DISSERTATION

THE SCIENTIFIC ADVANCEMENT OF TWO NATURE-BASED INTERVENTIONS FOR PEOPLE WITH DEMENTIA: ADAPTIVE RIDING AND ADAPTIVE GARDENING

Submitted by
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ABSTRACT

THE SCIENTIFIC ADVANCEMENT OF TWO NATURE-BASED INTERVENTIONS FOR PEOPLE WITH DEMENTIA: ADAPTIVE RIDING AND ADAPTIVE GARDENING

People living with dementia are at risk for decreased quality of life (QoL). QoL may be supported through adaptive riding and horsemanship activities and adaptive gardening, two nature-based interventions; yet, they require further scientific advancement. This dissertation sought to scientifically advance adaptive riding and adaptive gardening for people with dementia. Study one, a mixed methods descriptive case study, addressed the development of an adaptive riding intervention and resulted in a logic model linking its purpose, assumptions, components, occupational opportunities, and immediate outcomes of QoL for participants with dementia. Study two, a quantitative case study compared adaptive riding and adaptive gardening, targeted development and piloting, and revealed that both supported participants' emotional well-being and participation, two dimensions of QoL, with significantly longer durations of complex participation observed during adaptive riding. Study one provided the first published logic model for a nature-based intervention involving animals, whereas study two served as the first nature comparison for this population. Both interventions were scientifically advanced from development to piloting and described in-depth to inform future replication. Next, care partners' perceptions should be explored. The novel observational approach applied in both studies may be helpful to describe other nature-based interventions, and may also contribute to occupational science with a method for situating occupations in the *here* and *now*.

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DEDICATION

I dedicate this dissertation to the people living with dementia and their families who participated in my dissertation research and to anyone who may be experiencing dementia. It is my hope that adaptive riding and adaptive gardening can be a means for you to make your lives better. I hope the connections and support you may have experienced as you participated in these interventions will bring you light and comfort—you are not walking this path alone.

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DEFINITIONS OF KEY TERMS

Ability to function: A dimension of QoL describing a person’s functional competence in daily life and includes the use of their retained capacities (Wood et al., 2017).

Adaptive gardening: Adaptive gardening is the skillful modification of gardening activities by trained staff to meet the needs of participants with varying health challenges. The aim of adaptive gardening is to provide access to the health benefits (e.g. physical activity, stress reduction) inherent in gardening activities (see Gonzalez & Kirkevold, 2013; Han, Park, & Ahn, 2018; Whear et al., 2014).

Adaptive Riding: Adaptive riding is the skillful modification of horsemanship and riding activities for people with diverse health challenges that are delivered by a trained instructor (Wood et al., 2020.). The purpose of adaptive riding is to provide access to horsemanship activities for their inherent health benefits (e.g. physical activity, emotional well-being).

Animal-assisted intervention: An animal-assisted intervention (AAI) is an overarching term used to describe the incorporation of a various animal species to promote health and well-being in human participants and include animal-assisted activities and animal-assisted therapies (American Veterinary Medical Association, 2018).

Assumptions: A term describing a logic model component detailing presumptions such as ideas, beliefs, and principles about how and why a program is thought to work (WK Kellogg Foundation, 2004).

Care partner: A term describing a family member or other partner who provides care to a person living with dementia.

Contextual factors: Contextual factors are a component of both a process evaluation and a logic model. Contextual factors are environmental elements that can influence the implementation and outcomes of an intervention and may be external or seen, or internal and unseen (Moore et al., 2015; WK Kellogg Foundation, 2004).

Complementary intervention: A term describing a non-mainstream intervention that can be used in conjunction with traditional medical care (National Center for Integrative and Complementary Health, 2018.)

Complex intervention: Complex interventions contain several interacting components and may vary in complexity by possessing one or more of the following characteristics: targeting various groups or organizational levels; producing a number of variable outcomes; requiring a range and difficulty of behaviors of providers; and involving a degree of flexibility and tailoring for participants during the delivery of the intervention (Craig et al., 2006, 2013).

Dementia: An overarching term for a group of symptoms involving difficulties with memory, problem-solving, language, and a person's ability to think and complete daily activities (Alzheimer's Association, 2020).

Development phase: A foundational phase in the scientific advancement of a complex intervention that consists of identifying the evidence, selecting a theory or guiding set of assumptions, describing the intervention, and modelling its processes and outcomes onto a logic model (Craig et al., 2006, 2013; Moore et al., 2015).

Dose: A term describing the frequency and duration of the delivered intervention (Moore et al., 2014).

Emotional well-being: A dimension of QoL that encompasses a person's emotional experience of their current situation and includes their sense of self (Wood et al., 2017).

Environmental perspective of QoL for people with dementia: An environmental perspective emphasizes the physical, social, interpersonal, cultural, and socio-political environmental elements of a person's immediate situation that shape their participation in occupation and associated experiences of QoL (Wood et al., 2017; Wood, 2019).

Evaluation phase: A phase of the scientific advancement of a complex intervention that involves assessing the effectiveness of an intervention, including its cost effectiveness, and the process through which change occurs using a process evaluation (Craig et al., 2006, 2013).

Excess disability: A term describing a preventable loss of function due to an absence of chances for use (Brody, Kleban, Lawton, & Silverman, 1971).

External factors: A type of contextual factor that is external to the person, yet influences their experience of the intervention and their outcomes (Moore et al., 2014). External factors may include the weather and whether or not participants connects with staff.

Feasibility and piloting phase: A phase in the scientific advancement of a complex intervention that involves determining proof of concept (e.g. can it work?) and whether or not it is feasible (e.g. can it be done?) (Craig et al., 2006, 2013).

Fidelity: Fidelity is the quality and consistency that an intervention is implemented (Steckler & Linnan, 2002).

Impact: A logic model component that involves system level changes in an organization or community including improved conditions, increased numbers of participants served, and changes in policy resulting from short and long-term outcomes (WK Kellogg Foundation, 2004).

Implementation phase: A phase of the scientific advancement of a complex intervention that encompasses the wide-spread dissemination of an intervention with surveillance and monitoring to determine the quality of its delivery, or fidelity, and long-term follow-up (Craig et al., 2006, 2013).

Implementation or implementation process: Implementation describes the process through which a complex intervention is delivered and includes the study of fidelity, adaptations, dose, and reach (Moore et al., 2014).

Immediate outcomes: A logic model component as understood in this dissertation is the outcomes present during the program or intervention.

Inputs: An element of a logic model that depicts the financial, human, organizational, and community resources required to implement a program (WK Kellogg Foundation, 2004).

Logic model: A logic model visually displays how an intervention is thought to work by identifying and interconnecting its assumptions, salient elements, key activities, and desired outcomes (Mclaughlin & Jordan, 2004; WK Kellogg Foundation, 2004).

Long-term outcomes: A logic model element describing outcomes that span four to seven years (WK Kellogg Foundation, 2004)**.**

Mechanism of change: A term describing the components present in an intervention that are thought to explain intended or unintended changes in the outcomes (Moore et al., 2014).

Nature-based interventions: Nature-based interventions are programs, activities, or strategies that incorporate nature-based experiences to improve a person's health and well-being (Shanahan et al., 2019).

Occupation: An occupation is a subjective and collective experience of doing that involves intentional actions, holds a clear beginning and end, and are part of a person or group's immediate situation (see Dickie, Cutchin, & Humphry, 2006; Ramugondo & Kronenberg, 2015; Yerxa, Clark, Jackson, Pierce, & Zemke, 1990).

Occupational opportunity: An intentionally organized offering of a specific occupation (Wood et al., 2017).

Occupational science: Occupational science is an academic discipline focused on the study of occupations and how they unfold over time for people with and without disabilities (Larson, Wood, & Clark, 2003). Occupational scientists study occupation in concert with the environmental elements of a person’s daily situation and examine how occupations may function to transform them both (Cutchin et al., 2017; Dickie et al., 2006; Larson, Wood, & Clark, 2003; Wood, 2019).

Outcomes: A logic model component describing the outcomes of specific activities (occupational opportunities) and refer to changes in the participants’ behavior, knowledge, skills, status, or levels of functioning of participants in a program (WK Kellogg Foundation, 2004).

Outputs: A logic model component that describes the immediate product of program activities, typically describing the size and scope of services, such as the number of participants served or the frequency and duration delivered (WK Kellogg Foundation, 2004).

Participation: A person’s involvement in their prevailing situation (WHO, 2002).

Process evaluation: A study seeking to understand how a complex intervention functions through examining the intersections of its implementation processes, mechanisms of change, and contextual factors and how together these components impact the implementation and outcomes of the intervention (Moore et al., 2014).

Quality of life: QoL is examined in this dissertation through three dimensions: participation in occupation, a person’s ability to function, and their emotional well-being (Wood et al., 2017).

Reach: A term describing the extent to which the planned intervention is delivered to the target population (Moore et al., 2014).

Rehabilitation science: Rehabilitation science is an academic discipline focused on the study of disability and function across the lifespan (Seelman, 2000). Rehabilitation scientists study how disabilities develop and how environmental supports and barriers may enable or disable a person to participate and perform in their daily life (Brandt & Pope, 1997; WHO, 2002).

Retained capacities: A term describing a person's cognitive, social, and physical abilities relative to their stage of dementia that relates to their ability to function (Wood et al., 2017).

Short-term outcomes: A logic model component that describes outcomes that occur up to one-three years after an intervention (WK Kellogg Foundation, 2004)**.**

Theory of change: A theory of change is a description of what a program or intervention is, why it is assumed to work, and how it will achieve its desired outcomes (WK Kellogg Foundation, 2004).

CHAPTER ONE: INTRODUCTION

The purpose of this chapter is to orient you to my dissertation. First, I identify the problem my dissertation seeks to address, then I describe its purpose and guiding framework. Next, I elucidate my underlying assumptions and reflect on my positionality, then I describe the structure of my dissertation. Lastly, I define key terms.

Statement of the Problem

Supporting quality of life (QoL) and function for people living with dementia are key outcomes in dementia care and research (Alzheimer's Association, 2020; Scott et al., 2019). *Dementia* is an overarching term describing a set of symptoms, involving difficulties with memory, problem-solving, orientation, and communication (Alzheimer's Association, 2020). While there are many different types of dementia, the symptoms often begin in the early stages with mild cognitive impairments that are apparent during daily life and become more pronounced in the moderate stages, leading to declines in physical function; until eventually in the later stages, the person is bed-bound and often requires continuous care. In fact, dementia is the second leading cause of disability in older adults globally with roughly 5.8 million people living with dementia (Alzheimer's Association, 2020; World Organization Health [WHO], 2018). Consequently, the degenerative nature of dementia places a person at risk for decreased QoL. Moreover, people with dementia identified QoL and function as important care goals and emphasized participating in activities they found meaningful to address them (Jennings et al., 2017). Thus, meaningful activities are crucial to the QoL of people living with dementia.

Activities in nature, especially those involving gardens and animals, such as horses, may be meaningful to people living with dementia, and may also foster their QoL with opportunities to participate and use their retained capacities (Fields, Bruemmer, Gloeckner, & Wood, 2018;

Mmakp, Courtney-Pratt, & Marsh, 2020; Wood, Fields, Rose, & McLure, 2017). Such activities can be used as *nature-based interventions,* that is, activities, strategies, or programs that involve nature-based experiences to support a person's well-being (Shanahan et al., 2019). While there is growing evidence of the benefits of nature, research of nature-based interventions incorporating horses for people living with dementia is sparse with only three studies, all of which focused on people residing in long-term care (Dabelko-Schoeny et al., 2014; Fields et al., 2018; Fields, Wood, & Lassell, 2019). Similarly, the majority of gardening research is focused on people with dementia in long-term care and overlooked those dwelling in the community (Hewitt,Watts, Hussey, Power, & Williams, 2013; Noone & Jenkins, 2018; Hall, Mitchell, Webber, & Johnson, 2018; Smith-Carrier, Johnson, Blake, & Howard, 2019). Moreover, no studies exist that examine how people with dementia may respond similarly and differently to varying types of nature-based interventions in regard to their QoL. This dissertation sought to address these gaps with the scientific development of two novel nature-based interventions: adaptive riding and adaptive gardening for people with dementia.

Purpose of the Dissertation

Therefore, the purpose of this dissertation was to scientifically advance adaptive riding and adaptive gardening for people with dementia. Specifically, I aimed to 1) advance an adaptive riding intervention by providing a basis for its replication and multi-site research, 2) replicate the adaptive riding intervention for people with dementia in the community; and 3) launch the development of an adaptive gardening intervention for comparison.

The primary focus of this dissertation was the scientific development of an adaptive riding intervention aimed at enhancing the QoL of people living with dementia. *Adaptive riding* is the skillful modification of horsemanship and riding activities for people with diverse health challenges and is delivered by a trained instructor (Wood et al., 2020). The purpose of adaptive riding is to provide access to horsemanship activities for their inherent health benefits (e.g. physical activity, emotional well-being). While the use of horses for therapeutic purposes dates back to ancient Greece, the origin of adaptive riding is attributed to Liz Hartel in 1943, who contracted polio and later won an Olympic medal in the equestrian sport of dressage (Scott, 2005). Yet, adaptive riding for people living with dementia is new. In fact, Fields and colleagues' (2018, 2019) published findings from the first study of adaptive riding for this population. Their study focused on the Riding in the Moment program, referred to herein as the adaptive riding intervention, which is the main focus of this dissertation.

The secondary focus of this dissertation was to scientifically develop the adaptive gardening intervention, also seeking to support participants’ QoL. While many terms for gardening in a therapeutic context exist, I use the term *adaptive gardening* to delineate the skillful modification of gardening activities by trained staff to meet the needs of participants with varying health challenges. The aim of adaptive gardening is to provide access to the natural health benefits of gardening activities (e.g. physical activity, stress reduction) (see Han, Park, & Ahn, 2018; Howarth, Brettle, Hardman, & Maden, 2020; Whear et al., 2014). While the health benefits of gardens have been recognized since ancient times, psychiatrist Dr. Benjamin Rush is credited with the first therapeutic use of gardens in the early 19th century (Detweiler et al., 2012). The use of gardens for people living with dementia emerged in the 1990’s and has grown in popularity (Gonzalez & Kirkevold, 2013). Yet, research of gardening interventions for community-dwelling people with dementia arose roughly 20 years later (Hewitt et al., 2013), and are beginning to develop. To scientifically advance adaptive gardening and adaptive riding, I applied the Medical Research Council’s phased approach.

A Phased Approach to Scientific Development

The Medical Research Council is an organization that seeks to support excellence in research to foster the health of people living in the United Kingdom and worldwide (www.mrc.ukri.org/about/). To support this mission, the Medical Research Council provides guidance for the development and evaluation of complex interventions. A *complex intervention* contains a number of interacting components, targets various groups, and involves a degree of flexibility and tailoring for participants, among other characteristics (Craig et al., 2006, 2013). In short, interventions containing one or more of these characteristics can be considered complex, and may be guided with four phases of development and evaluation that can overlap in a cyclical process (see Figure 1).

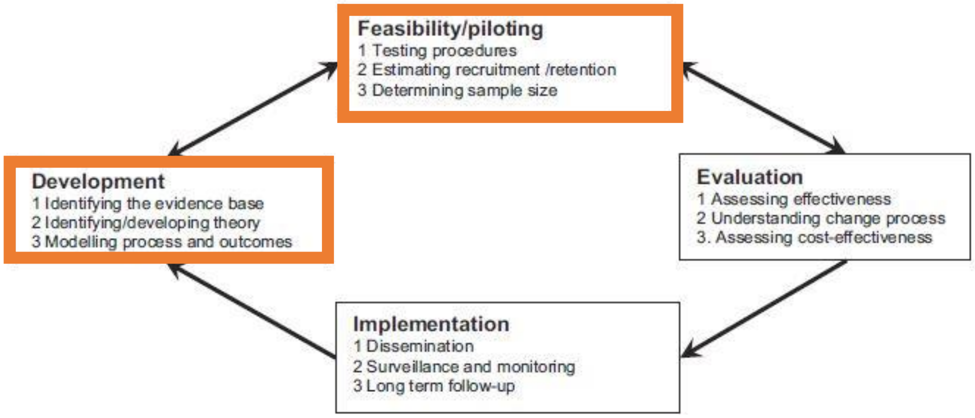


Figure 1. Key phases of the development and evaluation process. Adapted from Craig et al.'s (2013) article Developing and evaluating complex interventions: The new Medical Research Council Guidance, in the *International Journal of Nursing Studies*, 50, p. 589. Double arrows indicate phases that may co-occur. Single arrows depict one phase leading to another. Orange rectangles show phases targeted by this dissertation.

The *development phase* of a complex intervention consists of identifying the evidence, selecting a theory or guiding set of assumptions, describing the intervention, and modelling its processes and outcomes onto a logic model (Craig et al., 2006, 2013, 2019; Moore et al., 2015). The intent of the development phase is to provide an in-depth description of an intervention detailing *what* is it and *how* is it thought to work, which are foundational for its subsequent replication and refinement. As illustrated in Figure 1., milestones in the *feasibility and piloting phase* may co-occur with the development phase and involve determining proof of concept (e.g. can it work?) and whether or not it is feasible (e.g. can it be done?). Feasibility may involve calculating recruitment and retention rates, estimating sample sizes, and trialing testing procedures. Testing procedures may include identifying relevant outcome measures and piloting a comparison condition. Also, relevant to this phase is determining participants and stakeholders' satisfaction with the intervention, or its acceptability. The purpose of the feasibility and piloting phase is to prepare the intervention for successful multi-site replication during a full-scale evaluation; therefore, both of these phases may influence the other. During the *evaluation phase*, the effectiveness of an intervention is assessed, including its cost effectiveness, and the process through which change occurs using a process evaluation. The goal of the evaluation phase is to determine *if* an intervention works, and if it does, to understand *how*, leading to the implementation phase. The *implementation phase* encompasses the dissemination of an intervention with surveillance and monitoring to determine the quality of its delivery, or fidelity, and long-term follow-up. The aim of the implementation phase is to successfully deliver the intervention widely with careful consideration of the local context, and may also lead to further refinements of the intervention in the development phase. Phases targeted in this dissertation are 1) *development*, and 2) *feasibility and piloting*.

Adaptive Riding. Relevant to scientific advancement, Fields et al., (2019) described the adaptive riding intervention as being complex in nature, due to the number of skilled behaviors required of providers to tailor the activities to participants' needs. In relation to the *development phase*, Wood et al.'s (2017) systematic mapping review of interventions incorporating animals for people living with dementia identified the evidence base to inform the continued development of the adaptive riding intervention. Also, Fields et al. (2018) identified an environmental perspective as a guiding set of assumptions and described how people with dementia residing in long-term care responded to the intervention through observed indicators of QoL. Contributing to the *feasibility and piloting phase*, Fields et al. (2018, 2019) developed proof of concept that the adaptive riding intervention supported QoL and was acceptable to direct service providers at the long-term care facility and the therapeutic riding center. Furthermore, Fields et al., (2019) suggested modelling the processes and outcomes of the intervention using a logic model as a next step. In this dissertation, I address milestones in the 1) *development* and 2) *feasibility and piloting* phases of the adaptive riding intervention.

Adaptive Gardening. The adaptive gardening intervention studied in this dissertation can also be considered a complex intervention, as it involves the skillful tailoring of gardening activities to fit each participants' abilities and needs. In fact, Jarrott, Kwack, and Relf (2002) emphasized that gardening activities could be easily modified to fit the needs of people living with dementia across varying stages. Additionally, previous research has informed the *development phase* of the adaptive gardening intervention. For instance, there is growing evidence supporting gardening as a means to enhance QoL for people with dementia with a number of systematic and literature reviews (Blake & Mitchell, 2016; Detweiler et al., 2012; Gonzalez & Kirkevold, 2013; Mmakp et al., 2020; Whear et al., 2014). However, gardening interventions for community-dwelling people with dementia are scarce with no published studies inviting care partner involvement (Hewitt et al., 2013; Hall et al., 2018; Noone, & Jenkins, 2018; Smith-Carrier et al., 2019). Therefore, I sought to develop and pilot a novel adaptive gardening intervention for people with dementia and invited their care partners to participate, undertaking milestones in the *1) development*, and *2) feasibility and piloting* phases.

Accomplishing milestones in the *development* and *feasibility and piloting* phases of adaptive riding and adaptive gardening will help advance both interventions toward a full-scale evaluation, such as a randomized controlled trial. To accomplish these milestones, I applied an environmental perspective of QoL for people with dementia to guide my research.

An Environmental Perspective of QoL for People Living with Dementia

While many definitions of QoL exist and vary based on dementia severity (Ettema et al., 2005), I focus on two dimensions: participation and emotional well-being (Wood et al., 2017). To better understand these dimensions, I've applied an environmental perspective. This perspective conceptualizes a person's daily experiences of QoL as shaped by the physical, social, interpersonal, cultural, and socio-political environmental elements of their daily situations (Wood et al., 2017; Wood, 2019). Particularly, these environmental elements influence a person's access to, and experience of, occupations.

Occupation in this dissertation is understood as a subjective and collective experience of doing that involves intentional actions, holds a clear beginning and end, and are part of a person or group's immediate situation (see Dickie, Cutchin, & Humphry, 2006; Ramugondo & Kronenberg, 2015; Yerxa, Clark, Jackson, Pierce, & Zemke, 1990). Here, I'm understanding the "experience" of engaging in occupation as subjective perceptions that may also be collective and result in a level of satisfaction and meaning (Reilly,1962; Wood, 2019). While "meaning" is a loaded concept with a kaleidoscope of complexities, some of which may be harmful, I'm understanding meaning as it relates to QoL. For instance, the "meaning" of occupation in this dissertation can be subjective and shared as a collective, and relates to a sense of identity and belonging through social connections with chances to contribute and reciprocate with others (Hammell, 2004; Wilcock, 1999). Therefore, occupations offer a means to express the essence of who we are, but also to transform us into who we are becoming, not only individually as people, but also collectively as community. Access to opportunities for specific occupations, or *occupational opportunities*, can provide possibilities for intentional action (Wood et al., 2017). If chosen and acted upon, a person *participates,* or is involved in their prevailing situation (WHO, 2002).

