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Increasing Occupational Participation of Older Adults with Low Vision Through an Occupation-Based Exercise Video

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Running Head: GEARING UP FOR GUIDE DOGS

Increasing Occupational Participation of Older Adults with Low Vision Through an Occupation-
Based Exercise Video

Valerie DeRoos and Skyler Moon

A Culminating Project Submitted in Partial Fulfillment of the Requirements for the
Degree Master of Science Occupational Therapy
School of Health and Natural Sciences
Dominican University of California

San Rafael, California

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This project, written under the direction of the candidates' faculty advisor and approved by the chair of the Master's program, has been presented to and accepted by the Faculty of the Occupational Therapy department in partial fulfillment of the requirements for the degree of Master of Science in Occupational Therapy. The content, project, and research methodologies presented in this work represent the work of the candidates alone.

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Abstract

With the increasingly large population of older adults with low vision, many older adults would benefit from having a guide dog as an assistive device. When walking with a guide dog, different upper extremity muscles and postures are adopted to handle the guide dog. However, older adults with low vision may not be in the proper physical condition to meet the strenuous demands of handling a guide dog due to the normal aging process and decreased mobility. To prevent pain and injury, stretching and strengthening muscles used when handling a guide dog may benefit older adults before entering the Guide Dogs for the Blind (GDB) training program. The objective of the project is to improve older adults' strength and endurance through the use of an evidence-based, occupational exercise video. The exercises within the video are integrated into daily life activities to promote habituation and adherence to the exercises.

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Introduction

Older adults with low vision is a growing population. Guide dogs are effective assistive devices that positively influence the lives of older adults with low vision. However, barriers exist that prevent older adults from receiving a guide dog. Older adults may not know that they are eligible for a guide dog as an assistive device. If eligibility is met, older adults may still be struggling with the transition from a long cane to a guide dog. Occupational exercises can be integrated into older adults' daily life activities to stretch and strengthen the necessary muscles to handle a guide dog. The purpose of this project is to develop an exercise video, *Gearing Up for Guide Dogs: An Exercise Video*, in order to prevent pain and injury while facilitating the success of older adults within the Guide Dogs for the Blind (GDB) training program. Older adults may use this video during the application process in preparation for training. It is hoped that continued practice of the exercises in *Gearing Up for Guide Dogs: An Exercise Video* will maintain muscle strength to prevent pain and injury when handling a guide dog.

The short-term goals for this project are to decrease muscle pain and injury when handling a guide dog and to promote older adults' success in the GDB program. Long-term benefits may potentially increase eligibility of older adults in preparing and maintaining the physical capability when partnering with a guide dog. Additionally, integration of exercise into daily occupations may facilitate older adults' long-term adherence to exercise, and therefore help to maintain their ability to handle a guide dog. There are four chapters in the video, with the first three focusing on stretching and strengthening the upper body, lower body, and abdomen. The fourth chapter presents information about appropriate footwear to prevent pain and injury while walking with a guide dog.

Literature Review

The following literature review will first discuss older adults with low vision. Subtopics include gait with low vision and community mobility. Fear also influences older adults with low vision as it relates to a fear of falling and fear of being stereotyped. The use of assistive devices will be discussed in relation to older adults with low vision. Then, the muscles used with a guide dog will be explored in order to develop appropriate exercises for the exercise video. Finally, traditional structured physical activity programs will be compared to lifestyle intervention programs integrating exercises into daily activities, which may result in long-term adherence to the program. Thus, *Gearing Up for Guide Dogs: An Exercise Video* was developed to promote long-term increased physical activity to facilitate continued guide dog handling for older adults with low vision.

Visual Impairment in Older Adults

Visual impairment is defined as “having 20/40 or worse vision in the better eye even with eyeglasses” (Blindness and Vision Impairment, 2011). Visual impairment is attributed to chronic eye conditions such as age-related macular degeneration, cataracts, diabetic retinopathy, and glaucoma (World Health Organization [WHO], 2007). According to the WHO (2007), age-related visual impairment is increasing. Visual impairment ranges from low vision to total blindness. Low vision is defined by the National Eye Institute as “a visual impairment that is not correctable by standard eyeglasses, contact lenses, medication, or surgery and that interferes with the ability to perform everyday activities” (National Eye Institute, n.d., para 8). Legal blindness is defined as having visual acuity less than 3/60 or a visual field of less than 10 degrees in the better eye, with correction (WHO, 2007). Total blindness is the inability to perceive light (WHO, 2007). It is estimated that 65% of people who are visually impaired are over age 50. Of those

