participant in Project Momentum?**	1	2	3	4	5
13.	How available to you is the information that you need in your day-to-day life **now**	1	2	3	4	5

	that you have been a participant in Project Momentum?					
14.	To what extent do you have the opportunity for leisure activities **now that you have been a participant in Project Momentum?**	1	2	3	4	5

		Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well ware you able to get around **now that you have been a participant in Project Momentum?**	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16.	How satisfied are you with your sleep **now that you have been a participant in Project Momentum?**	1	2	3	4	5
17.	How satisfied are you with your ability to perform your daily living activities **now that you have been a participant in Project Momentum?**	1	2	3	4	5
18.	How satisfied are you with your capacity for work **now that you have been a participant in Project Momentum?**	1	2	3	4	5
19.	How satisfied are you with yourself **now that you have been a participant in Project Momentum?**	1	2	3	4	5
20.	How satisfied are you with your personal relationships **now that you have been a participant in Project Momentum?**	1	2	3	4	5
21.	How satisfied are you with your sex life **now that you have been a participant in Project Momentum?**	1	2	3	4	5

22.	How satisfied are you with the support you get from your friends **now that you have been a participant in Project Momentum?**	1	2	3	4	5
23.	How satisfied are you with the conditions of your living place **now that you have been a participant in Project Momentum?**	1	2	3	4	5
24.	How satisfied are you with your access to health services **now that you have been a participant in Project Momentum?**	1	2	3	4	5
25.	How satisfied are you with your transport **now that you have been a participant in Project Momentum?**	1	2	3	4	5

The following question refers to **how often** you have feel or experience certain things **now that you have been a participant in Project Momentum.**

		Never	Seldom	Quite often	Very often	Always
26.	How often do you have negative feelings such as blue mood, despair, anxiety, and depression **now that you have been a participant in Project Momentum?**	5	4	3	2	1

Appendix F

Interview Protocol

Semi-Structured Interview Questions

QUESTIONS	POTENTIAL PROMPTS
Tell me about why you decided to participate in Project Momentum	
Tell me about your expectations of Project Momentum prior to participating	-What did you expect it to be like? -How did you think it would impact you
Tell me about how this program has impacted you (see detailed physical functioning questions below)	-How has it impacted your physical functioning? -How has it impacted your ability to participate in instrumental activities of daily living? (work, home-life, responsibilities, community outings) -How has it impacted your overall quality of life?
What aspects of Project Momentum do you think contributed to these impacts?	-Within your physical functioning -Within your IADL -Within your level of quality of life

1. Retrospective Perspective Question:

    Prior to being a Project Momentum participant, how would you describe your physical functioning in relation to these elements?

2. Present Perspective Question:

    Now that you have been a Project Momentum participant, how has your physical functioning in these same areas been impacted?

    Possible Probe: What aspects of Project Momentum do you think contributed to these changes?

Appendix G

Reference Sheet on Physical Functioning

Physical Functioning

Please consider the following list of functional movements when answering these questions:

- Motor control:
  - Fine Motor Control:
    - Grasp
    - Pinching
    - Gripping
  - Gross Motor Control
    - Mobility
    - Balance
    - Coordination
- Strength and Endurance
- Range of motion and Flexibility