Participation in occupations may support a person's functional competence in daily life and includes the use of their retained capacities, or their *ability to function* (Wood et al., 2017). For instance, when a person living with dementia participates, they may use their retained cognitive, physical, and social capacities. Use of these capacities through participation in self-selected occupations can support daily function and lessen declines associated with dementia (Baum, 1995; Fernández-mayoralas et al., 2015; Sobral & Constanca, 2013). Also, participation in occupations can prevent or reduce *excess disability*, or a preventable loss of function due to an absence of chances for use (Brody, Kleban, Lawton, & Silverman, 1971). Less excess disability may decrease dependence on others for daily activities, which is associated with increased QoL for people with dementia (Soylemez, Akp, Küçükgüçlü, & Akyol, 2020), and may increase their ability to live at home for longer (Andersen, Wittrup-jensen, Lolk, Andersen, & Kragh-sørensen, 2004; Kurz, Scuvee-Moreau, Rive, & Dresse, 2003).

Moreover, participation in self-selected occupations may also support emotional well-being. Emotional well-being encompasses a person's emotional experience of their current situation and a sense of self (Wood et al., 2017). Yet, people living with dementia are at risk for experiencing prolonged negative emotional states. For instance, a person may experience a loss of identify and feelings of shame or inadequacy from social stigmas as dementia progresses (Swaffer, 2014). As a result, it is paramount to foster positive emotional experiences to support emotional well-being, which may be accomplished through participation in occupations of a person's choosing. When a person chooses to participate in an occupation, they may experience a sense of autonomy, identity, competence, and mastery (Laliberte Rudman, Cook, & Polatajko, 1997; Wilcock, 1999). Also, participating in occupations may unite people with shared intentions (Ramugondo & Kronenberg, 2015) and "create common associated experiences" (Aldrich & Aldrich, 2018, p. 343). These experiences may instill a sense of belonging and connect a person to their community, culture, and society (Cutchin, Dickie, & Humphry, 2017; Laliberte Rudman & Aldrich, 2017). Therefore, opportunities to participate in valued occupations can be vital to emotional well-being.

Occupations involving horsemanship activities, including riding and gardening may be valuable and meaningful to people living with dementia. Particularly, occupations with horses and gardens may support emotional well-being by immersing a person in the present moment (Fields et al., 2019; Smith-carrier et al., 2019), creating positive emotional experiences (Fields et al., 2018; Hall et al., 2018; Jarrott et al., 2002), and fostering personal identity (Fields et al., 2019; Noone et al., 2018). Occupations involving horses and gardens may also provide chances to socialize and contribute to others (Fields et al., 2018; Smith-Carrier et al., 2019). For instance, gardening may involve creating a tangible product (Jarrott et al., 2002), while occupations with horses may lend chances to contribute to the care of a horse. Furthermore, participation in horse-related occupations and gardening may support a person's ability to function through use of their retained capacities. For example, a person may use their cognitive capacities as they follow directions to plant a seed, or brush a horse, or engage in physical activity when weeding or riding as they interact with others (Fields et al., 2018; Han et al., 2018; Jarrott, 2002; Scott, 2005). In sum, participating in occupations involving horses and gardens may be meaningful to people with dementia and holds potential to support their QoL.

Exploring QoL for people living with dementia through an environmental perspective can be helpful in the scientific advancement of adaptive riding and adaptive gardening. Particularly, an environmental perspective can guide a rich description of how the environmental elements present within these interventions may shape a person's immediate experience of QoL. This rich description can be very useful during the development and piloting phases of a complex intervention. Specifically, understanding whether or not the environmental elements and components of an intervention are supporting participants' QoL can inform refinements prior to a full-scale evaluation (see Craig et al., 2013; Moore et al., 2015). Therefore, an environmental perspective provides the descriptive capacity needed to scientifically advance both interventions during their development and piloting phases. In addition to an environmental perspective, my research approach was grounded in pragmatism.

Applying the Philosophy of Pragmatism

Pragmatism is a philosophy that emphasizes the evolving nature of knowledge with a need to solve everyday problems (Morgan, 2014). For instance, pragmatist John Dewey viewed knowledge as continually evolving, where a person tests their beliefs through their actions. In fact, Dewey viewed inquiry as a form of human experience where actions were the result of inquiry. Using this perspective, inquiry begins with the recognition of a problematic situation. Here, the researcher considers why it matters to define a research problem in one way versus another. Then, the researcher creates a potential line of action to address the problem. Next, the researcher weighs the potential line of action in relation to its consequences, and takes the course of action they feel best addresses the problematic situation. Here, a researcher's beliefs about how to best address a problem is informed by previous actions and may involve established research on a topic. Consequently, the researcher selects the methods that will best address their research problem and may include the use of mixed methods (Shank, 2013), which I applied in this dissertation.

For instance, after reflecting on previous research, I utilized mixed methods in study one to provide a more comprehensive description of the adaptive riding intervention. In fact, a mixed methods approach is recommended by the Medical Research Council during the development and piloting phases of a complex intervention to better understand what the intervention is and how it works (Craig et al., 2008; Moore et al., 2015). Additionally, my choice of quantitative methods during study two was rooted in my desire to explore quantifiable similarities and differences between the two interventions. Therefore, applying the philosophy of pragmatism afforded the flexibility to use mixed methods, but also the ability to evolve the focus of my research questions and methods as my knowledge of the two interventions changed.

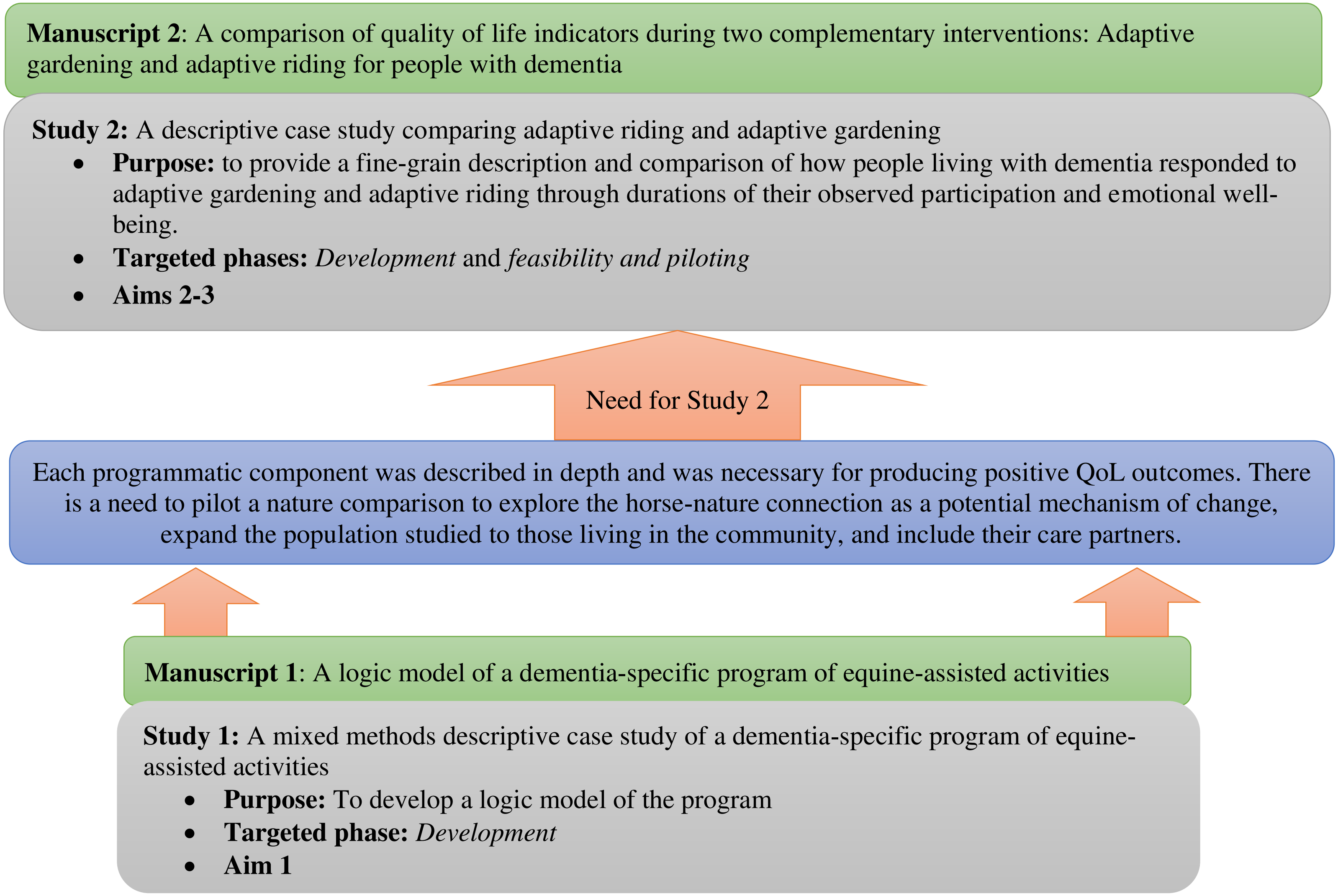
Positionality and Reflexivity

In congruence with a pragmatic perspective, my life experiences and beliefs inform my positionality and reflexivity. Positionality involves a researcher acknowledging their social and ideological positions in relation to their research; whereas, reflexivity describes a researcher’s critical reflection on how these positions may influence their research (Glesne, 2016). My social roles as an occupational therapy practitioner, former horse owner, and nature enthusiast were shaped from my previous experiences. For instance, occupations with horses and nature were a means to improve my life in adolescence and adulthood. Furthermore, as an occupational therapy practitioner, I’ve witnessed how occupation-based interventions with horses and gardens can improve the lives of children and adolescents with a variety of needs. In addition, my previous positive experiences with horses and gardens influenced my interest in addressing scientific advancement of adaptive riding and adaptive gardening for people living with dementia. These experiences shaped several beliefs that undergird my research. First, I believe that humans are intrinsically driven to participate in occupations; second, horses and gardens can offer opportunities to engage in occupations that may be meaningful; and third, the occupations present within a natural environment, such as a barn or garden, have the potential to enhance QoL for people living with dementia.

While I believe people living with dementia can benefit from adaptive riding and adaptive gardening, I have an extensive background with horses and minimal experience with gardens. To offset my lack of experience in study two, I partnered with a gardening educator to develop and implement adaptive gardening to provide a credible comparison to adaptive riding. Here, I also struggled with my passion for horses and often reflected on how this passion may have influenced the adaptive gardening intervention. This prompted me to discuss my concerns regarding the comparability of both interventions with my doctoral advisor as they arose.

Structure of the Dissertation

This dissertation is comprised of five chapters. Chapter one introduces my dissertation and orients you to its structure. Chapters two and three contain two manuscripts resulting from two studies. Manuscript one and was published in the *Human-Animal Interaction Bulletin*, manuscript two was published in *Complementary Therapies in Medicine*. Figure 2 illustrates how the first study informs the second and my rationale for the inclusion of both studies in my dissertation. Specifically, the logic model of the adaptive riding intervention developed in study one identifies the need for study two. That is, there is a need to pilot a nature comparison condition for the adaptive riding intervention to explore the horse-nature connection as a potential mechanism of change. Also, there is a need to expand the population studied in the adaptive riding intervention to include people in the early stages of dementia living in the community, and to involve their care partners. Next, chapter four outlines how both studies contributed to the scientific advancement of the adaptive riding and adaptive gardening interventions and how they may inform the development of other nature-based interventions for people living with dementia. In chapter five, I reflect on my dissertation research in relation to occupational science and rehabilitation science, the two sciences comprising my doctoral program, then I conclude by reflecting on my journey from a Ph.D. student to a scholar.



Manuscript 2: A comparison of quality of life indicators during two complementary interventions: Adaptive gardening and adaptive riding for people with dementia

Study 2: A descriptive case study comparing adaptive riding and adaptive gardening

- **Purpose:** to provide a fine-grain description and comparison of how people living with dementia responded to adaptive gardening and adaptive riding through durations of their observed participation and emotional well-being.
- **Targeted phases:** *Development* and *feasibility and piloting*
- **Aims 2-3**

Each programmatic component was described in depth and was necessary for producing positive QoL outcomes. There is a need to pilot a nature comparison to explore the horse-nature connection as a potential mechanism of change, expand the population studied to those living in the community, and include their care partners.

Manuscript 1: A logic model of a dementia-specific program of equine-assisted activities

Study 1: A mixed methods descriptive case study of a dementia-specific program of equine-assisted activities

- **Purpose:** To develop a logic model of the program
- **Targeted phase:** *Development*
- **Aim 1**

Figure 2. Relationship of Study One to Study Two

CHAPTER TWO: A LOGIC MODEL OF A DEMENTIA-SPECIFIC PROGRAM OF EQUINE-ASSISTED ACTIVITIES[1]

The study reported herein sought to advance the scientific basis and replication of an innovative multifaceted program of equine-assisted activities for older adults with Alzheimer's disease and related dementias. This program was designed to enhance the quality of life (QoL) of older adults with dementia. Preliminary proof of concept that the program was associated with participants' improved QoL has been established (Fields, Bruemmer, Gloeckner, & Wood, 2018). The program constitutes a type of animal-assisted intervention (AAI). AAI is a broadly used term that describes the integration of various species of animals to help benefit human health and well-being (American Veterinary Medical Association, 2018).

AAIs incorporating birds, cats, dogs, fish, and horses have emerged for people with dementia over the past 20 years. Some of these AAIs have also shown promise for enhancing outcomes in persons with dementia related to their emotional experiences and mood, social interactions, and physical activities (Wood, Fields, Rose, & Mclure, 2017; Yakimicki, Edwards, Richards, & Beck, 2018). Although studies of AAIs that incorporate horses with this population are sparse, researchers have reported improved outcomes in mood and other dementia-specific indicators of QoL such as communication and participation in activities (Dabelko-Schoeny et al., 2014; Fields et al., 2018; Fields, Wood, & Lassell, 2019). Fields et al., (2019) previously studied the program that is the focus of this paper, which they described as comprising a *complex intervention*.

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[1] From "A logic model of a dementia-specific program of equine-assisted activities," by R. Lassell., B. Fields, S. Busselman., T, Hempel, & W. Wood, *Human-Animal Interaction Bulletin*, 9(2). Copy right 2019 by the Human-Animal Interaction Bulletin. Reprinted with permission.

While no exact line distinguishes simple from complex interventions, complex interventions are characterized by several distinctive elements (Craig et al., 2013). For instance, some elements of complexity pertain to the existence of multiple interacting components as the intervention is being implemented. Other elements pertain to the high degrees of flexibility, tailoring, and skilled behavior that are required of providers to ensure that they deliver an intervention safely and effectively. Still other elements of complexity pertain to the range and sophistication of the measured outcomes of an intervention. In the early scientific development of a complex intervention, the Medical Research Council recommended that researchers describe the intervention's interacting components and model its processes and outcomes onto a logic model (Craig et al., 2013; Moore et al., 2015).

Simply described, a *logic model* visually displays the logic of an intervention by identifying its salient elements and interconnecting its key activities and desired outcomes, among other programmatic components such as guiding assumptions and resources (Mclaughlin & Jordan, 2004; WK Kellogg Foundation, 2004). Logic models are especially useful in describing the elements and processes of complex interventions in the health sciences (Moore et al., 2015). Specific to older adults, for instance, health professionals and researchers have developed logic models of an elder abuse forensic center (Navarro, Wilber, Yonashiro, & Homeier, 2010), of recommended practices for integrating mental health services within chronic disease prevention and health promotion programs (Lando, Williams, Williams & Sturgis, 2006), and of a community-based program for recruiting volunteers among older urban African Americans (Chadiha et al., 2011). Logic models such as these function as guiding scientific and practice-based frameworks that help to describe, replicate, and refine promising complex interventions (Lando et al., 2006). Elucidating the logic model of a complex intervention is also foundational to subsequent assessment of the intervention's efficacy and effectiveness (Moore et al., 2014).

The literature on AAIs for people with dementia shows intermittent attention to prevalent components of logic models; especially, the assumptions, inputs, activities, outputs, and outcomes of an intervention (WK Kellogg Foundation, 2004). *Assumptions* in a logic model encompass the beliefs, ideas, and principles that define how and why an intervention is thought to change or benefit people and the community to accomplish its purpose. Related to assumptions, for example, it has been presumed that horses are therapeutic because of their social, non-judgmental, and vulnerable nature, and their abilities to be in-tune with their environments (Burgon, 2011; Karol, 2007; Porter-Wenzloff, 2007). *Input*s are the financial, human, organizational, and community resources required to implement an AAI and support the quality of its implementation (WK Kellogg Foundation, 2004). Related to inputs, Nordgren and Engström (2012) identified a flat-coated retriever, experienced nurse, and dog handler as resources needed to implement their study of a canine-assisted intervention. *Activities* encompass the processes, tools, events, technology, and actions that are integral to the implementation of an intervention (WK Kellogg Foundation, 2004). Related to activities, Dabelko-Schoeny et al. (2014) identified grooming activities that involved braiding, brushing, and combing the horse's hair their study of an equine-assisted therapy for people with dementia. *Outputs* are the direct products that the program provides to the participants, such as the size and scope of services or number of participants reached (e.g. number of residents, or dosage) (Mclaughlin & Jordan, 2004; WK Kellogg Foundation, 2004). Related to outputs, Olsen et al. (2016) indicated that their canine-assisted intervention consisted of 30-minute weekly sessions that were provided over 12 weeks to 41 participants. *Outcomes* refer to changes in the behavior, knowledge, skills, status, or levels of functioning of participants in a program (WK Kellogg Foundation, 2004). Improved engagement during activities of daily living and decreased depression and apathy have been identified as outcomes for older adults with dementia who were involved in a canine-assisted intervention (Friedmann et al., 2015).

The above-described areas of attention suggest that researchers have elucidated aspects of AAIs that correspond with specific components of a logic model. At the same time, studies of AAIs often lack comprehensive descriptions of *what* comprises their respective interventions and *how* they are thought to work (Wood et al., 2017); these gaps pose challenges for subsequent replication and further scientific development (see Moore et al., 2014). To our knowledge, moreover, no research-based logic model has been published of an AAI for people with dementia. Hence the purpose of this study was to develop a logic model describing a promising program of equine-assisted activities for members of this population. By developing this logic model, we hope to provide an empirical basis upon which the program can be replicated across multiple research and practice contexts and also further developed scientifically. We asked these questions:

1. What was the purpose of the dementia-specific program of equine-assisted activities and on what assumptions was it based?
2. What resources facilitated implementation of the program?
3. What occupational opportunities (activities) were offered during the program?
4. What were the program’s outputs?
5. What were the outcomes of the program in relation to each occupational opportunity?

Methods

Design

We conducted a descriptive, secondary analysis of data from a mixed methods study, herein referred to as the parent study; this study examined the influence of the program of equine-assisted activities on the QoL of older adults with dementia (Busselman, Wood, Hooper, & Bruemmer, 2017; Fields et al., 2018, 2019). A secondary analysis involves analyzing previously collected data for a purpose different from the original study (Cheng & Phillips, 2014). For our secondary analysis, we used previously collected qualitative and quantitative data from the parent study to richly describe the equine-assisted activities program using a logic model framework. A mixed methods approach is often situated in the philosophy of pragmatism (Creswell & Plano, 2017). Pragmatists find truth in solving practical problems to best answer their research questions, substantiating the use of a wide range of research methods (Cherryholmes, 1992; Huber, 1973; Shaw, Connelly, & Zecevic, 2010). Guided by this philosophy, we sought to bridge the divide between research and community-based AAIs by using a logic model to describe the program in order to guide future refinement and replication in other contexts.

Setting and Sample

The parent study was conducted at two sites that included a PATH Intl. certified therapeutic riding center and a long-term care (LTC) facility. Research participants in the parent study were purposively recruited and included direct service providers and older adults with dementia. Providers had to meet two inclusion criteria: (a) a frontline provider or facility administrator and (b) history of in-depth involvement with the program. Two providers were from the LTC facility who regularly attended program sessions. The other three providers delivered the program of equine-assisted activities and held certifications in therapeutic riding from PATH Intl. Older adults with dementia had to meet the following inclusion criteria: (a) 45 years or older, (b) able to ambulate with minimal assistance from a caregiver (by walking or wheelchair), (c) stable regimen of medications (including psychotropic medications), (d) diagnosed with mild-moderate stage dementia (e) resident at a participating LTC facility for four weeks or longer prior to the study, (f) not allergic to horses, (g) English-speaking, and (h) interest in horses. Approval from the Institutional Review Board of Colorado State University was obtained. All participants and their legally authorized representatives provided informed consent.

Data Collection

Five direct service providers took part in individual interviews in the parent study. These interviews were semi-structured, ranged from 30-60 minutes, and were audio-recorded and transcribed. Interview data were collected to learn about providers' perceptions of positive and negative influences of the program on the QoL of older adults with dementia. Research team members recorded field notes after each session to describe what occurred. In addition to the interview and field note data, four older adults with dementia were videotaped during the program. These older adults had been selected for videotaping because they evidenced a range of dementia severity from mild to moderate. Videotaped data were collected for the purpose of documenting QoL outcomes for the older adults with dementia. Videotaping occurred across four sessions, resulting in 16 hours of video data.