visually impaired over age 50, 82% are blind (WHO, 2014). Organizations that provide rehabilitation services for older adults with varying levels of vision will be in increasingly high demand because the number of Americans over age 65 is predicted to increase twofold over the next 40 years (Harada, Natelson, & Triebel, 2013). Older adults' participation in daily activities can be hindered by low vision, which can increase functional disability through a decreased ability to see and interact with their environment (Travis, Boerner, Reinhardt, & Horowitz, 2004).

Vision and mobility. Vision assists with balance and also plays a major role in gait (Logan et al., 2010). Vision provides sensory information about the body's position in space. Sensory information travels through the nervous system to the brain, which then sends motor signals to the muscles in response to the sensory information received. When standing still, vision helps with making postural corrections to maintain balance. During movement, the body's nervous system processes sensory signals, including visual input, to maintain a stable, upright posture (Logan et al., 2010). Therefore, when walking, vision assists in maintenance of balance when shifting from standing on two legs to supporting all of the body's weight on one leg (Logan et al., 2010). Through these pathways of sensory and motor information, adaptation occurs to maintain balance and an upright posture when standing or walking.

Change in body position and movement from one place to another is termed "functional mobility" (American Occupational Therapy Association, 2014). Functional mobility can affect one's ability to participate in meaningful daily activities. Older adults with low vision experience functional mobility challenges, some rooted within themselves and others within their environment. As visual input is used for mobility, older adults with low vision must adapt and develop new strategies to compensate for their low level of vision.

Because of the important role of vision in gait, those with low vision use different strategies when walking. A cross-sectional retrospective study by Hallemans, Ortibus, Meire, and Aerts (2010) compared 10 adults with low vision to 20 typically sighted individuals as controls. Participants had a mean age of 27 with a range of 13 years. Gait was measured with an automated infrared camera system that recorded the movement of markers placed on key points of the participants' bodies. The researchers then analyzed results and compared the data between groups using statistics. Patterns of walking down the walkway in this study were significantly different between older adults with low vision and sighted individuals. Compared to sighted individuals, participants with low vision had shorter stride lengths, an earlier heel strike, and less bending forward at the trunk when walking (Hallemans et al., 2010). These patterns indicated a slower gait with greater stability due to shorter strides and were also observed in the sighted controls when they walked across the walkway blindfolded. A significance ($p < .05$) was found for stride length, cadence, maximal trunk anteflexion, and maximal ankle dorsiflexion in stance. However, no differences were found in preferred walking speed and walking direction between participants with low vision and sighted individuals (Hallemans et al., 2010). While the participants in the study were younger than 55, the studies highlighted the differences in gait between participants with low vision and sighted individuals. The specific adaptations in gait were seen in both participants with visual impairment and in sighted individuals when they were blindfolded, as such, one can assume these are universal gait changes when walking with low or no vision. Because of the key role of vision in gait, older adults with low vision may require more assistance to maintain their balance than sighted individuals.

Vision and community mobility. Through the use of a qualitative descriptive research paradigm, Southall and Wittich found that older adults reported negative experiences on public

transportation and in other crowded areas in the community (2012). Six focus groups were created to understand barriers and perspectives of accessibility of low vision services. Twenty-one individuals with an age range of 38 to 92 participated in the focus groups. While the aim of the study focused on accessibility of low vision services, results indicated that participants experienced difficulty with community mobility. Difficulties expressed included negative experiences that occurred in the community, such as being bumped by others without visual impairments due to a lack of awareness. Further, when interacting with others without visual impairments, study participants reported a fear of being stereotyped, beliefs that others were misinformed regarding visual impairments, and feelings of stress (Southall & Wittich, 2012).

Fear. Older adults with low vision may experience fear related to mobility in the community. Rudman and Durdle (2008) performed a secondary analysis from a descriptive phenomenological study. They found that older adults described their experience of living with low vision as having “a pervasive sense of fear regarding one’s body and way of being” (Rudman & Durdle, 2008, p. 111). Participants in the study were older adults ranging in age from 70 to 94. Feelings of fear also resulted in inability to engage in meaningful activities (Rudman & Durdle, 2008). Similarly, Southall and Wittich (2012) also found that participants noted being referred to as “blind” elicited a negative response within them. Additionally, feelings of fear may hinder older adults’ ability to access necessary services that will improve their independence and participation in meaningful occupations (Southall & Wittich, 2012).