Data Analysis and Trustworthiness

To answer research questions one through four, we uploaded the previously collected interviews and field notes into NVivo (www.qsrinternational.com/nvivo/home), a qualitative data analysis software. For secondary analysis of these data, we then used the method of directed content analysis. Content analysis is considered a basic form of qualitative description, providing the facts of an event and the meaning attributed to the event by participants in "everyday language" (Sandelowski, 2000, p. 336). Content analysis differs from other qualitative methods in that it is pragmatically informed by an existing body of knowledge on a topic or event and the experiences of the research team, versus phenomenological and hermeneutical traditions (Neergaard, Olesen, Andersen, & Sondergaard, 2009). Further, content analysis allows for the subjective interpretation of text using a "systematic classification process of coding" to help identify themes (Hsieh & Shannon, 2005, p. 1278). When using *directed content analysis*, researchers apply a deductive approach to incorporate qualitative codes established in previous research in order to more thoroughly describe an event. We created a priori parent codes that corresponded to each component of a logic model defined in this paper's introduction (i.e., purpose and assumptions, inputs, activities, and outputs). We then mapped data from the parent study onto these codes, while also developing and applying relevant sub-codes. For example, the code, *Assumptions,* contained the subcodes horse and nature connection, social participation, and holistic experience. (Supplementary materials Table 9 contain names and definitions of all codes and sub codes).

We used the strategies of triangulation, peer-debriefing, and negative case analysis to ensure trustworthiness of findings resulting from this secondary analysis (Savin-Baden and Major, 2013). Triangulation consisted of revisiting interviews and field notes to ensure consistency with emerging logic model findings. Weekly peer-debriefings were held among researchers to reach consensus and ensure consistent interpretation of the data. Finally, we conducted negative case analysis to search for any conflicting accounts of the program evident in the interview and field note data.

To answer research question five, we uploaded videotape data into Noldus Observer XT 13 (www.noldus.com), a behavioral analysis software. We selected eight hour-long videotapes for secondary analysis because they had been previously coded for dementia-specific indicators of QoL using a direct observational measure, the Activity in Context and Time (ACT) (Wood, 2005). Table 1 presents these codes and definitions. These indicators of QoL reflected the actual activities of participants during the program and their concomitant expressed affect.

Table 1.

Parent Study Codes and Definitions using the Modified Activity in Context in Time

Domain: Sub domain	Code	Definition	Indicator Category
Time Use: Gaze	Engaged gaze	Sustained intentional scanning, watching, or visually orientating to some person, event, object or physical environmental attribute in the absence of agitation or distress.	Positive
	Unengaged gaze	No evidence of attention to something in environment; eyes can be open.	Negative
	Eyes closed	Eyes are closed.	Negative
Time Use: Position and Movement	Sitting	In a seated position.	Neutral
	Stairs	Ambulating up or down stairs.	Positive
	Standing	Standing in an upright position.	Positive
	Walking	Ambulating across an area (regardless of assistance or ambulation device). Participant must be continuously walking with less than a five second pause to be coded as walking.	Positive
	Sitting on horse	Seated on a saddled horse, regardless of whether the horse is moving or not.	Neutral
	Lying down	Reclined or lying down.	Negative
Time Use: Communication	Yes communication	Any active exchange of information that is either verbal or nonverbal, that can include physical contact, physical	Positive

		gestures, spoken language, or turn taking.	
	No communication	There is no evidence of an exchange of information.	Neutral
Time Use: Participation	Yes Participation	Active sustained engagement in activities that are appealing or acceptable to an individual and not externally coerced or driven.	Positive
	Modifier: Put on or take off helmet	Putting on or taking off riding helmet or hat; participation in putting helmet on is complete when the chin strap is closed and the helmet is adjusted	Positive
	Modifier: Ride the horse	Riding the horse inside or outside, can be sitting on the horse, but does not include mounting. Includes games, the sensory trail, and obstacle courses such as weaving in and out of cones or walking over ground poles.	Positive
	Modifier: Mount or dismount	Process of getting off the horse that begins when the participant is physically touching the horse or tack with intent to get on the horse. Mounting ends when the horse begins to move forward out of the mounting block. Dismounting begins when the participant begins to swing their leg or move off of the horse. Dismounting ends when the participant has two feet on the ground.	Positive
	Modifier: Pet	Using hands or arms to stroke the horse (not using any type of equipment such as a brush). Activity beings when the participant touches the horse and ends when the series of stroking the horse has ended.	Positive
	Modifier: Groom	Grooming the horse with some type of equipment (i.e. brush); activity begins when participant touches horse with a brush and ends when the series of brush strokes has ended.	Positive
	No Participation	Absence of participation in activity.	Neutral
Apparent Affect	Anger	Clenching teeth, grimacing, shouting, yelling, cursing, berating, pushing, physical aggression or implied aggression such as fist shaking, pursed lips, narrowed eyes, or knit brow.	Negative

	Anxiety/Fear	Furrowed brow, motoric restlessness, repeated or agitated movement, facial expression of fear or worry, withdrawal from other, tremor, tight facial muscles, calls repetitively, hand wringing, leg jiggling, or eyes wide.	Negative
	Interest	Eyes following object, intent fixation on object or person, visual scanning, facial, motoric, or verbal feedback to other, eye contact maintained, body or vocal response to music, turn body or move toward person or object.	Positive
	Pleasure	Smiling, laughing, stroking, touching with “approach” manner, nodding, singing, arm or hand outreaching, open-arm gesture clapping, any signs of warmth or affection towards a person or horse.	Positive
	Sadness/Depression	Cry, tears, sigh, mouth turned down at corners, eyes/head turned down and face expressionless, wiping eyes.	Negative
	No Apparent Affect	No movement of eyes, face, or body.	Negative
Agitation			
	Yes Agitation	Inappropriate verbal, vocal, or motor activity that is not judged by the outside observer to result directly from needs or confusion of the individual; agitated behaviors are always socially inappropriate and can manifest as 1) abuse or aggression towards others, 2) appropriate behavior performed with inappropriate frequency, or 3) inappropriate according to social standards for the specific situation (most frequently manifestations are restlessness, pacing, complaining, repetitive sentences or questions, negativism, constant requests for attention, and cursing or verbal expression).	Negative
	No Agitation	Absence of agitation behaviors.	Positive
Missed observations	Missed observation	Occurred anytime a participant was blocked from view for more than ten seconds and could apply to any code.	Neutral

Note. Gaze and participation definitions were based on Wood's (2005) definitions. Apparent Affect definitions were based on Lawton, Van Haitsma, and Klapper's (1996) and Lawton, Van Haitsma, and Perkinson's (2000). Definitions of agitation were based on Cohen-Mansfield, Marx, and Rosenthal (1989).

Our secondary analysis of these videotapes involved coding them for occupational opportunities. As defined for the purpose of this coding, *occupational opportunities* encompassed the options that were offered to participants to engage in specific activities throughout each session of the program (Wendy Wood, Lampe, et al., 2017). To honor participants' preferences for activities, staff and volunteers always presented these opportunities as options rather than as requirements or expectations. Codes for occupational opportunities were created through an iterative process of watching videotape data, generating initial codes, modifying these codes, creating new ones, and reaching consensus on all existing codes until we met saturation. Table 2 illustrates these codes and definitions. We used a continuous sampling approach in Noldus, where one occupational opportunity code was assigned for every second of time (see Noldus Information Technology, 2016). An occupational opportunity began when it was offered to a participant with dementia and ended when it was no longer available. For example, we started coding the opportunity of petting when a handler led a pony within reach of a participant with dementia and ended when the pony was no longer within reach. Researchers coded missed observation if a participant with dementia was blocked from view.

The nesting function in Noldus allows researchers to merge data from two separate coding strands of the same video with the option of inserting one coding strand within another (Noldus Information Technology, 2016). Hence, after completing coding for occupational opportunities, we used the nesting function in Noldus to merge previously coded indicators of QoL within the coded occupational opportunities. We used this nesting function to document

Table 2.

Secondary Data Analysis: Occupational Opportunity Codes and Definitions

Code	Definition
Grooming	The opportunity to groom a horse began when a participant (who was not mounted on a horse) was within reaching distance of a horse and grooming tools were available for use. Grooming the horse ended when the participant no longer had a grooming tool in his or her hand and began walking away from the horse.
Observing	Observing was defined solely by the fact that participants were sitting on the bench or in a chair, facing the activities that were ongoing. Hence observing offered opportunities to watch horses and people involved in the program, and to survey many and oftentimes dynamically interacting elements of its equine environment.
Petting	The opportunity to pet a horse began when a horse was within reaching distance of a participant (who was not mounted on a horse) and there were no physical barriers hindering the participant from petting the horse. The opportunity ended when the horse was no longer within reaching distance of the participant.
Riding	The opportunity to ride a horse began when a participant was standing on the mounting platform and the horse began walking between the blocks towards the rider. The rider would then be assisted by program volunteers and staff to mount the horse. Riding included games such as cones, obstacle courses, walking over poles, reaching for rings or a toy, etc. This opportunity ended when the participant had dismounted, defined as having both feet on the ground, and began walking away from the horse.
Transitions	The opportunity of transitions began when a participant ended an occupational opportunity by walking to the next one. This opportunity included chances to put on or take off a helmet, which were previously coded as participation. Transitions ended when the participant entered a different occupational opportunity.

Note. Each occupational opportunity was unique and mutually exclusive, meaning that one occupational opportunity could be assigned at a time. Transitions were not a program activity, however, in order to capture every moment of time, transitions were coded to cover the amount of time traveling between activities

how proffered occupational opportunities (e.g., the opportunity to ride the horse) did or did not overlap with participants' actual activities in response to the opportunities (e.g., actually mounting and riding the horse versus walking away from the horse). We then used the analysis function in Noldus to generate frequencies and durations of each occupational opportunity and its corresponding indicators of QoL across all program sessions. Percentages of each code for the total program duration were calculated using a formula in Excel and were then mapped onto the logic model. For example, the most prevalent identified occupational opportunity, observing, offered older adults' opportunities to talk with people and also to watch horses and people interact before or after their own opportunities to interact with a horse. This opportunity accounted for 54% of the total duration of the program. During observing, participants demonstrated an engaged gaze (i.e., a positive indicator of QoL) 93% of the time; we then mapped these findings onto the logic model.

To ensure trustworthiness of this coding process, two researchers underwent extensive training in Noldus. Inter-coder reliability was calculated based on two hours of all videotaped data, or 20%. A kappa coefficient of 0.82 was achieved indicating nearly perfect agreement (Viera & Garrett, 2005). Two subsequent checks for drift reliability were also completed among the secondary-analysis study team.

Results

Findings from our secondary data analysis are mapped onto the logic model framework (Figure 3) and described in the subsequent sections.

Purpose and Assumptions

The stated purpose of the dementia-specific program of equine-assisted activities was to improve the QoL of people with Alzheimer's disease and related dementias. Consistent with this purpose, providers hypothesized that specific qualities of the program favorably influenced older adults' QoL. Namely, providers posed that shared activities among older adults and horses fostered social connections and participation. Grooming, for instance, created opportunities for older adults to get to know a volunteer on a one-on-one basis and also to become acquainted

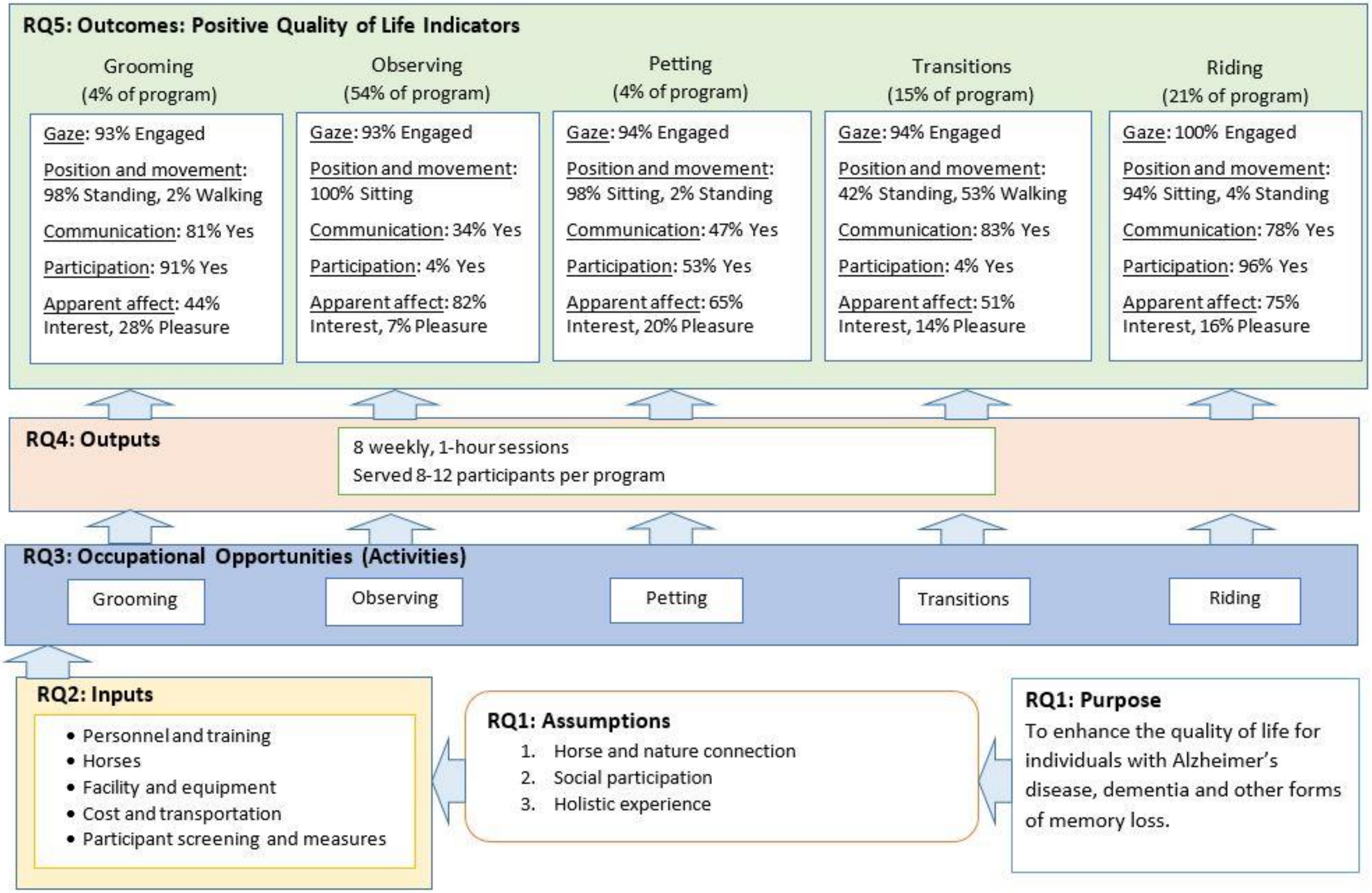

Figure 3. Logic Model of a Dementia-specific Program of Equine-assisted Activities. No negative quality of life indicators were observed. Percentages in each category do not add up to 100% due to missed observations.

with a horse. Additionally, providers reported that horses evoked rich sensory experiences and the natural setting of the therapeutic riding center rekindled prior positive memories of horses and nature, helping to uplift older adults' emotions. Furthermore, providers believed that experiences of the program as a whole enhanced older adults' QoL. For instance, many components of the program synergistically gave rise to simultaneous positive experiences for participants, such as connecting with a horse, re-living previous memories in nature, socializing, and being physically active.

Inputs

Personnel and training. The Director of Special Activities at the therapeutic riding center was responsible for managing the program, overseeing paperwork, and establishing and maintaining collaborative partnerships between the therapeutic riding center and participating LTC facilities. This role involved visiting each LTC facility in which older adults in the program lived, learning about the facility's care approach, and addressing any miscommunication or conflict that arose. Two therapeutic riding instructors certified by the Professional Association of Therapeutic Horsemanship, International (PATH Intl.) led the program and were assisted by volunteers. Volunteers generally held a 3:1 ratio with older adults for riding activities and a 1:1 ratio for ground activities including grooming and observing. All activities occurred concurrently where volunteers and therapeutic riding instructors presented opportunities to participate in activities to each participant throughout the duration of the program. Riding was selectively presented to older adults who had been cleared by their physician. A therapeutic riding instructor directed riding activities while two side-walkers and a horse leader accompanied the older adults. Groundwork activities, such as petting and grooming, were facilitated by a volunteer. Specific training was provided to volunteers for the roles of barn-worker, horse-leader, and side-walker. Volunteer responsibilities included program set-up and implementation. For example, volunteers arranged seating in the arena and gathered equipment prior to each session. Volunteers implemented the program by interacting with the older adults and adhering to safety procedures, such as helping the older adults' put-on riding helmets.

Horses. In accordance with the standards of PATH Intl. (www.pathintl.org/quick-links/standards-manual), all horses utilized in the program underwent a rigorous screening and training process. Therapeutic riding instructors selected horses to deliver the program based on (a) narrow to normal width, (b) slow and steady movement, (c) tolerance for imbalanced riders, and (d) comfort being surrounded by four to five people. Horses with a narrow to normal width were chosen as a precaution for older adults' hips. Three horses and one pony participated in the program. All were mares with the following ages and breeds: a 14-year-old Spanish Barb/Quarter Horse, 18-year-old Halfinger, 21-year-old Appaloosa, and a 15-year-old Shetland/Welsh pony.

Facility and equipment. The program occurred at a premier accredited therapeutic riding facility, the highest level of accreditation possible through PATH Intl. A PATH Intl. certification requires the facility to uphold industry standards for safety and administration of equine-assisted activities. The therapeutic riding center is located on the outskirts of the Rocky Mountains in Loveland, Colorado with scenic views of the foothills. Resources utilized during the program included an indoor arena, handicap accessible mounting ramp, and an outdoor sensory trail. Materials for groundwork included benches and chairs facing the ongoing activities. Grooming equipment involved a hitching post for the horses, standard halters, lead ropes, and grooming buckets with two to four brushes each. Equipment and tack utilized during riding included a standard riding helmet, western saddles, saddle pads, bridles, and, in some cases, colored reins clipped to a halter. Materials for games during riding included colored rings, cones, ground poles, basketball hoop, and a ring tree. The outdoor sensory trail, located at the base of the foothills of the Colorado Rockies, included wooden logs, ground poles, jump standards, barrels, and a bridge.

Cost and transportation. Cost of the program included administration fees for participant screenings, meetings, volunteer and staff trainings, as well as the cost of each session. Costs were based on program frequency and duration in accordance with each LTC facility's needs. Most commonly, a LTC facility would enroll in a four-week program with hour-long sessions. However, some LTC facilities attended weekly sessions, spanning eight weeks. LTC facilities were responsible for transporting older adults via bus.

Participant screening and measures. To begin the program's screening process, a participant's healthcare proxy was required to complete an enrollment packet that included a physician's consent (see Appendix A). The enrollment packet contained background information on the participant's history with horses as well as a list of contraindications involving medical conditions that would deem them unsafe to participate in the program, such as a spinal cord injury. Once older adults passed the initial screening process, riding instructors traveled to the LTC facility to complete an in-person evaluation of each potential participant. The screening involved wearing a riding helmet and sitting on a barrel to assess the older adults' hip flexibility. Riding instructors determined whether the older adult was able to ride comfortably, and assessed their ability to follow directions, respond to cues, and safely mount and dismount. During this screening, staff looked to see if the older adult was interested in participating in the program and if they demonstrated signs of distress, pain, agitation, or potentially dangerous behaviors to help determine if the older adult was appropriate for the program. Furthermore, riding instructors began to formulate which program activities would best suit each participant. Staff from the LTC facility such as nurses and therapists were encouraged to attend the screening to answer questions related to older adults' health and functional abilities. Upon passing both screening phases, older adults were officially enrolled as participants in the program. Currently, therapeutic riding instructors do not utilize a standardized outcome measure to document outcomes of the program.

Occupational Opportunities

Ground experiences. Four distinct occupational opportunities to interact with horses on the ground were offered to participants: observing, grooming, petting, and transitioning from one activity to another. During the opportunity for observing, participants sat in a chair with a back or on a bench, facing the ongoing activities in the indoor arena. Observing involved opportunities to socialize with volunteers or other participants, watch the horses and ongoing activities of the program, and survey the equine environment in which the program occurred. Volunteers and staff in the program also presented participants with opportunities to groom, pet, and ride a horse. If a participant expressed interest in any of these opportunities, a volunteer would assist them in putting on a helmet prior to participating. Grooming involved opportunities to brush a horse, comb a horse's mane, and become acquainted with the horse and volunteers. During this opportunity, volunteers and program staff helped participants successfully sequence and complete grooming tasks by offering simple steps and tactile cues. For example, a staff member would guide a participant's hand to brush the horse's neck. The opportunity to pet a horse or pony was presented while participants were seated on the bench. Staff led a miniature pony to participants, providing the opportunity to engage in petting. Petting created opportunities for conversations with staff, volunteers, the horse or pony, and other older adults. Transitions occurred when volunteers escorted participants from one activity to the next.

Riding experiences. Two providers described riding as the most challenging activity, posing the highest risk. Offering the opportunity to ride involved having a therapeutic riding instructor accompany participants onto the mounting platform and the horse into the mounting area. If participants chose to ride, then two therapeutic riding instructors on either side of the ramp would assist them to mount the horse. Once the participant mounted the horse, the horse was led out of the mounting platform. The horse leader checked the participant's weight distribution and guided the instructors to adjust the stirrups if necessary. Next, two side-walkers accompanied the participant on either side of the horse, to ensure safety during riding activities. The horse leader and the side-walkers instructed the participant on riding techniques such as steering with reins and giving the horse verbal commands such as "walk." Riding included games involving upper body exercises, steering around cones and barrels, throwing balls into a basketball hoop, placing rings on a ring tree, and riding over ground poles. Typically, five of 12 participants, who had been cleared by their physician, chose to ride each session. Riding lasted roughly 15 minutes to avoid fatigue and began in an indoor arena, and weather permitting, included riding outside over obstacles on the sensory trail. Therapeutic riding instructors assisted participants in dismounting using either a crest or croup technique as described in the PATH Intl. riding instructor manual (www.pathintl.org/images/pdf/resources/Evaluator%20 Update%20pdfs/Riding-on-site-Workshop-Manual.pdf).