While fear is a valid feeling related to community mobility, successful use of an assistive device such as a guide dog or a long cane can increase participation in meaningful occupations for older adults with low vision. Community mobility may be challenging for older adults with low vision, yet compensation and adaptation may help with successful navigation of the

environment (Southall & Wittich, 2012). Compensation and adaptation can take the form of assistive devices. Assistive devices such as a long cane or guide dog are helpful for older adults with low vision.

Assistive Devices

According to the Assistive Technology Act of 1998, an assistive technology device is defined as “any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities” (United States, 1998). Assistive devices function to support or increase older adults’ ability to complete everyday tasks when used properly (Fok, Polgar, Shaw, & Jutai, 2011). Fok et al. (2011) divided low vision assistive devices into five categories: optical devices and electronic vision-enhancement systems, mobility devices for vision rehabilitation, prisms and other field-enhancement devices, lighting and filters, and adaptive computer technologies. The researchers conducted telephone interviews with 17 older adults with a mean age of 57 to gather information on the selection process and use of low vision assistive devices. Among the 124 assistive devices named by older adults, 16% of those devices were not used consistently (Fok et al., 2011).

Adequate training, education, and professional support are necessary for older adults to successfully use a new assistive device (Gramstad, Storli, & Hamran, 2014; Skymne, Dahlin-Ivanoff, Claesson, & Eklund, 2012). The assistive devices in these studies were for older adults with typical vision, however, the studies still provide important insight into the type of support needed for older adults when learning to use new assistive devices. Gramstad et al. (2014) conducted interviews with nine older adults three times during the assistive technology device (ATD) service delivery process. The results from these interviews were compiled using a

hermeneutical phenomenological perspective, which indicated that older adults expected to be able to successfully use the assistive devices once they were received (Gramstad et al., 2014). However, most were unable to properly use the assistive device because of insufficient professional training. Insufficient training led to feelings of low self-efficacy among older adults, which further hindered attempts to learn to use a new assistive device. Skymne et al. (2012) found that in order to successfully complete training, older adults must understand their physical capabilities and trust the professional training them. When older adults were assured that the professional was providing them with accurate information, they were more confident and successful in using their prescribed assistive devices (Skymne et al., 2012).

In Gramstad's et al. study, there was a common theme among the participants of feeling abandoned by the professionals once their devices were received (2014). Participants expected that any potential problems could be solved with help from a professional support system, but lack of follow up led to unsuccessful device use. Participants in the study were not aware of which professionals to call for help, and this prevented participants from using their assistive device regularly. Gramstad et al. (2014) concluded that older adults need a professional support system with easily available contacts in order to increase assistive device use.

Participants in the GDB program graduate from the program with a large alumni support system. The alumni association includes access to the support center, which includes telephone counseling for dog management, veterinary issues, mobility concerns, legal issues, and emotional issues. Alumni also have access to information on laws that prevent denial of access to businesses for guide dog users (Guide Dogs for the Blind, 2014). Participants in GDB can find support and encouragement through the training course and the alumni association. However,

misconceptions about the program and the support offered may hinder older adults from applying to GDB.

Misconceptions of guide dogs as assistive device. A study by Whitmarsh (2005) identified common misconceptions about the GDB program and why older adults did not apply. Eight hundred and thirty-one older adults with low vision, including 404 guide dog owners and 427 non-guide dog owners, reported several misbeliefs and opinions about the GDB program through telephone interviews (Whitmarsh, 2005). There were many common misbeliefs regarding the criterion for entering the program; 40% of older adults assumed guide dog owners needed to be completely blind and seven percent thought there was an upper age limit. Whitmarsh (2005) found that one in eight older adults who did not own a guide dog stated that they did not understand how a guide dog could assist an individual with visual impairments. A total of five percent of older adult males and eight percent of older adult females believed guide dogs executed tasks such as bringing a telephone to the individual (Whitmarsh, 2005). Almost one-third of the interviewees did not apply for a guide dog due to the responsibility of caring for the dog while six percent of older adults thought it was mandatory to pay for the dog and the full cost of all veterinary bills. Whitmarsh's data revealed that older adults with low vision are not fully aware of the benefits of guide dogs as an assistive device and thus may not apply to the GDB program (2005). To correct these misconceptions, the GDB website provides information to educate potential participants through the online application process and to dispel common misconceptions about guide dogs (Application Information, 2015). The GDB website also informs older adults that they will not be discriminated against based on age in the online application (Application Information, 2015).