Outputs

Outputs of the program included eight-weekly sessions, lasting approximately one hour. All four older adults who participated in the video observations attended the entirety of each of the four video-taped sessions. Furthermore, videotape data aligned with providers' reports of serving 8-12 participants per program. The program began by serving one local LTC facility. Currently, the program collaborates with four local care agencies, ranging from LTC to adult day programs for people with dementia and is offered in the spring, summer, and fall seasons.

Outcomes

All occupational opportunities were associated with high levels of positive and neutral QoL indicators pertaining to time use (gaze, position and movement, communication, participation) and apparent affect and agitation (Figure 3). No negative QoL indicators were observed at any time throughout the program. Therefore, each occupational opportunity supported older adults' QoL, demonstrating congruence with the purpose of the program.

With respect to opportunities provided on the ground, observing was most pervasively offered in the program and also associated with the highest frequencies of an observed positive affect of interest. Thus, while not actually interacting with horses during the opportunity called observing, older adults watched and showed interest in various activities going on around them while sitting on the bench. Opportunities to groom a horse, pet a horse, or transition from one activity to another were offered for much shorter durations than opportunities for observing. Yet these opportunities were also distinctively linked with particular positive QoL indicators. Namely, the opportunity to groom a horse was related to the greatest proportions of time that participants spent standing and communicating with the horse or volunteers, the second greatest proportion of time spent participating in the offered opportunity (grooming), and the greatest frequencies of an observed positive affect of pleasure. Therefore, grooming supported indicators of QoL related to an uplifted emotional state, communication, and the use of participants' physical capacities. Grooming seemed to offer opportunities for more complex engagements than petting and observing, in that participants often simultaneously groomed and talked to their horses while also conversing with other nearby people. The opportunity to pet a horse was linked to the second greatest levels of the observed affect of pleasure. Petting was accessible to all older adults with varying physical abilities and occurred while older adults were seated. Like grooming, petting demonstrated variances in positive and neutral QoL indicators, such as an uplifted emotional state, communication, and participation in a short period of time. Lastly, the opportunity to transition from one activity to another was linked to the greatest proportions of time that older adults spent walking and communicating with people and horses. The opportunity to ride a horse was the second most pervasively offered opportunity. Three of the four older adults who were video-taped during the program had previously been cleared for riding, all of whom chose to ride once given the opportunity. This opportunity was associated with the greatest proportions of time that older adults spent with an engaged gaze and actively participated in all the opportunities offered; namely, mounting a horse, riding the horse while oftentimes doing various other activities such as games or obstacle courses, and dismounting a horse. Riding was also linked to large proportions of time spent communicating with the horse, therapeutic riding instructor, and horse handlers. This opportunity offered the longest bouts of time where older adults were observed to engage in more complexly layered activities simultaneously. For example, older adults were observed to communicate with staff and the horse, while demonstrating an engaged gaze, and following directions to participate in riding, such as steering the horse around cones.

Discussion

Findings from this study align with the Medical Research Council's recommendation that researchers describe an intervention's interacting components and model its processes and outcomes onto a logic model in the early phases of scientific development (Craig et al., 2013; Moore et al., 2015). As next developed, the logic model resulting from this study depicts *what* comprised the purpose, assumptions, programmatic activities, and outcomes of the program of equine-assisted activities for older adults with dementia; it illustrates congruent linkages across these components; and it suggests a foundational understanding of *why* and *how* the program worked. For these reasons, the logic model can serve as a guiding framework to replicate and refine the program across multiple sites (see Moore et al., 2014). This research-based logic model can also help to justify further scientific investment in developing the program and clarify next research steps.

Creating the logic model allowed us to make providers' assumptions describing *why* the program worked explicit. Providers, who assumed that the many elements of the program synergistically contributed to the positive QoL experiences of participants, emphasized in particular connections with horses and nature and social participation as mechanisms of change. Much literature pertaining to AAIs support these assumptions. For example, investigators of AAIs have drawn from Wilson's biophillia hypothesis (Kellert & Wilson, 1993), which assumes that humans are hardwired to connect with animals and nature (Beck & Katcher, 2002; Beetz, 2017). Furthermore, being in nature has been connected with positive emotional states in older adults with dementia (Duggan, Blackman, Martyr, & Van Schaik, 2008) and linked to health (Kaplan, 1995; Kuo, 2015).

Providers in this study also credited the experience of getting to know a horse as enhancing the QoL of older adults who participated in the program, a presumption that aligns with the fairly widely expressed view that the horse-human bond can elicit positive outcomes (Burgon, 2011; Dell et al., 2011; Yorke, Adams, & Coady, 2008). Other researchers of AAIs have similarly assumed that interactions with animals can help to facilitate social connections, serve as a non-threatening topic of conversation (Hunt, Hart, & Gomulkiewicz, 1992; Wells, 2009), and provide social support (Gee, Mueller, & Curl, 2017). Providers in the current study also assumed that the sensory experience of engaging with a horse and nature favorably influenced positive outcomes of QoL. In like fashion, Dabelko-Schoeny et al. (2014) posed that the multi-sensory experience of being around a horse and a farm can contribute to positive outcomes in older adults with dementia.

The assumption of providers that many programmatic components as a whole helped to enhance participants' QoL was reflected in how they delivered programmatic activities. For example, the screening process allowed therapeutic riding instructors to collaborate with LTC staff to select older adults who were interested and able to safely participate in the program. The different roles of personnel (e.g. therapeutic riding instructor, side-walker), their respective training processes (e.g. staff training on dementia care) and availability of different types of equipment (e.g. mounting platform) were all needed to deliver the program safely. These inputs, which made it possible to deliver the occupational opportunities during the program and implement the entire program safely, collectively contributed to realizing the program's purpose of enhancing older adults' QoL.

Other examples of the holistic nature of the program pertained to the delivery of specific programmatic elements. To honor each participant's preferences and needs, providers offered a dynamic array of possible interactions with horses rather than prescribing a set of group activities. This method of offering opportunities is congruent with Kitwood's (1997) person-centered approach to dementia care, one in which caregivers honor each person's preferences by providing choices. Accordingly, because providers in the present study intentionally offered different ways to watch or engage with horses throughout the session, the resulting logic model emphasized *occupational opportunities* rather than *activities*, a common element in logic models (see W.K. Kellogg, 2004). Use of the term, occupational opportunity (Wood et al., 2017), in the model underscores the importance of providing possibilities for action. Detailed descriptions of *how* each occupational opportunity was implemented may also help to guide future replication and evaluation of the program. Wood et al., (2017) noted that AAI studies targeting older adults with dementia provide little description of the intervention and instead focuesd on outcomes, such as improved mood and decreased negative behaviors. The providers' description of each occupational opportunity in the present study may possibly serve as a template for elucidating the elements and implementation processes of other dementia-specific animal-assisted interventions, thereby addressing a crucial step in scientific development.

Lastly, the logic model that resulted from this study linked providers' assumptions about why the program worked with their programmatic activities and also associated indicators of QoL exhibited by participants in the program. Nested within each occupational opportunity, for instance, were the specific ways in which participants responded to the opportunities, showing that all five occupational opportunities had distinct value as gauged by participants' positive expressions of engagement, interest and pleasure. Hence, each occupational opportunity was shown to be distinct by variations in positive and neutral indicators of QoL among participants with varying levels of cognitive and physical abilities. For example, participants with more severe cognitive deficits were provided with simple directions and tactile cues during grooming, such as guiding their hands to brush the horse's neck. Participants with limited mobility were offered the occupational opportunity of petting a horse while seated on the bench.

Directions for Future Research

Findings from our logic model revealed several areas for future research. Namely, there are needs to explicate a more in-depth theory of change; investigate factors that pose risk to or protect program implementation and outcomes; examine fidelity of implementation and optimal dosages of the program; document short and long-term outcomes beyond the immediate experiences of participants during the program; and document the impact of the program on the local community.

Researchers should investigate the missing linkages of *how* providers' proposed mechanisms were active in producing outcomes of QoL during the program. Simplistic depictions of causal relationships are weaknesses associated with logic models (Rogers, 2008)—especially those created during the early phases of development. However, the Medical Research Council underscores the importance of first describing an intervention to determine *what* ingredients are present, identifying which ones are presumed to bring about change, prior to testing causal explanations (Craig et al., 2013; Moore et al., 2015). Therefore, the developed logic model can be refined to illustrate complex pathways to QoL outcomes through future causal testing to build a more in-depth theory of change (see Mclaughlin & Jordan, 2004; Moore et al., 2014).

We suggest a process evaluation as a next step for the future research of the program. A process evaluation guided by a logic model can help illuminate which ingredients are active and how they produce change within a complex intervention, building a more in-depth theory to drive future research (Moore et al., 2014). The Medical Research Council provides guidance on key components of a process evaluation framework (Moore et al., 2015). Relying on this guidance, we suggest these next research steps: (a) external factors that may protect or pose risk to participants' outcomes or the success or failure of the program in multiple contexts could be assessed through interviews of volunteers, therapeutic riding staff, family members and other care partners, among other stakeholders, and (b) the program's fidelity, or its quality and consistency in implementation, could be assessed using checklists of observed core components of the program. Assessment of fidelity would help to ensure that future replications of the program will be of a high quality. During replication of the program, researchers should also examine the program's fidelity, or its quality and consistency in which each occupational opportunity is implemented. Fidelity could be assessed using checklists of observed core components of the program (Steckler & Linnan, 2002). Assessment of fidelity would help to ensure that future replications of the program will be of a high quality and is crucial during a full-scale evaluation, such as a randomized controlled trial (see Moore et al., 2014).

Future research should examine dosage as a next step. The outputs of the program illustrated by the logic model, provide an understanding of the dosage, format of delivery, and the number of participants reached. The delivered product of eight weekly sessions to 8-12 participants delivered immediate outcomes of positive and neutral indicators of QoL. However, it is unknown what the most effective dosage and format of delivery (individual, small group, large group, etc.) of the program is, based upon a person's stage of dementia. This unknown is also reflected in the AAI literature with variances in dosage and delivery formats across participants with varying stages of dementia (see Yakimicki et al., 2018). For example, Thodberg et al. (2016) found that individual visits with a dog twice a week over six weeks increased pro-social behaviors for older adults with mild to severe dementia. In contrast, Olsen, Pedersen, Bergland, Enders-Slegers, and Ihlebæk's (2016) canine-assisted intervention delivered twice a week for 12 weeks in small group format (3-7 people) found significant improvements in QoL in older adults with severe dementia, but not for those in the mild to moderate stages. Hence, more research of the program is needed to examine the most effective dosage based on the older adults' stage of dementia.

Other next steps concern short-term outcomes of one to three years and long-term outcomes of four to six years, plus community impact. Both levels of these outcomes could be explored qualitatively through interviews of with family members or other care partners, or quantitatively using dementia-specific measures such as Dementia Quality of Life Instrument (Mulhern et al., 2013). Lastly, the program's impact at a level of the local community could be captured by conducting interviews with still other stakeholders such as community leaders or individual and corporate donors to the program. Addressing each of these areas for future research, will advance the scientific merit of the program and inform the development of other dementia-specific AAIs.

Limitations

A limitation of our secondary analysis was that the qualitative interviews were originally conducted for a purpose other than developing a logic model. Therefore, interview questions were not designed to elicit responses for the desired logic model components, meaning the data were fitted to the logic model retrospectively. However, Mclaughlin and Jordan (2004) highlight that logic models can be created retrospectively for existing programs to guide future evaluation. Furthermore, our sample was not inclusive of the full range of participants served by the program. Our study captured findings for older adults in the mild to moderate stages of dementia and did not include those with mild cognitive impairment or those in the late stages of the disease. Lastly, we did not include the perspectives of informal care partners who could have illustrated additional program characteristics due to the limited scope of the parent study.

Conclusion

While AAIs are growing in popularity for older adults with dementia, their scientific development remains in early phases. Specifically, AAIs for this population lack a thorough description of what occurs during these types of interventions, posing challenges for their replication and subsequent evaluation. We therefore developed a logic model of a promising program of equine-assisted activities to describe *what* the program is and *why* and *how* it works. The developed logic model elucidated the program's essential components and processes, and its most immediate outcomes as measured by directly observed indicators of older adults' QoL, while they were engaging in the program. This logic model provides a basis for replication and further refinement of the program across multiple sites. It is our hope that the logic model may serve as a guide for preliminary scientific development of other AAIs whose purpose is to also enrich the QoL of people with dementia.

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CHAPTER THREE: A COMPARISON OF QUALITY OF LIFE INDICATORS DURING TWO COMPLEMENTARY INTERVENTIONS: ADAPTIVE GARDENING AND ADPATIVE RIDING FOR PEOPLE WITH DEMENTIA[2]

Quality of life (QoL) is an important outcome in dementia care. Best practices recommend the use of complementary interventions to address QoL, recognizing that participation in meaningful activities and positive emotional experiences are crucial to the QoL of people living with dementia (Scales, Zimmerman, Miller, & Carolina, 2018). In this descriptive case study, we compare and contrast two complementary interventions, adaptive gardening and adaptive riding and other horsemanship activities, that were designed to support the QoL of their respective participants with dementia.

QoL is a complex concept with numerous definitions (Ettema et al., 2005). In this study, we draw from an environmental perspective of QoL for people with dementia (Wood, Lampe, Logan, Metcalfe, & Hoesly, 2017; Wood, 2019). This perspective recognizes that a person's experiences of QoL are influenced by physical, interpersonal, cultural, and socio-political environmental elements of their prevailing situations. More exactly, everyday situations may offer *occupational opportunities,* or opportunities to participate in activities that, if accepted and acted upon by the person with dementia, may support or elicit positive emotional experiences (Wood et al., 2017). Participation in activities of a person's choosing is therefore linked to their emotional well-being (Schreiner, Yamamoto, & Shiotani, 2005), an important dimension of QoL in dementia care. *Participation* is understood as a person's "involvement in a life situation" (World Health Organization, 2002, p. 14). Accordingly, when a person participates in

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[2] From "A Comparison of Quality of Life Indicators During Two Complementary Interventions: Adaptive Gardening and Adaptive Riding for People with Dementia," by R. Lassell, W. Wood, A. A. Schmid, and J.E. Cross, Copy right 2021 CC BY-NC-ND by *Complementary Therapies in Medicine*, doi.org/10.1016/j.ctim.2020.102658.

activities they find interesting or meaningful, they use various retained cognitive, physical, and social capacities. These existing capacities are most robustly tapped when a person participates in more complex activities. Altogether, participation in simple or comparatively more complex activities may enhance functioning (Fernández-mayoralas et al., 2015; Sobral & Constanca, 2013), and thereby help to prevent excess disability, or an unnecessary loss of capacities, due to lack of opportunities for use (Brody et al., 1971).

Opportunities to participate in nature-based activities, especially gardening (Blake & Mitchell, 2016; Detweiler et al., 2012; Mmakp et al., 2020; Whear et al., 2014) and horsemanship activities including riding (Fields et al., 2018; Lassell et al., 2019), show promise for supporting the QoL of people with dementia. Such activities may foster attention to the present moment (Fields, Wood, Lassell, 2019; Smith-carrier et al., 2019), positive emotional experiences of interest and pleasure (Fields et al., 2018; Hall et al., 2018; Jarrott et al., 2002; Lassell et al., 2019), and personal identity (Fields et al., 2019; Noone et al., 2018). Moreover, gardening may provide chances to socialize with and contribute to others (Smith-carrier et al., 2019), and can also culminate in a tangible product (Jarrott et al., 2002). Similarly, access to activities with horses may promote interactions with horses and other people (Fields et al., 2018; Lassell et al., 2019), and offer opportunities to contribute to caring for a horse. Such access can also foster participation (Fields et al., 2018; Jarrott et al., 2002). Moreover, participation can also be supported by adapting gardening and horsemanship activities to fit a range of cognitive, physical, and social needs (Fields et al., 2019; Jarrott et al., 2002).

Therefore, providing opportunities to garden, or to ride and engage in other horsemanship activities, can be consistent with best practices in dementia care. Yet, to our knowledge, no studies have directly compared these complementary nature-based activities and their respective influences on the QoL of people with dementia. Therefore, we aimed to provide a fine-grain description and comparison of how people with dementia responded to opportunities to participate in two nature-based interventions, adaptive gardening and adaptive riding. We asked: (1) To what extent do people with dementia participate and evidence emotional well-being during adaptive gardening and adaptive riding?, and (2) Are observed durations of participation and emotional well-being similar and different across these interventions?

Methods

Design

We used a descriptive case study design, which allows researchers to describe a phenomenon in its natural setting (Yin, 2012). In this study, we described and compared observed durations of participants' QoL indicators averaged across four videotaped sessions of adaptive gardening and adaptive riding.

Participants

Participants were recruited from several local organizations and self-selected into adaptive gardening or adaptive riding. To be included in the study, participants had to speak English, be 45 years or older, diagnosed with dementia, and on a stable regimen of medications. Additional inclusion for adaptive riding were not having horse allergies, obtaining a physician's approval to participate, and passing a screening at the therapeutic riding center (Lassell et al., 2019). During the study, participants were accompanied by one family member who provided care to them, referred to as their care partner. Either care partner assent, or if able, participant consent was obtained. The Institutional Review Board of Colorado State University approved this study.

Interventions

The two interventions, adaptive gardening and adaptive riding, aimed to support QoL for people with dementia and occurred in Northern Colorado. Both interventions were held for hour-long, weekly sessions, for eight weeks. Each intervention contained five distinct occupational opportunities with a focus on the experience of these opportunities versus an acquisition of skills (see Table 3). Within each opportunity, staff adapted activities to each participants' abilities and needs. An effort was made to keep the same staff and for adaptive riding, the same horse, with each participant.

Adaptive Riding

Adaptive riding is the modification of horsemanship and riding activities for people with diverse needs and is provided by a trained instructor (Wood et al., 2020). The adaptive riding intervention was based on a previously studied program that was found to support QoL for participants with dementia (Fields et al., 2018, 2019; Lassell et al., 2019). In this study, the intervention was modified to invite participants' primary care partner to participate. The intervention took place at an accredited Professional Association of Therapeutic Horsemanship (PATH) Intl. riding center and was held in an indoor arena and adjacent barn. Two PATH certified therapeutic riding instructors offered adaptive riding with trained staff who were volunteers from the community. Staff adapted activities for each participant's needs with modified directions from one to multiple steps, or the control of the horse during riding, from leading to supervision. Three horses and one donkey participated in adaptive riding. The adaptive riding intervention served as a template for creating the adaptive gardening intervention.

Table 3.

Occupational Opportunity Descriptions and Codes

Adaptive Gardening	Adaptive Riding
Planting: Staff presented opportunities to prepare the soil, start seeds, water, label, and transplant herbs, house plants, flowers, and vegetables with chances to take plants home.	Grooming: Staff invited participants to brush the horse, untack and put away equipment (e.g. saddle and grooming supplies).
Weeding: Staff provided chances to pull weeds from outdoor garden beds.	Petting: Staff offered participants chances to pet their horse with no access to grooming supplies.
Harvesting: Staff provided opportunities to harvest, explore, and eat a full-grown herb, flower, or vegetable planted during the session.	Riding: Staff offered chances to mount a horse and play games, such as weaving through cones and tossing a beanbag into a bucket.
Observing: Unstructured time where staff did not present opportunities for structured activities and included chances to socialize, explore the garden, and watch ongoing activities.	Observing: Unstructured time where staff did not present opportunities for structured activities and included chances to socialize and watch ongoing horsemanship activities.
Transitions: Staff offered chances to move from the end of an opportunity to a new one.	Transitions: Staff offered chances to move from the end of an opportunity to a new one. Included opportunities to take the horse to his stall or pasture.

Adaptive Gardening

Adaptive gardening, as defined in this study, is the modification of gardening activities to meet participants' levels of functioning. Adaptive gardening took place outdoors at a local senior center on a paved patio and indoors during inclement weather. The first author and a trained gardening educator led the intervention with trained staff who were undergraduate and graduate students and volunteers from the community. Staff adapted activities to each participants' needs with different choices for plants and seeds, varied the number of steps in directions, applied bright tape to planting containers as a visual aide, and used decomposable seed tape for an easier grasp.

Data Collection

Demographic data were collected before the interventions and included age, type of dementia reported by their care partner, years diagnosed, and observed mobility (e.g. walking independently, with an assistive device, wheelchair bound). The status of participants' neurocognitive function was assessed using index scores from the Repeatable Battery Assessment of Neuropsychological Status (RBANS) (Randolph, Tierney, Mohr, & Chase, 1998). The RBANS index scores summarize five domains of cognitive function: immediate memory, visuospatial/constructional abilities, language, attention, and delayed memory. Higher scores indicate higher function, while lower scores indicate greater impairment.

To address the research questions, videotaped data were systematically collected and coded. To collect video data, one trained assistant was assigned to videotape one participant during four sessions in each intervention. Altogether, 31 hours of videotapes were collected and uploaded into Noldus Observer XT 13 (www.noldus.com), a behavioral analysis software. The study's primary outcome measure was also entered into Noldus to guide all subsequent coding of the videotapes. In each videotape, observed durations of each participants' QoL indicators within the occurring occupational opportunity were coded, as next described.

Outcome Measure

A modified version of the *Activity-in-Context-in-Time (ACT)* was the primary outcome measure (see supplementary materials Table 10). The *ACT* is a direct-observational tool that uses codes to systematically capture observed behaviors of people with dementia that are indicative of positive, neutral, and negative indicators of QoL in specific contexts (Wood, 2005; Wood, Womack, & Hooper, 2009). The *ACT* is consistent with Ostrov and Hart's (2014) recommendations for systematic behavioral observations with clear codes, systematic sampling and recording methods, and evidence of reliability and validity. Whereas, most of the ACT's codes directly measure participation and emotional well-being, we used an established process (Lassell et al., 2019) to modify the ACT by creating new codes that were specific to adaptive riding and adaptive gardening.

New codes were created for *occupational opportunities* to characterize the specific opportunities that were offered in the context of adaptive riding and adaptive gardening. Additionally, *participation* was modified within the *ACT* to be a separate domain with the codes *gaze*, *communication*, and *active participation*. The code, *yes-engaged gaze*, was a positive QoL indicator suggestive of basic environmental engagement by intentional scanning, watching, or visually orienting; conversely, *unengaged gaze* and *eyes closed* were negative QoL indicators. The code, *yes-communication* was a positive QoL indicator describing verbal or nonverbal exchanges of information or interactions with people or animals; conversely, *no-communication* was a neutral QoL indicator. The code, *yes-participation*, was a positive QoL indicator characterizing active participation in freely chosen activities; conversely, *no-participation* was a neutral QoL indicator. For this study, modifiers of *yes-participation* were created to describe the singular activity in which a person was participating (e.g. *planting*). When multiple modifiers were coded, they delineated more complex forms of active participation (e.g. *ride and pet a horse*).

Emotional well-being was measured within the *ACT* with the domains of apparent affect and agitation. Apparent affect included codes of *interest, pleasure*, *anger, fear or anxiety*, and *sadness* (Lawton, Van Haitsma, & Klapper, 1996; Lawton, Van Haitsma, & Perkinson, 2000). *Interest* documented deliberate attention toward an event, object, person, or animal and *pleasure* characterized smiling and laughing, both codes were positive QoL indicators. Whereas, *anger* was evidenced by shouting or clenching teeth; *anxiety or fear* through eyes wide or sudden withdrawal; and *sadness* with frowning or crying and all were considered negative QoL indicators. Agitation contained two codes. *Yes-agitation* characterized inappropriate verbal, vocal, or motor activity (pacing, repetitive sentences, etc.) and was a negative QoL indicator (Cohen-Mansfield et al., 1989). Conversely, *no-agitation* was considered a positive QoL indicator.

A continuous time sampling method (Ostrov & Hart, 2014) was used to document the observed occupational opportunity, and to record whether each QoL indicator code was present or absent within. For example, at the start of each videotape, the first author coded the occupational opportunity first and then simultaneously documented the observed QoL indicators within the domains of participation, apparent affect, and agitation immediately afterwards. For example, the rater coded observing (occupational opportunity); then engaged gaze, no-communication, and no-active participation (participation); while simultaneously documenting interest (apparent affect); and no-agitation (agitation). These codes would run continuously in Noldus until the rater entered a different code to denote any changes. Using pre-determined coding rules (Lassell et al., 2019), two raters established inter-rater reliability with a kappa of 0.85 on 20 minutes of videotapes from both interventions.

Data Analysis

Proportions of the durations of each QoL indicator were calculated in Excel for individual participants. Individual proportions were aggregated by intervention and by occupational opportunity within each intervention. A Wilcoxon Mann Whitney-U test was used to compare proportions of QoL indicators by intervention in SPSS Version 26. Proportions were converted to percentages.

Results

Demographics

Eight participants completed the study; four in each intervention (Table 4). In both interventions, two care partners identified their respective participant as in the early to moderate stages of dementia and two in the moderate to later stages. Care partners identified all participants as white and as having experience riding or gardening. RBANS scores suggested that all participants had serious cognitive impairments. No significant differences in RBANS scores or mobility were found between groups.

Table 4.

Participant Demographics

Participant	Group	Age	Sex	Years dx	Type	RBANS	Observed Mobility
1	AR	57	F	5	PCA	41	I
2	AR	67	F	1	EO	41	WC
3	AR	74	M	5	MCI	55	I
4	AR	67	F	<1	VAS	68	I
5	AG	60	F	2	EOAD	65	I
6	AG	96	F	<1	NOS	51	AD
7	AG	74	M	2	NOS	51	WC
8	AG	98	F	6	NOS	51	AD

Note. AG, adaptive gardening, AR, adaptive riding, AD, assistive device (e.g. walker), EO, early onset, EOAD, Early onset Alzheimer's disease, I, independent, MCI, mild cognitive impairment, NOS, not otherwise specified, PCA, posterior cortical atrophy, and WC, wheelchair. RBANS, Repeatable Battery Assessment of Neuropsychological Status, total index scores reported. Scores <69 are categorized as extremely low cognitive function.

QoL Indicators

Participants in both adaptive gardening and adaptive riding expressed a preponderance of positive QoL indicators (Table 5).

Table 5.

Median Percentages of Quality of Life Indicators Averaged Across Four Sessions

Domain	Codes and sub codes	Adaptive Gardening Median (min-max)	Adaptive Riding Median (min-max)	Wilcoxon Mann-Whitney *p* value
Apparent Affect	Anxiety or fear	- -	- (0-0.10%)	0.69
	Interest	88.70% (63.10-94.60%)	65.90% (31.90-73.50%)	0.20
	Pleasure	9.70% (1.50-33.90%)	25.60% (19.50-59.60%)	0.20
Participation	Gaze			
	Yes, Engaged Gaze	98.90% (98.80-99.80%)	98.50% (95.7-99.60%)	0.686
	No, Engaged Gaze	0.10% (0-0.30%)	- -	0.343
	Communication			
	Yes Communication	42.60% (18.5-59.10%)	39.40% (29.7-49.60%)	0.886
	No Communication	57.10% (39.7-81.10%)	60.20% (48.7-70.20%)	1.00
	Active Participation			
	Yes Active Participation	33.80% (9.80-56.20%)	60.80% (43.20-62.80%)	0.057
	Singular	33.79% (9.80-56.17%)	47.29% (42.95-52.50%)	0.343
	Complex	- -	9.33% (0.17-18.76%)	0.029*
	No Active Participation	67.30% (42.80-89.40%)	38.60% (27.40-56.70%)	0.057

Note. Percentages do not add up to 100% due to missed observations. Apparent Affect codes of sadness or depression and anger were not observed. No signs of agitation were observed.

Participants in both interventions were observed to *participate* through visual engagement with their environments nearly continuously and by communicating with care partners, staff, or their horse or donkey nearly half of the time. A Wilcoxon Mann-Whitney U test showed a trend toward higher durations of active participation in adaptive riding (Median = 60.80%) compared to adaptive gardening (Median = 33.80%), ($U = 15$, $p = 0.057$). Furthermore, participants in adaptive riding observably engaged in complex active participation

(Median = 9.33%) significantly more than those in adaptive gardening, where no complex active participation was observed ($U = 16$, $p = 0.029$). Additionally, participants were observed to express *emotional well-being* with either interest or pleasure in both interventions. While expressions of interest were more prevalent in adaptive gardening, expressions of pleasure were more common in adaptive riding. With the exception of one fleeting episode of apprehension when a horse's head bumped a participant, no signs of ill-being or agitation were observed during both interventions. Moreover, both interventions appeared to support social interactions with similar durations of communication. Variations in positive QoL indicators across the two interventions and their respective occupational opportunities are next described.

Active Participation

Participants in adaptive gardening were observed to actively participate in singular activities (one-at-time) (Table 6, Figure 4). For example, during the opportunity of harvesting, participants ate herbs and vegetables as they shared recipes or reminisced with care partners and staff. Within the opportunity of planting, participants planted flowers, herbs, plants, and vegetables in raised garden beds or small pots, watered plants, and sometimes donned or doffed garden gloves. When transitioning between opportunities, participants transported plants or engaged in hygiene activities like handwashing. During the opportunity of observing, participants watched ongoing activities and drank water. Within the opportunity of weeding, one participant chose to weed and the other three opted to explore the garden instead. Staff and three of the four care partners collaboratively engaged with participants in all opportunities. Care partners provided encouragement, direction, and physical assist to their respective participant to support their engagement in singular activities, including hand-over-hand assist during watering and stabilizing containers during planting.

Table 6.

Adaptive Gardening Average Percentages of Positive Quality of Life Indicators by Opportunity Per Session

Occupational Opportunities	Time Offered % of session	Apparent Affect		Participation		
		Interest	Pleasure	Engaged Gaze	Communication	Active Participation
Harvesting[a]	11 min 18%	86%	10%	99%	33%	58%
Weeding[a]	23 min[b] 38%	89%	10%	99%	20%	39%
Planting[a]	27 min 45%	85%	14%	99%	47%	35%
Transitioning	6 min 9%	75%	14%	94%	57%	12%
Observing	11 min 19%	79%	20%	99%	42%	8%

Note. Opportunities are presented in order of the longest durations of active participation to the least. Percentages do not add up to 100% due to missed observations.

[a] Involved direct interactions with plants.

[b] Average time offered for weeding was calculated using the two sessions it was offered.

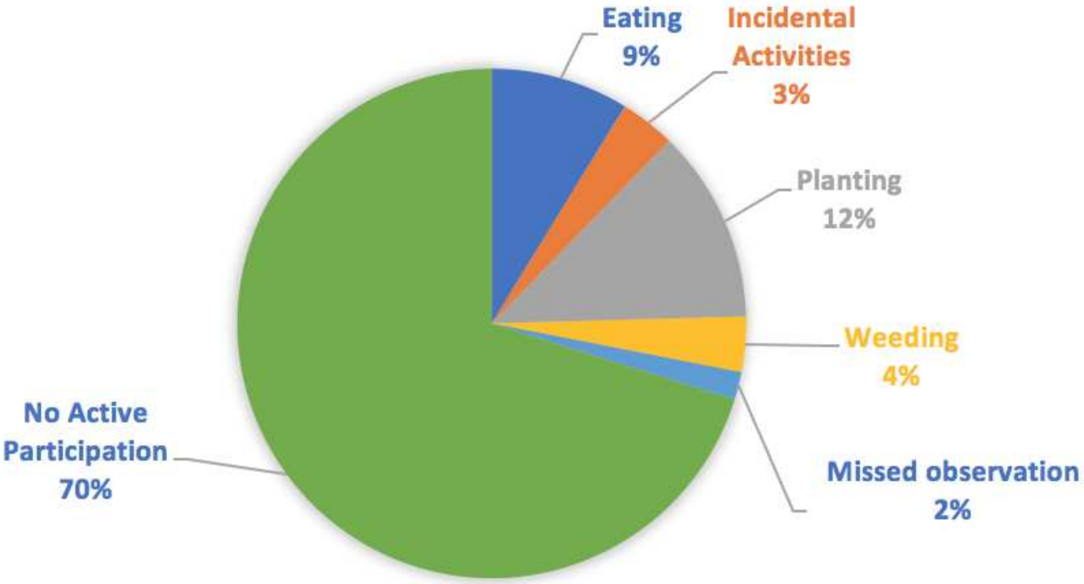

Figure 4. Adaptive Gardening Average Percentage of Active Participation Per Session. Incidental activities captured activities occurring for <1 minute a session: drinking, exploring the garden, hygiene, putting on taking off gloves, transporting, and watering.

Comparatively during adaptive riding, participants engaged in a greater range of singular activities and also participated in two or more activities simultaneously (Table 7, Figure 5). For instance, during the opportunity of riding, participants were observed to ride their horse or donkey, while petting it or playing various games involving obstacle courses or tossing bean bags. Within the opportunity of grooming, one participant pet and groomed her horse concurrently; participants also brushed, petted, and untacked their horse, and put away riding and grooming equipment. During the opportunity of petting, participants were observed to stroke their horse's or donkey's face, nose, chest, and neck; one participant repeatedly kissed her donkey's nose. When transitioning, participants donned and doffed helmets and two participants accompanied staff to take their horse to the pasture. Within the opportunity to observe, participants sipped coffee and watched ongoing activities. Active participation was

Table 7.

Adaptive Riding Average Percentages of Positive Quality of Life Indicators by Opportunity in Per Session

Occupational Opportunities	Time Offered % of session	Apparent Affect		Participation		
		Interest	Pleasure	Engaged Gaze	Communication	Active Participation
Riding[a]	21 min 35%	73%	24%	99%	34%	95%
Grooming[a]	13 min 21%	50%	45%	99%	45%	75%
Petting[a]	4 min 8%	32%	60%	99%	45%	60%
Transitioning	10 min 17%	42%	27%	94%	57%	15%
Observing	12 min 20%	66%	27%	96%	27%	2%

Note. Opportunities are presented in order of the longest durations of active participation to the least. Percentages do not add up to 100% due to missed observations.

[a] Involved direct interactions with horses.

also collaborative as staff and three of the four care partners co-participated, including walking alongside their participant during riding. Care partners encouraged, directed, and provided physical assist to their respective participant, supporting their participation in singular and complex activities. For instance, care partners guided participants towards their horses during grooming (singular) and provided encouragement during mounted games (complex).

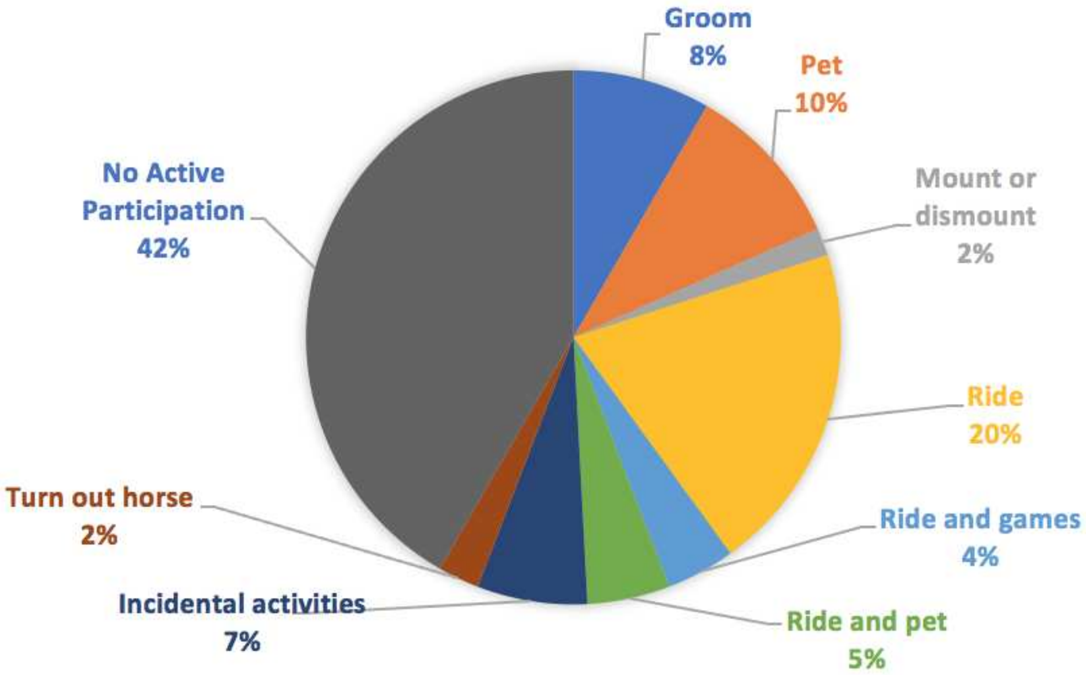

Figure 5. Adaptive Riding Average Percentage of Active Participation Per Session. Incidental activities captured activities that occurred for <1 minute a session: drinking, grooming and petting, hygiene, putting on or taking off helmet. Missed observations averaged less than 20 seconds a session.

Therefore, both interventions supported positive and neutral QoL indicators and provided chances for collaborative participation with care partners and staff. The difference between adaptive gardening and adaptive riding was observed through complex active participation, underscoring that adaptive riding involved more opportunities for complex activity.

Discussion

This was the first study using systematic behavioral observations to describe and directly compare QoL indicators during adaptive gardening and adaptive riding for people with dementia. Our findings underscore that both self-selected interventions supported positive and neutral QoL indicators in participants with differing types of dementia and a broad range of physical and cognitive needs. Thereby, both interventions merit continued scientific development. Moreover, our findings build on the evidence supporting nature-based interventions for people with dementia (De Bruin, Buist, Hassink, & Vaandrager, 2019; Mmakp et al., 2020; Wood, Fields, Rose, & McClure, 2017).

Our findings align with previous research of gardening and QoL for people with dementia. Specifically, Jarrott et al. (2002) observed people with dementia as they participated in a gardening day program and also documented more expressions of interest with less pleasure. Higher expressions of interest may be linked to the creative nature of gardening. Smith-carrier and colleagus (2019) found, for instance, that people with dementia who participated in gardening experienced curiosity, wonder, and learning. Furthermore, our findings align with Hall et al. (2018) who observed a diverse range of participation from more relaxed with watching ongoing activities to active participation in leisure activities during a 10-week gardening intervention at a day program. Both active participation and relaxation in gardens can be beneficial as they are linked to increased physical function and decreased stress (Han, Park, & Ahn, 2018). Yet, no previous studies, to our knowledge, have examined the forms of participation during gardening in-depth. This study adds to the literature with a basic understanding of the singular and often collaborative forms of active participation during an adaptive gardening intervention for people living with dementia, and is the first published study to invite care partner participation, to our knowledge.

Also, our findings confirm previous research of the adaptive riding program replicated in this intervention as supporting QoL for people with dementia (Fields et al., 2018; Lassell et al., 2019), and adds to the literature with a basic understanding of the horse's role. Namely, interactions with a horse seemed to support expressions of pleasure. Similarly, Fields et al. (2018) documented participants' QoL indicators during the adaptive riding program compared to routine activities at their care facility and found that adaptive riding was associated with higher frequencies of pleasure. Additionally, Lassell et al. (2019) documented durations of QoL indicators during each occupational opportunity in the adaptive riding program and consistent with our findings, found that grooming and petting elicited the highest durations of pleasure. Yet, we observed longer durations of pleasure during these opportunities. Unlike previous studies of the adaptive riding program, participants were often accompanied by their care partners, and paired with the same horse, which may have created a greater sense of comfort and familiarity. The comforting and calming nature of human-animal interactions, particularly physical contact, has been recognized as potential mechanisms of change for improving mood (Shen, Xiong, Chou, & Hall, 2018), and may help explain our findings. One other equine-gardening comparison exists: Peters, Wood, Hepburn, and Moody (n.d.) found occupational therapy (OT) involving activities related to gardening and horses beneficial for children with autism spectrum disorder. Yet, only OT incorporating horses significantly reduced irritability. Coupled with our findings, activities with a horse may elicit a more uplifted emotional state when compared to activities indoors and in a garden.

Additionally, we found that opportunities that involved direct interactions with horses appeared to require a higher level of active complex participation, particularly during grooming and riding. Thereby, participants in adaptive riding were observed to utilize their retained capacities at a higher level as they participated in more complex activities with horses. Whereas, participants in adaptive gardening appeared to tap into their retained capacities at a lower level with shorter durations of singular active participation. Perhaps the horse (Hart & Yamamoto, 2015), or the dynamic nature of horse-human interactions, served as motivators to participate. In sum, participating in activities with a horse may support positive emotional experiences and provide more opportunities to utilize a person's retained capacities at a higher level through complex active participation.

Limitations, Implications, and Future Directions

Systematic behavioral observations do not capture a person's subjective experience. Therefore, our observations serve only as indicators and may not accurately correspond with participants' perceived experiences of QoL. Yet, behavioral observations are often used to capture a person's experience when they are unable to describe it (Ostrov & Hart, 2014), and can be particularly useful for people with later-stage dementia. Behavioral observations are a very time-intensive research method; however, this method can yield a rich and rigorous description of what occurs during an intervention. Additionally, our findings should be interpreted with caution due to a small and non-diverse sample and should not be generalized to the larger population. Participants also self-selected into the interventions instead of being randomized. Self-selection was chosen to support participants' preferences and safety as undesired interactions with horses could be harmful. Lastly, opportunities for complex participation were built into adaptive riding with mounted games; whereas, adaptive gardening did not naturally lend this chance, presenting a limitation to the comparability of the two interventions. Notably, all other complex participation occurred spontaneously in adaptive riding and appeared to be a form of self-expression.

Our findings can inform healthcare providers' recommendations for adaptive gardening and adaptive riding, knowing that both may offer benefits of emotional well-being and participation for people with dementia. Our findings also provide a rich description of the QoL indicators associated with each occupational opportunity in both interventions. This description can inform healthcare providers' recommendations for specific activities related to adaptive gardening and adaptive riding. When recommending these interventions based on client choice, healthcare providers should consider cost and access. Adaptive riding can be costly and may not be accessible to those in underserved or urban areas who have limited resources. Whereas, adaptive gardening is less costly and can be more readily accessed.

More research is needed to investigate how adaptive gardening and adaptive riding may support QoL similarly and differently for people with dementia with a larger sample. Additionally, research examining the perceived experiences of community-dwelling people with dementia and their care partners during gardening remains scarce (Hewitt et al., 2013; Noone et al., 2018; Smith-carrier et al., 2019), and has yet to be explored during adaptive riding. Thereby, an acceptability study is needed to capture care partners and participants' experiences of these interventions. Moreover, the first author's training as an OT, occupational scientist, and rehabilitative scientist brought emphasis to the different forms of participation in relation to QoL. Future research should include broader interdisciplinary perspectives of QoL and explore other nature comparisons. These findings could further inform healthcare providers' recommendations to support QoL for people with dementia.

Conclusion

This was the first study to compare adaptive gardening and adaptive riding for people living with dementia. Both positively shaped QoL through participants' observed emotional experiences and participation. Adaptive riding seemed to offer greater opportunities for active and more complex forms of participation and may utilize a person's retained capacities at a higher level. More research is needed to further untangle the similarities and differences between the two.