Benefits of guide dogs as assistive devices. While misconceptions exist about owning a guide dog, there are many benefits to using a guide dog as an assistive device. Miner (2001) interviewed eight adults about their experience of living with and handling a guide dog. The responses of the participants confirmed that having a guide dog as an assistive device increased feelings of confidence and independence, which in turn increased social interaction (Miner, 2001). Miner's (2001) phenomenological study was limited by a small number of participants but still provides a glimpse into the lived experience of owning and handling a guide dog. Similarly, Whitmarsh also found that 81% of guide dog owners believed that their mobility had improved, and 54% of men and 62% of women experienced greater independence with their guide dog (2005). Other benefits found through Whitmarsh's study included feelings of increased companionship, socialization and confidence. Also, 20% of guide dog owners felt that they were treated more positively since obtaining their guide dog (Whitmarsh, 2005).

A guide dog is an effective assistive device to improve the quality of life of older adults with low vision. Guide Dogs for the Blind serves older adults with various levels of vision. Older adults with low vision who qualify for a guide dog learn to handle the guide dog in ambulation and community mobility through the GDB training program. Guide dogs can serve as an assistive device and help those with low vision to navigate through the community.

Muscles Groups Used When Walking with a Long Cane and a Guide Dog

Long canes and guide dogs are both helpful assistive devices, yet the muscles used to handle a guide dog are different than those used with a long cane. While there is an overall lack of research studies regarding muscles used with either a long cane or a guide dog, the project developers supplemented current literature with experts' opinion from GDB. The project developers spoke with experts such as experienced trainers at GDB to discuss the different

muscles used when handling a guide dog. Muscles of the upper body, lower body and abdomen work together to enable the necessary motions for walking with a guide dog.

Muscles of the upper body. Muscles of the upper body including those of the rotator cuff, forearm, and wrist are involved in long-cane use. Mount et al. (2001) explored the muscles used when walking with a long cane and discovered thirty-nine categories of postures and repetitive joint movements in participants with low vision. The 28 participants age 17 to 67 were videotaped indoors while they navigated a 12-meter path (Mount et al., 2001). Four researchers analyzed the videos to classify the common movement patterns. Mount et al. (2001) found that movements of the wrist and forearm were the most prevalent when the upper body maintained a sustained posture. Twenty percent of the participants reported pain from associated body movements with the long cane, including pain in the head, neck, shoulder, lower back, forearm, and wrist. Moreover, during five trials navigating the 12-meter path, participants did not vary their body movement patterns, indicating the possible incidence of cumulative trauma disorders with long cane use (Mount et al., 2001). However, more current research will be needed to fully understand the muscles and required body movements for long-cane use and cumulative trauma injuries.

While upper body muscles used with a long cane can be identified, muscles used when walking a guide dog have not been adequately researched. The project developers contacted the staff at Guide Dogs for the Blind to better understand which body positions and movements are commonly used by program participants. The left arm is typically used to hold the dog harness and leash. When stopping at a curb or obstacle, the halt position is used, where the left arm is extended at the shoulder about 30 degrees with the elbow slightly bent. When walking with the guide dog, the left shoulder is flexed to bring the arm forward approximately 40 degrees with the

elbow extended straight. Shoulder stability is key to support the handling arm through the motions required to handle a guide dog in the GDB training program.

Muscles of the lower body. Through discussions with the trainers at GDB, the project developers explored the differences in lower body movements when walking with a long cane versus a guide dog. Walking with a long cane requires the feet to be hip-width apart. Steps with a long cane are slower as the person sweeps the cane to explore the environment. In contrast, walking with a guide dog demands a narrower stance. Walking speed is notably faster with a guide dog and the person walks in a more direct path.