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CHAPTER FOUR: DISCUSSION

In this chapter, I seek to elucidate how both studies accomplished my dissertation's purpose of scientifically advancing the adaptive riding and adaptive gardening interventions for people living with dementia, and discuss its implications for nature-based interventions. Here, I outline the scientific development of each intervention, describe next steps for their continued advancement, identify areas for refinement, and suggest short-term outcome measures. Then, I discuss the contributions of my dissertation to nature-based interventions, recognize its limitations, and identify areas for future research.

Scientific Advancement

Both studies accomplished the purpose of this dissertation by scientifically advancing the adaptive riding intervention, 1) providing a basis for its replication and multi-site research, 2) replicating the adaptive riding intervention for people with dementia in the community; and 3) launching the scientific development of the adaptive gardening intervention for comparison.

Advancement of Adaptive Riding

Scientific development of the adaptive riding intervention occurred in this dissertation in the 1) *development* and 2) *feasibility and piloting* phases with two studies (see Figure 6). In study one, I undertook the *development phase* and to describe *what* the adaptive riding intervention is, and *how* it was thought to work by modelling its processes and outcomes onto a logic model using a mixed methods case study design. The qualitative data from interviews with direct service providers afforded an in-depth description of the intervention components and how they were linked to its purpose, assumptions, and immediate outcomes of participants' QoL. Additionally, the quantitative observational data provided a rigorous description of how the occupational opportunities within the intervention contributed to participants' immediate

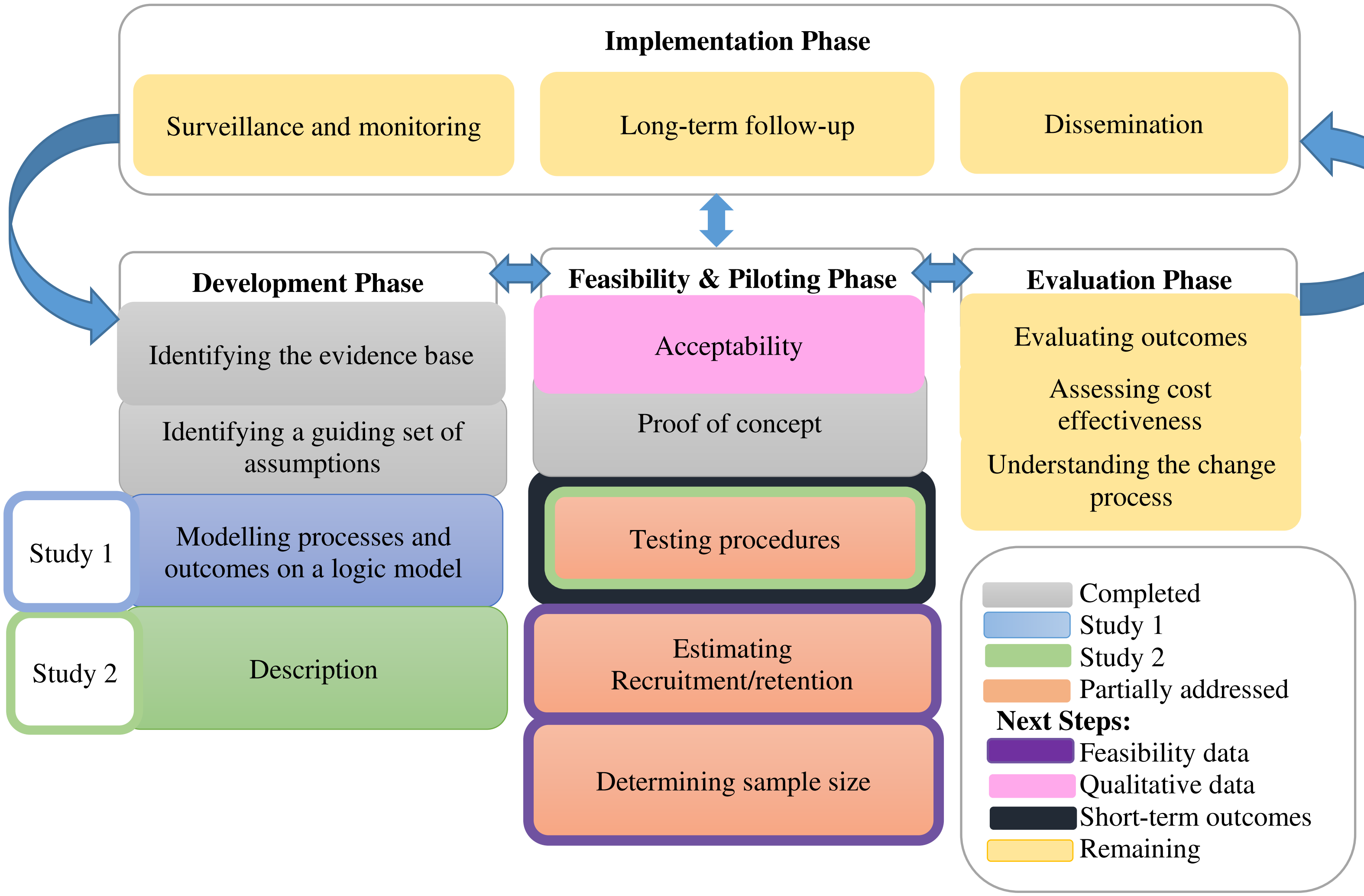

Figure 6. Current scientific advancement of the adaptive riding intervention. Adapted from Craig et al.'s (2013) article Developing and evaluating complex interventions: The new Medical Research Council Guidance, in the International Journal of Nursing Studies, 50, p. 589. Double arrows indicate phases that may co-occur. Single arrows depict one phase leading to another.

outcomes of QoL. These findings were illustrated in a logic model, providing a basis for the replication of the adaptive riding intervention and a basic theory of change in manuscript one.

Manuscript one highlighted a need to explore the horse-nature connection as a potential mechanism of change within the adaptive riding intervention. Also, the first manuscript underscored a need to expand the population studied to those in the earlier stages of dementia (i.e. those living in the community) and to include their care partners. Both of these needs led to further research of the adaptive riding intervention in study two.

Study two addressed milestones simultaneously in the *1) development* and the *2) feasibility and piloting* phases of the adaptive riding intervention with a quantitative descriptive case study comparing adaptive riding and adaptive gardening. Contributing to the *development phase*, I described *how* the adaptive riding intervention changed using quantitative behavioral observations to update descriptions of the occupational opportunities and participants' associated outcomes of QoL. Particularly, observational data highlighted how the occupational opportunity of transitions changed with the added options for participants to accompany their horse to pasture and put away equipment. Likewise, the opportunity of grooming expanded to include untacking the horse. Yet, the opportunity of riding narrowed with the absence of chances to ride outside.

Pertaining to the *feasibility and piloting phase*, I replicated the adaptive riding intervention and explored whether it *could work* for people living with dementia in the community by expanding the population studied to match those currently served by the intervention, pairing participants with the same horse, and inviting care partner involvement. Interestingly, the inclusion of care partners seemed to create more opportunities for co-participation, where three of the four care partners engaged alongside the participants. In addition, care partner engagement and pairing participants with the same horse appeared to create a sense of comfort and familiarity with higher durations of pleasure during grooming and petting when compared to study one. Therefore, study two revealed that adaptive riding *could work* for people living with dementia in the community, and may be enhanced by involving their care partners and pairing them with a horse. In addition, I partially addressed testing procedures with an adaptive gardening comparison condition to see if there were viable similarities and differences. Indeed, findings revealed an in-depth description of the similarities and differences between adaptive riding and adaptive gardening worth exploring. Particularly, both interventions seemed to support QoL through emotional well-being and participation; yet, adaptive riding appeared to offer chances for more complex participation. These findings were reported in manuscript two.

Next Steps for Adaptive Riding

Further scientific advancement of the adaptive riding intervention should target the 1) *development* and 2) *feasibility and piloting* phases. Specific steps include reporting findings from my remaining data, manualizing and refining the intervention, and identifying relevant short-term outcome measures.

Unpublished data collected during study two addressed the *development* and *feasibility and piloting* phases of the adaptive riding intervention (see Figure 6). Relevant to the *development phase*, I coded observational data of participants' body position and movements in the adaptive riding and adaptive gardening interventions, describing participants' physical engagement. Pertaining to the *feasibility and piloting phase*, I conducted interviews with care partners to document their experiences of the adaptive riding intervention and their perceived outcomes and influences on those outcomes during study two. Also, I partially addressed testing procedures by piloting short-term outcomes measures of QoL for both participants and their care partners and the exploratory measures of cognition and frequency of activity participation in participants following both interventions. Moreover, I collected feasibility data to explore whether comparing adaptive riding and adaptive gardening *could be done*. Feasibility data included process evaluation components of dose, reach, recruitment, retention, attendance, fidelity, personnel, time, cost, data management, and safety. This data can inform estimations of recruitment and retention rates and can help determine sample sizes for multi-site piloting.

Moving forward, I plan to report findings from my remaining data as outlined in my manuscript plan (see Table 8). Currently, my colleague Dr. Fields is manualizing the adaptive riding intervention with an implementation manual and curriculum. Once the manual is complete, a multi-site quasi-experimental study is needed with a process evaluation to determine the feasibility of implementing the intervention at multiple sites and to further address testing procedures by piloting short-term outcome measures (see Moore et al., 2014).

Table 8.

Manuscript Plan for Remaining Data

Manuscript	Journal	Submission priority	Proposed Submission Dates
Exploring care partner’s perceptions of an adaptive riding intervention for people living with dementia	*Quality in Aging*	1st	May 2021
A comparison of physical activity during adaptive gardening compared to adaptive riding for people with dementia	*Dementia*	2nd	September 2021
Exploring outcomes of cognition and telomere length in people with dementia after adaptive gardening and adaptive riding	*Journal of Alternative and Complementary Medicine*	3rd	December 2021
The feasibility of a nature-based comparison study of adaptive riding and adaptive gardening for people living with dementia	*Pilot and Feasibility Studies*	4th	March 2022

Continued piloting of short-term outcome measures is crucial to detect changes in QoL, if they exist, and to identify other relevant short-term outcome measures that justify continued research of the intervention. Suggested refinements and short-term outcome measures are described later to prepare the adaptive riding intervention for multi-site piloting. In addition, stakeholder and care partner acceptability should be revisited, as the intervention is implemented at multiple sites. Also, recruitment and retention rates should be monitored to better estimate sample size, prior to a full-scale evaluation.

Advancement of Adaptive Gardening

Scientific advancement of the adaptive gardening intervention also occurred by addressing milestones in the 1) *development* and 2) *feasibility and piloting* phases in study two (see Figure 7). Contributing to the development phase, I identified an environmental perspective as a guiding set of assumptions and provided a rich description of the occupational opportunities and how participants responded with their immediate outcomes of QoL. The piloting and feasibility phase was addressed with the creation and piloting of the adaptive gardening intervention to explore its proof of concept; that is, to determine whether the intervention supported participants' QoL, and indeed it did with an array of positive and neutral indicators of QoL. In addition, testing procedures were also partially addressed with the adaptive riding comparison condition. Findings were reported in manuscript two.

Next Steps for Adaptive Gardening

Much work is still needed to address the scientific advancement of the adaptive gardening intervention, particularly in the 1) *development* and the 2) *feasibility and piloting* phases (see Figure 7). To address both phases, I plan to report findings from my short-term outcomes and feasibility data, as described above, to explore whether the intervention *can work*

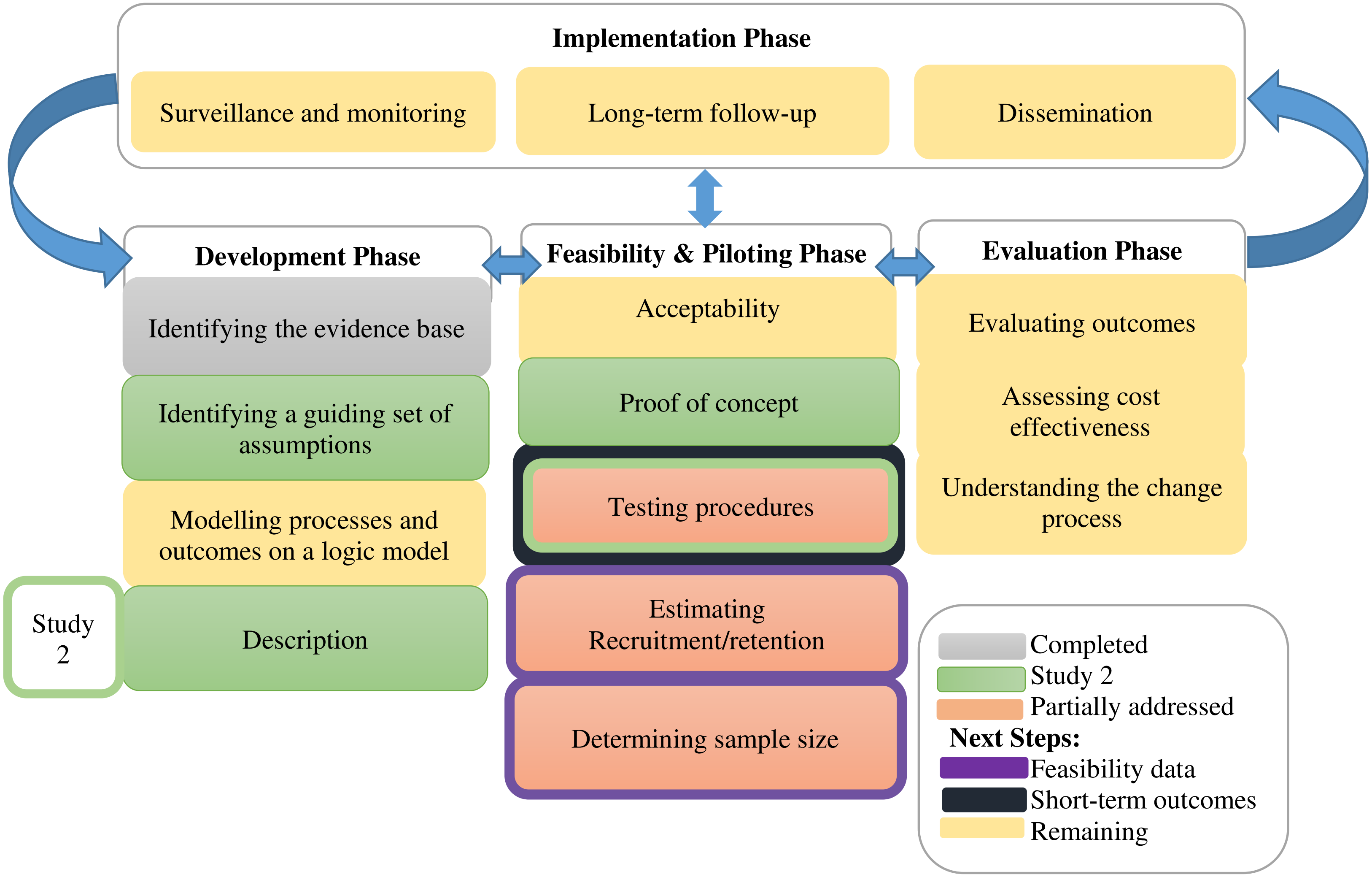

Figure 7. Current scientific advancement of the adaptive gardening intervention. Adapted from Craig et al.'s (2013) article Developing and evaluating complex interventions: The new Medical Research Council Guidance, in the International Journal of Nursing Studies, 50, p. 589. Double arrows indicate phases that may co-occur. Single arrows depict one phase leading to another

and whether *it can be done*. Then, relevant to the *development phase*, the adaptive gardening intervention should be described in-depth by mapping its components and processes using a logic model with the involvement of stakeholders and care partners. Creating a logic model can provide a better understanding of *what* the adaptive gardening intervention is, and *how* it is thought to work to inform future refinements and its replication across multiple contexts (see Moore et al., 2014).

Also, next steps in the *feasibility and piloting phase* should include exploring care partners and stakeholders' perceptions of the adaptive gardening intervention to determine its acceptability. In addition, the intervention should be expanded to include participants living in long-term care, as stakeholders from these facilities indicated interest. Once, and if, the adaptive gardening intervention is deemed acceptable by stakeholders and care partners, and relevant short-term outcome measures identified, the intervention should be manualized to support the quality of its replication in preparation for multi-site piloting prior to its evaluation phase (see Craig et al., 2013). Moreover, continued monitoring of recruitment and retention rates are needed to better estimate the desired sample size, prior to a full-scale evaluation.

Areas for Refinement

My observational data in study two illuminated an opportunity to refine the adaptive riding and adaptive gardening interventions with better tailoring of the occupational opportunities to meet participants' interests and needs. For instance, I observed two participants who had similar cognitive scores and functional abilities receive drastically different levels of challenge during adaptive riding (e.g. supervision versus being led). In part, this may have been due to care partner involvement for one participant and a lack thereof for the other; yet, this highlights the need to have a process to ensure that staff present the occupational opportunities to each participant with the same quality. Perhaps, additional training and a personalization checklist could help staff identify and personalize strategies to meet each participant's needs throughout each intervention. For example, a staff member could create a checklist at the participant's screening and use it to plan and debrief after each session, to see if they were able to personalize the session as intended and adjust accordingly. Added personalization could also include chances to ride outside, as a participant in the second study requested this option and staff were unable grant this request due to time constraints.

Another opportunity for refinement is offering more options for care partner involvement. While care partners indicated that co-participating with their loved one was positive and should continue during adaptive riding, I sensed that for some care partners in adaptive gardening, this wasn't the case. Future research should examine additional options identified by care partners for their desired involvement or respite. Perhaps, options may include engaging in a social hour or a gardening project with other care partners without their loved one. These options may better address QoL for care partners and ease caregiver burden, as caring for a loved one with dementia is associated with stress and burnout (Avargues-Navarro et al., 2020).

In addition, refinements to the recruitment process is needed with broader stakeholder engagement prior to multi-site implementation. Despite partnering with over six local organizations, I struggled to recruit eight participant-care partner dyads, instead of 24 as I had hoped. Difficulties with recruitment also impacted the research of other members on my Enriched Aging team. Much work is needed to engage new stakeholders to widen our recruitment possibilities. Our Enriched Aging team has been collaborating with the Office of the Vice President of Research and the Center for Healthy Aging at Colorado State University to broaden our recruitment pool. Perhaps, expanding our research to include all older adults may be a means to address limited recruitment.

Suggested Short-term Outcome Measures

Areas to explore short-term outcomes for adaptive gardening and adaptive riding include participation, physical, cognitive, and daily function, care partner QoL, and telomere length. Continued investigation of participation is needed to further delineate the differences in active and complex participation between adaptive riding and adaptive gardening and if they translate to a person's participation in daily life. While the exploratory outcome measure of the *Activity Card Sort* (Baum & Edwards, 2008) did not capture any changes in the frequency of participation in daily activities, based on my qualitative data, changes in the quality of participation outside the intervention merits further investigation. While no measure documents the quality of participation for this population, care partner interviews could be used instead.

Another salient short-term outcome to explore in conjunction with participation is physical activity because it holds the strongest evidence for staving off the cognitive declines associated with dementia (Guure, Ibrahim, Adam, & Said, 2017; WHO, 2019). The observed levels of physical activity during each intervention can guide specific short-term outcome measures like the *Berg Balance Scale* for balance (Dunning, 2011)*,* or the *Timed-Up-and-Go* test for functional mobility (Podsiadlo & Richardson, 1991). In addition, based on qualitative data, tracking the number of falls may also provide a relevant measure because care partners reported outcomes related to balance and decreased fear of their loved one falling.

There is also a need to examine participants' functional independence over time and whether or not they are able to live at home for longer as a result of the adaptive riding and adaptive gardening interventions. Perhaps the *Barthel Index* (Mahoney & Barthel, 1965) may prove useful in tracking functional independence. Also, documenting changes in participant's living situation (home, assisted-living, etc.) is worth exploring.

Cognition should continue to be measured for participants in the early stages of dementia. Cognitive status was successfully measured with the *Repeatable Battery for the Assessment of Neuropsychological Status (RBANS*) (Randolph et al., 1998) revealing positive trends. However, the *RBANS* is lengthy and care partners noted that their loved ones seemed to dislike this assessment the most. Perhaps, administering the *RBANS* twice instead of three times, or selecting specific subsections, such as immediate or long-term memory, may decrease testing burden on participants.

A new measure for care partner QoL may also be worth considering. I piloted the *World Health Organization's Quality of Life Brief (WHOQOL-BRIEF*) (WHO, 2004). While this measure was short and included questions about the environment, there were some areas that were not relevant to the interventions, such as access to healthcare. Moreover, the *WHOQOL-BRIEF* also appeared to have a ceiling effect, as all care partners scored high at the beginning of the intervention. Notably, all care partners were educated, of a higher socio-economic status, and seemed to actively access community resources, which may have contributed to their high baseline scores. Another QoL assessment to consider is the *Carer Well-being and Support Questionnaire* (Quirk et al., 2009). This measure was recently identified in a systematic review as the most accurate measure of QoL for informal care partners (Dow et al., 2018).

Lastly, continued exploration of telomere length is merited. Telomeres are tiny strands of DNA that shorten as we age and undergo stress (Shammas, 2011), and are thought to deteriorate more rapidly in people living with dementia and their care partners as they may experience more stress. During study two, a colleague collected telomere data from participants with dementia and their care partners before and four weeks after the interventions. Both care partners and participants increased their telomere length after the adaptive gardening intervention. Findings were mixed for the adaptive riding group as participants' telomeres lengthened, while care partners' telomeres shortened (Weigel & Faw, 2019). These findings warrant further research with a larger sample to better understand how both interventions may influence the biological health of people with dementia and their care partners.

Implications for Nature-Based Interventions

Both studies in my dissertation contribute to the growing evidence that nature-based interventions can support QoL for people living with dementia (Mmakp et al., 2020; Wood et al., 2017). Furthermore, both studies provided a novel approach for applying systematic behavioral observations to describe nature-based and complementary interventions. Study one contributed the first published example of a logic model of an animal-assisted intervention for people living with dementia. In addition, study two was the first nature-based comparison for this population, and the first to invite care partner participation. It is my hope that both studies may inform the development and piloting of other nature-based interventions.

Pertaining to the *development phase*, both studies in my dissertation provided new ways of describing nature-based interventions for people living with dementia. Namely, the behavioral observations utilized in both studies situated observed outcomes of participants' QoL within the occupational opportunities where they occurred. This was novel as prior observational studies of adaptive riding and gardening for this population categorized participants' outcomes by situation and did not distinguish the opportunities for activities within them. For instance, Fields et al. (2018) categorized participants' QoL outcomes during the adaptive riding intervention compared to other activity situations at their long-term care facilities. Similarly, Jarrott et al. (2002) categorized participants' emotional well-being and engagement during a gardening intervention at a day program, compared to those observed during their regular activities. Notably, these studies had different objectives that required a broader categorization of outcomes; yet, a drawback of this approach is a failure to understand where the observed outcomes occurred within each situation. Describing participants' outcomes in the occupational opportunities where they occurred in both studies was helpful for understanding whether the opportunities functioned as intended, and indeed they did. This fine-grain approach may be helpful for researchers describing other nature-based interventions.

Also relevant to the *development phase*, the logic model framework applied in study one was also useful for describing the adaptive riding intervention in-depth. Namely, the logic model of the adaptive riding intervention enabled a fine-grain description of intervention, linking its purpose, assumptions, components, occupational opportunities (activities) and their respective outcomes of QoL. Utilizing the logic model framework in study one guided the replication of adaptive riding and the creation of adaptive gardening in study two. While the developed logic model was the first example of a nature-based intervention involving animals for this population, there are logic models of gardening interventions. For instance, Buck (2016) used a logic model to inform the use of gardens for public health and policy in the United Kingdom, and Howarth, Brettle, Hardman, and Maden (2020) created a logic model to depict the relationship among gardens and health in their systematic mapping review. Yet, these logic models described a body of evidence in contrast to the logic model in study one that mapped a single intervention. Altogether, these examples of logic models may help guide the description of other nature-based interventions for people with dementia.

Concerning the *feasibility and piloting phase*, this dissertation provided the first published example of an adaptive riding and gardening interventions that invited care partner involvement. The invited participation of care partners is important because interventions supporting function and QoL are most effective when delivered to a person with dementia and their care partner (Scott et al., 2019). This was reflected in study two where participants demonstrated higher durations of pleasure during petting and grooming with care partners during adaptive riding when compared to study one without care partners. Indeed, study two highlighted the collaborative nature of participation among participants and their care partners, where care partners seemed to enrich the social interactions in both interventions. One other nature-based intervention invited care partner participation: De Bruin, Buist, Hassink, and Vaandrager (2019) created an adult day intervention involving farm work, interactions with animals, and gardening called Green Care Farms and also documented positive findings of QoL. Coupled with my findings, care partner involvement may enhance participants' QoL.

Also pertaining to the *feasibility and piloting phase*, study two provided the first example of a nature-based comparison study of adaptive riding and adaptive gardening. Notably, study two provided a basic understanding of how adaptive riding and adaptive gardening may be similar and different. Specifically, both interventions fostered emotional well-being, participation, social engagement, and may support function with chances for a person to use their existing capacities. In addition, both of these interventions may be meaningful as each participant chose to engage in the occupational opportunities within their respective intervention, suggesting on a foundational level, they found these opportunities acceptable and interesting enough to act upon. These findings align with previous research of adaptive riding and gardening interventions for people living with dementia, warranting their continued scientific advancement (Fields et al., 2018; Jarrott et al., 2002).

Study two also highlighted differences between adaptive riding and adaptive gardening. Specifically, adaptive riding appeared to offer more chances for complex participation and higher trends in active participation, and pleasure during opportunities with a horse. Horses are recognized as social animals who actively seek relationships (van Dierendonck & Goodwin, 2005), and interacting with them is thought to create feelings of comfort, acceptance, and belonging (Dell et al., 2011). Perhaps the social nature of the horse, coupled with the dynamic aspects of the horse-human interactions, may have motivated participants to engage in more complex ways. These new insights can contribute to broader understandings of how interacting with animals may support QoL for people with dementia.

Limitations

A limitation of the Medical Research Council's guidance for the development and evaluation of complex interventions is that their recommendations were intentionally broad to inform the scientific advancement of interventions in public health, social, and educational research. Accordingly, researchers must thoughtfully apply the framework based on the type of complex intervention studied, and the context in which it occurs. Yet, this framework does provide a comprehensive phased approach to guide the scientific advancement of complex interventions. In addition, findings from both studies should not be generalized due to small and non-diverse samples. Another limitation is the observational methods utilized in this dissertation are reliant upon a person's observable experience of QoL and may not align with their perceived experience. However, behavioral observations can be useful to describe a person's experience when they are unable (Ostrov & Hart, 2014), and can be helpful for people in the later-stages of dementia. Lastly, behavioral observations are time intensive and may not be feasible with a larger sample; still, this method afforded the rigorous description needed to scientifically advance the adaptive riding and adaptive gardening interventions. Broader quantitative and qualitative methods are needed to address these limitations in the future.

Areas for Future Research

Future research of nature-based interventions should invite care partner involvement and explore how it may or may not support participants' QoL. Also, there is a need to explore the acceptability of adaptive gardening and adaptive riding for care partners and people living with dementia. Further research of other nature-based comparisons for this population is needed to better understand how these interventions may support QoL similarly and differently. This understanding can enable people living with dementia, their care partners, and healthcare providers to best address the aspects of QoL they are hoping to achieve.

Eventually, I would like to conduct a full-scale evaluation investigating adaptive riding and adaptive gardening for people living with dementia with a wait-list control design. My hope is that my research may contribute to the growing evidence of nature-based interventions and perhaps one day, people with dementia could be prescribed and receive healthcare coverage for these interventions in the United States. Nature-based prescriptions, also called social prescriptions, are currently covered by healthcare systems in European countries, New Zealand, and Japan (Howarth et al., 2020; Shanahan et al., 2019). While the healthcare system in the United States is fundamentally different, nature-based interventions could receive coverage in the future with strong science, advocacy, and changes to healthcare policies.

CHAPTER FIVE: REFLECTIONS

The purpose of this chapter is to explore how my dissertation may contribute or relate to occupational science and rehabilitation science, the two sciences informing my doctoral degree; yet, also to reflect on my journey from a Ph.D. student to a scholar. First, I illuminate how my dissertation may contribute to occupational science. Second, I examine my dissertation through a rehabilitation science lens. Third, I reflect on my experience of becoming a scholar.

Occupational Science

Occupational science is an academic discipline focused on the study of occupations and how they unfold over time for people with and without disabilities (Larson, Wood, & Clark, 2003). While Larson and colleagues originally described occupational science as both an applied and a basic science, the field has since moved beyond investigating the basic substrates of occupation to more comprehensive and dynamic understandings using an environmental perspective. Dickie, Cutchin, and Humphrey (2006) pioneered an environmental perspective of occupation in their ground-breaking work that challenged previous conceptions of occupation as located in the person, detached from the larger context, and contained by a static environment. Dickie et al offered a new Deweyan perspective of occupation as a type of transaction, where occupation "functionally coordinates" the person and the environmental elements of their situation as a synergistic whole, holding the power to transform both (p. 90).

An environmental perspective of occupation gave rise to occupational scientists seeking to understand the situated nature of occupations. Occupational scientists have sought to identify the macro level historical, socio-political, and cultural forces that shape occupations (Laliberte Rudman, 2014). For instance, occupational scientists Madsen and Josephsson (2017) asked the "what" and "how" questions, exploring what macro level forces situate occupations and how they work in concert with the situation. Whereas, Wood (2019) explored occupations in the "here" and "now," examining how they are situated in specific locations and moments as they unfold across time. Understanding the situated nature of occupations has allowed for more comprehensive understanding of occupation, where occupational scientists have studied occupational justice, human rights, and questions concerning its meaning.

Recognizing the situated nature of occupations has also opened the door to exploring occupation as a collective experience. For instance, Ramugondo and Kronenberg (2015) continued to broaden understandings of occupation beyond the individual introducing the concept of *collective occupation*, or occupations that are engaged in by individuals but also groups, communities, and societies within their immediate situations. Ramugondo and Kronenberg highlighted how collective occupations may "reflect an intention toward social cohesion or dysfunction, and/or advancement of or an aversion to a common good," (p.10). While unified intentions of certain groups and societies can cause tension as they invariably serve to benefit some or oppress others, this perspective affords a broader understanding of occupation and lifts the curtain to examine the motivations behind them. More recently, Wood (2019) moved beyond the traditional anthropomorphic understandings of occupation to include non-human species. Particularly, Wood proposed that the Deweyan concept of "natural continuity," or the intermingling of lived experiences of live creatures, could be applied to more fully understand the complexity of occupation, especially in situations where the intermingling of live creatures may occur, such as the adaptive riding intervention.

While my dissertation was not specifically designed to contribute to occupational science, I was guided by a transactional understanding of occupation with an environmental perspective of QoL for people living with dementia. This perspective prioritized identifying and quantifying the opportunities for occupation within the immediate situation of the adaptive riding and the adaptive gardening interventions using behavioral observations. These observations situated participants' doings and associated QoL indicators in the "here" within each occupational opportunity, and the "now," documenting specific durations of time at which they occurred. The richness of the behavioral observational data enabled me to see how the occupational opportunities functioned in harmony with the physical and social elements of these interventions to synergistically support participants' QoL not only individually, yet also collectively as a group. These observations were not isolated, as direct service providers underscored the importance of each element of the adaptive riding intervention to holistically support participants' QoL in study one.

Future research of adaptive riding may contribute to deeper understandings of collective occupation across species. Particularly, future research of the adaptive riding intervention could explore occupation among humans and horses using Wood's (2019) application of "natural continuity." Indeed study two highlighted how occupational opportunities involving a horse appeared to lead to more complex participation and also held higher trends of pleasure, underscoring the enlivening and transformative potential of participating in occupations with a horse. As I reflect on my dissertation, I've become curious. How might these lived experiences and collaborative acts of doing among humans and horses function to form relationships and bonds, or a lack thereof? How might humans and horses unify with shared intentions during the adaptive riding intervention to engage in collective occupation, or how may they not? If so, how might these experiences transform them both? These questions merit further attention.

Moreover, the adaptive gardening intervention is *ripe* with opportunities to explore collective occupation in the future. Future research of the adaptive gardening intervention should explore the concept of collective occupation more in depth. Occupational scientists du Toit, Casteleijn, Adams, and Morgan-Brown, (2019) offered a research question that may be germane to future research of the adaptive gardening intervention: “How can the concepts of interdependence and shared doing (co-creating) be engendered to increase meaningful engagement for staff and residents [participants and care partners]?” (p. 580). Additionally, future research could investigate how adaptive gardening may transform not only people living with dementia, their care partners, and staff, but also shared community spaces. Based on my observations of the adaptive gardening intervention, the collective occupation of gardening indoors and outdoors holds the potential to transform people living with dementia, their care partners, staff, and their immediate spaces. It is not far-fetched to speculate that continued research of the adaptive gardening intervention might contribute to deeper understandings of collective occupation and highlight the ways in which it may transform people and their immediate situations for the common good.

As I reflect on my dissertation research, the enactment of the adaptive riding and the adaptive gardening interventions were an exercise in collective occupation. For instance, I relied on the staff at Hearts & Horses to implement the adaptive riding intervention. Also, because of my limited gardening experience, I was interdependent on others to successfully create and implement the adaptive gardening intervention. I was also struck by the unifying intentions of staff across several situational layers in both interventions. For instance, there was an intergenerational layer with students and younger volunteers who were paired with participants in both interventions, but also a blending of academic and interdisciplinary layers as 14 undergraduate and graduate students came together across nine different areas of study and intermixed with volunteers from the community. Yet, there was also a layering of different life experiences and ties to dementia. Some brought personal experiences with dementia, yet others held life experiences that fueled a desire to help others and a curiosity of what it might be like to work with this population. Despite our different ages, disciplinary perspectives, and life experiences, we were unified by the shared intentions of interacting with horses or gardening.

While I can't speak for others, the experience of conducting my dissertation research has left me transformed. I was incredibly moved that people from all walks of life would unite to carry both the adaptive gardening and adaptive riding projects to completion. My heart is bursting with gratitude for the participants in both studies, the care partners who shared their experiences, the stakeholders for their steadfast support, and the unwavering dedication of staff who together made both interventions possible. Through this experience, I have felt *part of* my community and I am a better person for experiencing their strength, compassion, resiliency, spontaneity, and creativity. While occupational science heavily influenced my dissertation, I must also acknowledge the other half of my doctoral studies: rehabilitation science.

Rehabilitation Science

Rehabilitation science is an academic discipline focused on the study of disability and function across the lifespan (Seelman, 2000). Rehabilitation scientists study how disabilities develop and how environmental supports and barriers may enable or disable a person to participate and perform in their daily life (Brandt & Pope, 1997; WHO, 2002). While rehabilitation scientists began with a narrow focus, studying disease and disability as inherent in the individual, devoid of environmental influences, the field has since broadened their view. For instance, rehabilitation scientists have applied the WHO's (2002) *International Classification of Functioning and Disability*, which acknowledges the influence of the physical, social, and attitudinal factors of the environment in addition to a person's unique background, health condition, body functions, and body structures that play a role in shaping their ability to participate in society.

While my dissertation was not guided by or designed to contribute to rehabilitation science, my broad understanding of participation in the second study was derived from the WHO's (2002) definition. Furthermore, when I examine my dissertation through a rehabilitation science lens, I recognize the importance of social support as a key environmental factor that seemed to support participants' engagement during the adaptive riding and the adaptive gardening interventions. For instance, the social support from staff enabled people living with various types and differing stages of dementia, as well as varying levels of function, to participate during both interventions. Particularly, both interventions offered a social environment that seemed to be enriched by the interactions among staff, other participants, care partners and for the adaptive riding group, horses. Staff offered and supported participants' choices for occupations with modifications to enable their participation (e.g. mounting ramp, seed tape, varying the steps in directions). Furthermore, the interactions between the participants, care partners, staff, and horses often brought smiles, conversation, and laughter. These interactions seemed to contribute to participants' QoL during both interventions. Perhaps, future research could explore how the physical, social, and attitudinal aspects of both interventions may or may not support each participant's ability to participate.

As I reflect on my experience conducting research of the adaptive riding and adaptive gardening interventions through a rehabilitation science lens, I am reminded of the importance of participating in occupations that bring us joy and chances to connect within our communities. Both of these interventions appeared to be a means of forming connections with others, all within the natural context of a barn or garden. The uplifting experiences that I've witnessed have inspired me to undertake and continue this work. It is my hope that my research might enable more people living with dementia to access occupations with nature and horses—and as a scholar, I am passionate about exploring how these occupations may shape well-being.

My Journey as a Scholar

I have experienced incredible growth as a scholar through this arduous Ph.D. process. My journey to becoming a scholar was realized with the support of Dr. Wood, my committee, and my Enriched Aging team. To them, I am incredibly grateful. On this journey, I've learned to be in the moment, to make peace with uncertainty, and to find my voice as a scholar.

A scholar must possess the ability to be in the moment, which to me is a continual process of intense focus, reflection, and questioning. When I began my Ph.D. journey, I carried my past work experiences with me. In addition to being an occupational therapist, I hold a background in journalism and marketing. While these experiences taught me to tell a story, they also taught me to write quickly. I soon realized that writing quickly does not afford the time needed for scholarly thought. Instead, scholarly writing requires me to linger "in the moment," to sit with the work, and to make space for intense focus, meticulous examination, and scrupulous critique. Scholarship involves reflecting on the thought processes behind *why* I'm thinking and writing about a topic in a certain way; connecting the topic to its past and present contexts that shape my understandings, or as King and Kitchener (1994) would call it, reflective thinking. I've learned that it takes time to produce quality scholarship and it often hinges on my ability to be in the moment. Dr. Wood has modeled this for me and I am thankful for her example. The skill of being in the moment is one that I will continually strive for as a scholar.

Another attribute of a scholar is being at peace with uncertainty. To me, this means being *okay* with the unknown, not only in regard to knowledge about a topic, but also with uncertainties or plot twists during a research project, or in daily life. I've encountered several plot twists on my Ph.D. journey: some brought joy, such as becoming a mother of two, while others were incredibly stressful—a global pandemic and wildfires. One of these twists even changed the course of my dissertation: due to recruitment difficulties, I decided to focus on the behavioral observations instead of short-term outcomes and care partner interviews as I'd originally planned. I was reluctant to change course, knowing that sleep deprivation was in my near future as I neared the birth of my second child. Yet, with the support of my mentor and committee, I was able to move past this uncertainty. And, I am so glad I did! I wouldn't have found significant differences in complex participation without changing course. As part of being at peace with uncertainty, I've been learning to identify and act upon what is in my power to control, and to let go of what isn't. While I can't say that I like uncertainty, I am learning to be at peace with it.

Part of becoming a scholar is finding your voice. Having a voice as a scholar, to me, is the ability to listen and to trust your own intuition, yet also the capacity to express, rationalize, and defend your position on a certain topic. After all, the whole point of scholarship is having a unique idea, conducting the research, and defending what you've done. Prior to embarking on my Ph.D. journey, my previous work experiences taught me to give voice to others through newspaper articles, marketing profiles, and client care plans. During my Ph.D. journey, there were moments where I felt comfortable and confident, as if I was finding my own voice. Yet at other times, I lost confidence and trust in myself, fearing that I lost my voice altogether. During these moments, I questioned myself and often defaulted to the voices of others, who I considered experts. Dr. Wood realized my struggle. She gave me permission to take the space and time to listen to my own voice, to write—unedited. Through this process, I wrote, not for

Dr. Wood, or my committee, but for myself and my reader. The culmination of this dissertation is the embodiment of my voice. It encapsulates my transformation from a Ph.D. student who found comfort in the voices of others, to a confident scholar with a voice of her own.

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APPENDICES

HEARTS & HORSES
Therapeutic Riding Center
est. 1997

Welcome!

Thank you for your interest in Hearts & Horses, a non-profit therapeutic horsemanship program, which creates a supportive and dynamic environment for the development of children and adults with disabilities living in our area. Through the teaching of horsemanship skills, physical, psychological, cognitive, behavioral, and communication goals are achieved and personal strengths are emphasized.

Children and adults with a wide array of disabilities including cerebral palsy, autism, and other spectrum disorders, sight and hearing deficits, multiple sclerosis, Down syndrome, emotional, developmental and learning disabilities find success in meeting their goals thanks to the powerful interaction with a horse. At present, we have an average of 150 riders per week participating in equine assisted activities at Hearts and Horses.

Physicians, therapists, teachers and friends may refer participants to Hearts & Horses. Our highly trained instructors and therapists design individual lesson plans for each participant tailored to their ability level and goals. Through a variety of equine-related activities, our participants realize many benefits that include greater confidence, self-awareness, increased balance, muscle strength and self-esteem.

Hearts & Horses offers a year-round program that includes group riding lessons and one-on-one intensive therapy with a licensed physical or occupational therapist.

To find more information about enrolling in an upcoming session at Hearts & Horses, please call

970-663-4200 or via email: info@heartsandhorses.org

Sincerely,

Jan

Jan Pollema
Executive Director

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EXPLANATION OF PROGRAM SERVICES, PARTICIPANT ELIGIBILITY AND POLICIES
KEEP FOR YOUR REFERENCE

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PROGRAM SERVICES

Therapeutic Riding (Ages 4 and up) –Therapeutic riding lessons are equestrian skill based lessons for individuals with disabilities. The focus of the lessons is skill development and progression while improving the rider's physical, cognitive, emotional and/or social skills. Lessons are taught by a Professional Association of Horsemanship International (PATH Intl.) Certified Therapeutic Riding Instructor and assisted by volunteers. Helping the participant reach their full potential is of paramount importance. The length of the lessons includes mounting and dismounting in addition to any pre or post mounted horse care planned by the instructor. Partial scholarships may be available based on family's financial need.

- **Group Classes -** 3-6 participants; generally one hour in length. Participants will engage in pre-mounted and post-mounted horse care (if appropriate). Participants are scheduled by age, skill level and availability.
- **Private Lessons -** Private lessons are typically 30-45 minutes in length depending on the needs and abilities of the participant. Due to arena space, private lessons are rare and only available with prior approval only.
- **Un-mounted Activities -** For participants who may be unable to ride a horse, un-mounted activities may be available.

Hippotherapy (Ages 2 and up) - Hippotherapy is a clinical, physical or occupational therapy using the horse as the modality and is administered by a licensed occupational, physical, or speech therapist. The horse's movement promotes active responses in the client and facilitates activation of postural control, balance, motor and sensory systems. Participants who have movement, speech and/or motor deficits can benefit from Hippotherapy.

A physician's prescription for physical therapy and/or occupational therapy with Hippotherapy is required. Hippotherapy fees are $75 per 30 minute session and are to be paid to the therapist at each treatment session. This service may qualify for insurance reimbursement. At this time Hearts & Horses does not bill through insurance, so any reimbursement must be processed through the individual's insurance, by the individual and is solely their responsibility.

TO GET STARTED

1. Contact Hearts & Horses for a Participant Intake Interview and schedule a short visit to Hearts & Horses.
2. Read carefully the Participant Enrollment Packet, which also includes a Physician Assessment.
3. Please complete the Participant Enrollment Packet and have your physician complete the Physician's Assessment.
4. Set up evaluation once forms are returned to Hearts & Horses.
5. After the evaluation we will discuss our services and your goals to determine the right placement in a class (if appropriate) and new participants can register for the next upcoming session during the open registration period.

New Participants: Once all completed forms are returned to Hearts & Horses along with a $35 evaluation fee, you will be contacted to schedule an evaluation. If it is determined that a physical or occupational therapist is needed, there will be a $45 evaluation fee. If the evaluation fee is a hardship, scholarship funds may be used to help offset the cost.