In a study by Périco et al. (2013) participants walked on a balance beam with and without vision occluded. In one condition of the study, participants walked across the balance beam with vision occluded and a guide dog to lead them. The participants walked most naturally in posture and significantly faster with vision occluded and a guide dog, when compared to vision occluded without a guide dog. The study concluded that the haptic perception from the guide dog promoted proper posture and postural stability when walking with vision occluded (Périco et al., 2013).

To promote older adult use of guide dogs as an assistive device, the project developers selected exercises including warm ups, stretching, and strengthening of the major lower body muscles. Older adults with low vision may also be unaware that different muscles are used with a long cane than with a guide dog. Upon acceptance to the GDB program, older adults with low vision may not be physically prepared and may experience pain or injury when learning to handle a guide dog. Hence, *Gearing up for Guide Dogs: An Exercise Video* aims to increase occupational participation through exercises that stretch and strengthen muscles that are used when handling a guide dog.

Evidence for the Exercises and Appropriate Footwear

Gearing Up for Guide Dogs: An Exercise Video consists of four chapters: Upper Body exercises, Lower Body exercises, Abdominal exercises, and Appropriate Footwear. Within each exercise chapter, demonstration is provided for how to warm-up, stretch, and strengthen specific muscles through exercises integrated into daily activities. The exercises included in the video are based on research findings regarding effective ways to warm-up, stretch, and strengthen certain muscles. Woods et al. (2007) explored the relationship between a warm-up and stretching protocol and prevention of muscular injury. They found that inclusion of a warm-up before exercise may reduce muscular injuries (Woods et al., 2007). Static stretching before engagement in exercise was also found to significantly decrease muscular injury and low back pain in military recruits (Amako et al., 2003).

Upper body exercises. With a focus on shoulder stability, the project developers added exercises to the video to strengthen the shoulder rotator cuff muscles that stabilize the shoulder joint. Research regarding muscles of the shoulder and rotator cuff guided selection of the exercises. Multiple studies were considered before selection of the side arm raise exercise to include in *Gearing Up for Guide Dogs: An Exercise Video*. In the side arm raise exercise, the shoulder rotator cuff muscle, called the supraspinatus, is isolated from other prime movers such as the middle deltoid through external rotation of the shoulder (Thigpen, Padua, Morgan, Kreps, & Karas, 2006). Strengthening of the rotator cuff muscles promotes proximal stability for distal mobility of the arm.

Thigpen et al. (2006) emphasized the use of the “full-can exercise” over the “empty-can exercise” for side arm raises to promote shoulder strengthening, specifically of the supraspinatus muscle across the top of the shoulder joint. The full-can exercise requires the arm to be held

straight and raised outwards to the side of the body with the thumb pointing up and the palm facing forward. The empty-can exercise is the same arm motion as the full can, except that the thumb points downward and the palm faces backwards. Full-can exercises are also more effective than empty-can exercises to activate and strengthen the infraspinatus muscle along the back of the shoulder joint, as demonstrated by EMG data (Townsend, Jobe, Pink, & Perry, 1991). While the full-can and empty-can exercises activated the supraspinatus muscle roughly the same amount, the full-can exercise held a lower risk of subacromial impingement throughout the exercise (De Wilde et al., 2003).

In order to further strengthen the shoulder, a technique called proprioceptive neuromuscular facilitation (PNF) was also included in the Upper Body chapter. PNF uses diagonal movements to increase shoulder strength. The majority of the research on PNF concerns the use of PNF on the lower body. Studies that used PNF for the upper body were rare. Three groups of 10 female participants each; a control group, a weight-training group, and a PNF group were included in one randomized controlled trial by Nelson, Chambers, McGown, and Penrose in 1986. This study is limited by the lack of male participants, but may indicate important information for PNF effectiveness. PNF was found to improve function significantly more than a weight-training intervention (Nelson, Chambers, McGown, & Penrose, 1986). The results of this study indicated that PNF may be beneficial for strength training because it trains specific muscles and has greater motor skill transfer when compared to weight training. Also, PNF may be more effective than weight training when related to athletic performance and injury rehabilitation (Nelson, Chambers, McGown, & Penrose, 1986).

For this project, the project developers used PNF to strengthen the shoulder for proximal stability in order to facilitate distal upper extremity mobility in older adults when handling a

guide dog. PNF for the upper extremities is achieved through the diagonal reaching exercise to improve the shoulder strength, and is a typical movement pattern in day-to-day activities. Older adults with low vision can easily incorporate PNF movement in daily activities, like unloading groceries or the dishwasher, to help prevent pain and injury when handling a guide dog.