Prior to and during the evaluation, we will ensure that our program is appropriate for you and that there are no contraindications to your participation in mounted equestrian activities.

Un-mounted equestrian activities are also available for those unable to ride.

***ALL enrollment forms must be updated annually in January.**

Explanation of Program Services, Participant Eligibility and Policies

Keep for Your Reference

Page 2 of 3

Eligibility Guidelines and Discharge Policy

Minimum Age: Therapeutic Riding – 4 years of age; Hippotherapy – 2 years of age. There is no maximum age for services at Hearts & Horses, as long as the Participant has no physical or medical contraindications.

Weight Maximums: Due to safety considerations for staff, participants and volunteers, we may not be able to accept a participant into the program who weighs over 170 pounds.

Postural Control: Riders over 60 pounds must be able to maintain a sitting position; at least by holding on with one hand.

Discharge Policy: Hearts & Horses strives to provide the safest possible conditions for participants, volunteers and employees. The acceptance, and continued participation, of a participant in our program depends on the availability of instructors, volunteers and suitable horses and is based on our determination that we can safely accommodate the participant. Hearts & Horses adheres to precautions and contraindications for participants established by the Professional Association of Therapeutic Horsemanship International (PATH Intl.). Hearts & Horses retains the right to refuse any participant that we cannot safely accommodate. Participants must inform us of changes in health status.

Safety Rules & Guidelines

Our program has an excellent safety record. Please observe these safety rules.

- If weight of participant is over 170 pounds, please let us know. For safety considerations, we may not be able to accept participants over 170 pounds.
- Children must be supervised at all times; please do not leave children unattended or allow then to run and play loudly.
- Parents must stay on the property during their child's lesson.
- Dogs and smoking are not allowed on Hearts & Horses property.
- Do not visit the horses without permission and supervision, including entering the horses stalls.
- Please observe quietly; your family members and friends are always encouraged to visit. When lessons are in progress or horses are out, guests are required to remain in the appropriate spectator area.
- Our horses and volunteers should be treated kindly - they work very hard for us all.
- Please drive slowly and park in designated areas.

Attire and Equipment

- Appropriate clothes are long pants and appropriate shoes for being around horses, preferably hard soled boots with a low heel. No sandals, flip flops, or Crocs please! Dress for comfort and according to the weather. Wear close-fitting clothing for safety as well as comfort. Loose or baggy clothing can get caught and tangled in equipment. No dangling jewelry is permitted.

- All participants are required to wear an ASTM/SEI approved Equestrian helmet when near/on horses. If you don't have your own helmet, Hearts & Horses will provide you with one. Should you choose to purchase your own, we can recommend several tack shops in our area.

Scholarship Information

If you need financial assistance, we have a limited number of partial scholarships available for those who qualify. It is our policy to keep our services accessible, so please contact the Program Coordinator if you need assistance to help cover the cost of your lessons. ***A scholarship application which MUST INCLUDE verification of your income (ex: tax return) must be submitted <u>by the registration deadline of the session you wish to register for.</u>**

Explanation of Program Services, Participant Eligibility and Policies

Keep for Your Reference

Page 3 of 3

Volunteers

Hearts & Horses instructors are assisted by a team of incredible volunteers. They groom and tack the horses and help the participant during class. Many volunteers help in other aspects of the organization, from facility maintenance, to office work, to fundraising. If you or someone you know is interested in volunteering, please refer them to the volunteer page on our website for further information. Please remember to thank your volunteers.

Cancellation Policy

Hearts & Horses will hold classes inside to allow riding during adverse weather conditions. However, if any conditions arise that may create unsafe circumstances in which to hold class, classes may be cancelled. The safety of our participants, volunteers and equines is of upmost importance! ***Refunds or credits are not issued for classes that are cancelled for circumstances beyond Hearts & Horses control**. Classes may be cancelled due to the following:

- Larimer County is on accident alert status or weather conditions have the potential to deteriorate significantly by the end of class time.
- Extreme winds, heat (above 95) or cold (below 20)

Attendance and Promptness

- Regular attendance is important! Please call if you cannot make your scheduled time as soon as possible (24 hours is ideal) so that we do not have horses, volunteers and instructors waiting for you. **Two "no call/no shows" in a session may result in you being asked to forfeit your spot to someone on the waiting list.** Hearts & Horses does not refund money for classes that you must cancel.
- Please arrive on time or a few minutes early for your class. We will make every effort to accommodate each rider; however, late arrivals may result in not being able to ride that day. A rider that arrives 15 minutes of more after the start of their class will not be allowed to ride.

Thank you!

Thank you for taking the time to review our policies and procedures, which are designed to provide our participants with a safe, effective and enjoyable environment. We encourage your input and suggestions. Please feel free to forward comments to Jan Pollema, Executive Director, at 970-663-4200 or email: jan@heartsandhorses.org

***Please keep this information (pages 1-3) for your reference.**

2016 HEARTS & HORSES REGISTRATION FORM

This writable PDF form can be saved and emailed
Register by Mail, email, fax or in Person

SESSION DATES • REGISTRATION DEADLINES • PRICING

Session		Session Dates	Registration Begins	Registration Deadline	Price: 1.5 HR Group	Price: 1 HR Group	Price: 30 min Private	Price: 45 min Private
Winter	8 Weeks	Jan 11-Mar 5	11/20/15	12/11/15	$360	$240	$320	$400
Spring	8 Weeks	Mar 21-May 14	2/5/16	2/19/16	$360	$240	$320	$400
Summer	8 Weeks	Jun 6-Aug 6	4/15/16	4/29/16	$360	$240	$320	$400
Fall	8 Weeks	Aug 20-Oct 17	7/1/16	7/15/16	$360	$240	$320	$400
Holiday	6 Weeks	Nov 2-Dec 17	9/23/16	10/7/16	$270	$180	$240	$300

Participant's name ______________________ Weight (*Please call if over 170#*)______ Height ______ Age ______

Responsible Party ______________________ Female Head of Household? ☐ Yes ☐ No For grant reporting purposes **only**

Phone(s)______________________ Email Address ______________________

Mailing Address ______________________ City ______________________ Zip ____________

Emergency Contact Name & Phone ______________________

Has participant's medical status changed? (seizures, etc?) ☐ Yes ☐ No If yes, please describe below:

____

PROGRAM (CHECK ONE) ☐ **THERAPEUTIC RIDING** ☐ **HIPPOTHERAPY**
☐ **CHANGING LEADS** ☐ **HEARTS & HORSES FOR HEROES (VETERANS)**

TYPE OF LESSON (CHECK ONE) ☐ **GROUP** ☐ **30 MIN. PRIVATE** ☐ **45 MIN. PRIVATE**
*** (PRIVATE LESSONS BY PRIOR ARRANGEMENT ONLY)**

Returning Participants
☐ I would prefer to keep my current day/time.
☐ I need to change my class; List your availability in the box →
☐ **I am a NEW participant;** List your availability in the box →

Availability:

Method of Payment (Please check one) *Payment or arrangement for payment must be made at the time of registration.

Please specify amount paid: $______________ Checks can be made payable to Hearts & Horses

☐ **Check#** __________ OR ☐ **Cash** *Please hand deliver to Hearts & Horses Office (M-F 9:00 am-5:00 pm)
☐ **Credit Card** *Call office or pay online at www.heartsandhorses.org If paying online, please attach your receipt.
☐ **Paid for by other agency or benefactor** *Please note you are still responsible for securing payment
Name of agency/contact person/address/phone ______________________________
☐ I have **2016 scholarship** forms on file. I understand that funds are limited.

***Office Use Only**:* Date Received __________ Initials __________

HEARTS & HORSES Therapeutic Riding Center • est 1997 • A PATH Intl Premier Accredited Facility • *2013 Non Profit of the Year*
163 North County Road 29 • Loveland, Colorado 80537 • Phone: 970.663.4200 • Fax: 970.663.3891 • www.heartsandhorses.org

2016 Enrollment Packet – Hippotherapy & Therapeutic Riding
(Page 1 of 5)

In order to ensure coordinated care, Hearts & Horses staff and volunteers may be provided with information about participant's abilities/disabilities.

Today's Date ______________

Participant's Name ______________________________ Birthdate ______________ Age ________

Weight ____________ *(Please call if weight over 170#)* Height ____________ Sex ________ Grade ______

Parent / Caregiver / Self (*please circle*) Name ____

Email ______________________________ Phone ______________________

Address ______________________________ City______________ Zip Code __________

Income Range (*for grant purposes – kept private and confidential*): ☐ Less than $30,000 ☐ $30,000 to $47,000

☐ Above $47,000 ☐ Decline to Answer

Ethnicity (*for grant purposes – kept private and confidential*): ____________________ ☐ Decline to answer

Client Goals: Personal ____

School ____

Family ____

Horsemanship ____

Strengths and Abilities ____

____

____

Presenting Problems/Concerns ____

____

____

Primary Diagnosis ____

Secondary/Tertiary Diagnoses ____

____

Physical Disabilities/Limitations ____

____

Allergies to medications or foods ____

____

2016 Enrollment Packet – Hippotherapy & Therapeutic Riding
(Page 2 of 5)

EMERGENCY CONTACTS – IN THE EVENT OF AN EMERGENCY, HEARTS & HORSES SHOULD CONTACT:

Name ____________________ Relation _________________ Phone(s) ____________________________

Name ____________________ Relation _________________ Phone(s) ____________________________

Name ____________________ Relation _________________ Phone(s) ____________________________

POLICY OF CONFIDENTIALITY

I agree to respect and observe privacy and confidentiality of the participants, volunteers, and donors of Hearts & Horses, Inc. and will not discuss or disclose any sensitive information about any person or their family.

_____________________________________ _____________________________________

Minor Participant Signature Parent or Legal Guardian Signature

CANCELLATION POLICY

Hearts & Horses will hold classes inside to allow riding during adverse weather conditions. However, if any conditions arise that may create unsafe circumstances in which to hold class, classes may be cancelled. The safety of our participants, volunteers and equines is of upmost importance. ***Refunds or credits are not issued for classes that are cancelled for circumstances beyond Hearts & Horses control**. Classes may be cancelled due to extreme heat, wind or cold.

I have read and understand Hearts & Horses cancellation policy: _____________________________________

Signature of Responsible Party

PHOTO & VIDEO RELEASE

Name of Participant ____

For valuable consideration given and which is hereby acknowledged, the undersigned hereby grants to Hearts & Horses, Inc. permission to take, or have taken, still and moving photographs and films including television pictures of the above named Participant, and consents and authorizes Hearts & Horses, Inc., its advertising agencies, news media, and any other persons interested in Hearts & Horses, Inc. and its programs, to use and reproduce the photographs, films, videos and pictures, and to circulate and publicize the same by any means deemed appropriate by Hearts & Horses, Inc., including, without limitation the generality of the foregoing: newspapers, web sites, social media, television media, brochures, pamphlets, instructional materials, books, and clinical materials.

With respect to the foregoing matters, no inducements or promises have been made to secure this signature to this release other than the intention of Hearts & Horses, Inc. to use, or cause to be used, such photographs, films, videos and pictures for the primary purpose of promoting and aiding Hearts & Horses, Inc. and the field of equine assisted activities and therapies.

I give consent ____ Date _____________

Signature of adult participant or parent/guardian/caregiver of minor participant

I <u>**do not**</u> give consent ____ Date _____________

Signature of adult participant or parent/guardian/caregiver of minor participant

2016 Enrollment Packet – Hippotherapy & Therapeutic Riding

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RELEASE OF LIABILITY

Name of Participant ____

WARNING

Under Colorado Law, an equine professional is not liable for an injury to or the death of a participant in equine activities resulting from the inherent risks of equine activities, pursuant to section 13-21-119, Colorado Revised Statutes.

RELEASE AND INDEMNIFICATION

I am aware that any activities involving horses are hazardous and I am voluntarily participating in these activities with knowledge of the danger involved, and hereby agree to accept any and all risks of injury, including death, and damage to property arising from participation. I **hereby promise not to sue, and hereby release**, to the fullest extent permitted by law, Hearts & Horses, Inc. and its agents, officers, directors, members, representatives, instructors, volunteers, coordinators, insurers, independent contractors, therapists and employees (collectively the "Released Parties"), from, **and hereby waive**, all claims of whatsoever kind that may be asserted against the Released Parties for personal injury and property damage arising from or in connection with participation in equine activities, and from the condition of the real property and personal property used in connection with such equine activities. By way of example, and not in limitation, this Waiver and Release includes releasing and waiving claims based upon: any negligent acts or omissions of the Released Parties and any other person; contract; warranty; premises liability; products liability; subrogation; contribution; and loss of consortium or loss of society.

I also hereby agree to indemnify, defend, and hold and save harmless the Released Parties from any claims, damages, expenses and costs incurred of whatsoever nature (including by way of example, and not in limitation, attorney fees and expenses), which may be made against or incurred by the Released Parties, arising from or in connection with my participation, including without limitation, any claims made by me or any other person.

It is intended that this Release and Indemnification shall release the Released Parties from, and waive, any and all claims, and indemnify the Released Parties, to the greatest extent allowed by law. In the event for any reason a Court determines that any portion of this Release and Indemnification is not enforceable, that provision shall be modified so as to give it the greatest effect allowed by law, or if it cannot be so modified shall be severed and the balance of the Release and Indemnification shall be given the greatest force and effect available under law. Furthermore, in the event that notwithstanding this Release and Indemnification, it is determined that any Released Party has any liability for any claim, in no event shall the liability exceed the amount of $500 in total aggregate for all claims arising from or in connection with my participation.

I acknowledge that by signing this document I am waiving important legal rights. I also acknowledge that the Released Parties would not allow me to participate in equine activities unless I have agreed to the waivers, releases, indemnifications and limitations contained in this Release and Indemnification. I acknowledge that the Released Parties are relying upon these provisions as a primary material consideration for allowing my participation in equine activities. I acknowledge and agree that the terms hereof are binding upon me, and my heirs, successors, representatives, insurers, and assigns.

If signing on behalf of another person, I represent and warrant to the Released Parties that I am the parent or legal guardian with the capacity to execute and make the foregoing waivers and indemnifications on behalf of such person; and I further acknowledge and agree that I am also personally bound by and make the releases and waivers as above set forth, and that I am jointly and severally liable for the indemnifications to the Released Parties.

Signature ____ Date ______________

Signature of adult participant or parent/guardian/caregiver of minor participant

2016 Hearts & Horses – Physician Assessment and Health History
(Page 4 of 5)

______________________ Date of Birth __________ Age _______ Gender ☐ M ☐ F
Name of Participant

TO BE COMPLETED BY PHYSICIAN

Height ____________ Weight _______ Date of Last Tetanus Shot ________________

Mobility: ☐ Independent ☐ Assistive Device ______________________________

Primary Diagnosis ____________________________________ Date of Onset ____________

Secondary Diagnosis __________________________________ Date of Onset ____________

Seizures ☐ No ☐ Yes Type ______________________ Date of last seizure ________________

Shunts/Impants: ____

Past/Prospective Surgeries (include dates and reasons) ______________________________

____

____

PLEASE LIST ALL CURRENT MEDICATIONS

1. ______________________________ Taken for: ______________________________
2. ______________________________ Taken for: ______________________________
3. ______________________________ Taken for: ______________________________

In order to safely provide this service, Hearts & Horses requests that you please note that the following conditions may suggest precautions and contraindications to equestrian activities. Therefore, when completing this form, please indicate whether these conditions are present and to what degree.

Orthopedic
Atlantoaxial instability (include neurologic symptoms)
Coxarthrosis
Cranial defects
Heterotopic Ossification/ Myositis Ossificans
Joint subluxation/dislocation
Osteoporosis
Pathologic fractures
Spinal Joint Fusion/Fixation
Spinal Joint instability/Abnormalities

Medical/Psychological
Allergies
Animal Abuse
Cardiac Conditions
Physical/Sexual/Emotional Abuse
Blood Pressure Control
Dangerous to Self or Others
Exacerbations of Medical Conditions (e.g. RA,MS)
Fire Setting
Hemophilia
Medical Instability
Migraines
PVD
Respiratory Compromise
Recent Surgeries
Substance abuse
Thought Control Disorders
Weight Control Disorder

Neurologic
Hydrocephalus/shunt
Paralysis due to spinal cord injury
Seizure
Spina Bifida/Chiari II Malformation
Tethered cord/Hdromyelia

Other
Age - Under 4 years
Indwelling Catheters/Medical Equipment
Medications – e.g., Photosensitivity
Poor Endurance
Skin Breakdown

*Next Page →

2016 Hearts & Horses – Physician Assessment and Health History
(Page 5 of 5)

When complete with ALL signatures, please return BOTH pages of this form

_______________________________ Date of Birth __________ Age ________ Gender ☐ M ☐ F
Name of Participant

As thoroughly as possible, please indicate current or past difficulties/symptoms in the following systems/areas that apply (include surgeries).

Area	No	Yes	Comments
Auditory			
Visual			
Tactile/Sensory			
Speech			
Cardiac			
Circulatory			
Integumentary/Skin			
Immunity			
Pulmonary			
Neurologic			
Muscular			
Balance			
Orthopedic			
Allergies			
Learning Disability			
Cognitive			
Emotional/Psychological			
Pain			
Other			

FOR PARTICIPANTS WITH DOWN SYNDROME

An annual neurological exam to exclude Atlantoaxial instability is required for all participants with Down Syndrome over the age of three. Please provide the following information:

Date of Exam ______________ Results of Exam ______________________________

Given the above diagnosis and medical information, this person is not medically precluded from participation in equine-assisted activities and/or therapies. I understand that Hearts & Horses, Inc. will weigh the medical information indicated above against any existing precautions and contraindications before accepting this person for mounted equestrian activities. Therefore, I refer this person to Hearts & Horses for ongoing evaluation to determine eligibility for participation.

Physician Name/Title______________________________ MD DO PA NP Other __________

Signature ______________________________ **Date** ______________

Address____

Phone ______________________________ License/UPIN Number ______________

SUPPLEMENTARY MATERIALS

Table 9.

Definitions of Qualitative Codes and Sub Codes.

Codes and sub codes	Definitions
Purpose	Text clearly stating the mission or purpose of the program.
Assumptions	Text describing the beliefs, ideas, and principles that define how and why the program is thought to change or benefit older adults with dementia (see WK Kellogg Foundation, 2004).
Horse and nature connection	Comments describing older adults' positive behaviors by being around horses and the natural environment during the program. Includes phrases involving the sensory aspects of interacting with horses and nature (e.g. sights, smells, touch) and tapping into previous memories of being with horses and in nature.
Social participation	Phrases related to attributing the benefits of the program to social interactions and connections.
Holistic experience	Text explaining older adults' positive behaviors by detailing the interdependence of the different experiences available in the program.
Inputs	Text describing the financial, human, organizational, and community resources required to implement the program (see WK Kellogg Foundation, 2004).
Personnel and training	Phrases describing the roles of the therapeutic riding center staff and volunteers and the training they received.
Horses	Phrases describing the horses including their breed, age, personality, and their roles in the program.
Facility and equipment	Phrases describing the therapeutic riding facility and the equipment used during the sessions.
Cost and transportation	Text describing the cost of program sessions and how the LTC facilities brought older adults with dementia to program sessions.
Participant screening and measures	Descriptions of the screening process for older adults with dementia to be enrolled in the program as well as text describing the measures used to document older adults' outcomes.
Occupational Opportunities	Text describing the options that were offered to participants to engage in specific activities throughout each session of the program (see Wood et al., 2017).
Ground experience	Phrases referring to activities offered off of the horse.
Riding experience	Text describing activities that occur when mounted on horseback.
Outputs	Text describing the direct products that the program provided to the participants, such as the size and scope of services or number of participants reached (e.g. number of residents, or dosage) (Mclaughlin & Jordan, 2004; WK Kellogg Foundation, 2004).

Table 10.

Modified Activity-in-Context-in-Time Codes

Domain	Code	QoL Indicator Category
Occupational Opportunities	AR: Grooming	NA
	AR: Petting	NA
	AR: Riding	NA
	AR: Observing	NA
	AR: Transitioning	NA
	AG: Planting	NA
	AG: Weeding	NA
	AG: Harvesting	NA
	AG: Observing	NA
	AG: Transitions	NA
Apparent Affect	Anger	Negative
	Anxiety/Fear	Negative
	Interest	Positive
	Pleasure	Positive
	Sadness/Depression	Negative
	No Apparent Affect	Negative
Agitation	Yes Agitation	Negative
	No Agitation	Positive
Participation	Yes Engaged Gaze	Positive
	No Unengaged Gaze	Negative
	Yes Communication	Positive
	No Communication	Neutral
	Yes Active Participation	Positive
	AR Modifier: Grooming	Positive
	AR Modifier: Mount or Dismount	Positive
	AR Modifier: Pet	Positive
	AR Modifier: Ride	Positive
	AR Modifiers: Ride and Games*	Positive
	AR Modifiers: Ride and Pet*	Positive
	AR Modifier: Tack or Untack	Positive
	AR Modifier: Turn Horse Out to Pasture	Positive
	AG & RM Modifier: Incidental Activities	Positive
	AG Modifier: Eating	Positive
	AG Modifier: Explore the Gardening	Positive
	AG Modifier: Harvesting	Positive
	AG Modifier: Planting	Positive

	AG Modifier: Weeding	Positive
	No Active Participation	Neutral

Note. AG, adaptive gardening, AR, adaptive riding. Apparent Affect definitions were based on Lawton, Van Haitsma, and Klapper's (1996) and Lawton, Van Haitsma and Perkinson's (2000). Agitation codes were based on Cohen-Mansfield, Marx, and Rosenthal (1989). Participation codes were derived from Wood (2005).

*Complex active participation, all other codes represent singular active participation, with exception to the incidental activity code "Groom and Pet."