Lower body exercises. Lower body muscles used in gait with a guide dog are also included in *Gearing Up for Guide Dogs: An Exercise Video*. A study by Lamoureux, Sparrow, Murphy, and Newton (2002) examined the relationship between lower body strength and gait in community-dwelling older adults. Forty-five older adults aged 62 to 88 had their lower body strength initially assessed during completion of an obstacle course comprised of common gait tasks. The muscle groups assessed included knee extensors and flexors, hip extensors and flexors, hip adductors and abductors, and ankle plantar flexors. The researchers recorded each participant's dynamic lower body strength, which was hypothesized in the study to be correlated significantly with the time needed to complete the gait tasks. The gait tasks in the obstacle course included opening a door, walking up a ramp and stairs, walking around plastic cones, and rising from an armless chair (Lamoureux et al., 2002). These tasks were considered to represent challenges that are frequently encountered by adults on a daily basis. Gait tasks in the course were categorized into four categories: stepping over, stepping across, raised surface, and foot targeting tasks. Lamoureux et al. (2002) set three different levels of intensity at ten, twenty, and thirty percent of each participant's leg length for the stepping over, stepping across, and raised surface tasks. The foot targeting tasks required participants to have the lead foot placed within spatial bounds and were set at foot length plus seven, five, and three centimeters to increase the challenge on lower limb control (Lamoureux et al., 2002). Linear regression models were used to explore the correlation values and percentage of the variance explained by strength, which

increased with each level. The significant relationships between lower body strength and completion of common gait tasks revealed that as the gait tasks became more challenging, more strength was needed. Therefore, a conclusion was inferred that intervention programs that aimed to increase lower body strength would help older adults with gait in the community (Lamoureaux et al., 2002).

Lord et al. (1995) developed an exercise program aimed to strengthen all major muscle groups of the lower body. The exercises included side stepping, leg lifts, and heel raises. The strength of the muscle groups was measured before and after the exercise program was completed. In this randomized controlled trial, significant improvements were made in lower body muscle strength within the twelve-month program (Lord et al., 1995). Therefore, some of these exercises are included in *Gearing Up for Guide Dogs: An Exercise Video* in order to improve lower body strength to prevent pain and injury when walking with a guide dog.

Abdomen exercises. Strengthening of the abdomen was found to have an effect on balance. In a randomized controlled trial by Kahle and Tevald, core muscle strengthening and balance were investigated with the use of a six-week home exercise program with healthy older adults ages 65 to 85 (2014). Baseline core strength was assessed using the Curl-up test and dynamic balance was measured with the Functional Reach test and the Star Excursion Balance test (Kahle & Tevald, 2014). The targeted muscles included the rectus abdominus, transverse abdominus, multifundus, external and internal obliques, and spinal stabilizers. The exercise group demonstrated increased muscle strength that in turn improved their dynamic balance through trunk stabilization. Kahle and Tevald (2014) recommended that core strengthening should be included as part of comprehensive balance training for the older adult population. Though older adult participants in the study had typical vision, the study is relevant as it relates

to increasing balance through core strengthening. As stated before, Logan et al. illustrated how vision allows for the body to make postural corrections to maintain balance, thus balance is affected by low vision and blindness (2010). Because the audience for *Gearing Up for Guide Dogs* will have some level of low vision, increasing balance through core strengthening will improve their ability to safely handle their guide dog.

Appropriate footwear. Wearing proper footwear when walking a guide dog is an important component to prevent pain and injury in older adults. A systematic review by Menant, Steele, Menz, Munro, and Lord (2008) explained that footwear influences balance and the subsequent risk of slips, trips, and falls. According to their findings, older adults should wear shoes with low heels and firm slip-resistant soles both inside and outside the home (Menant et al., 2008). Many components of footwear affect safe walking such as heel height, sole cushioning properties, collar height, and slip-resistant sole properties. It is recommended that heels should be less than one-inch thick. Since high-heeled shoes have multiple negative effects, older adults should not wear shoes with high heels because it places them at increased risk for falling (Menant et al., 2008). Menant et al. (2008) supported that high-collared shoes provide extra support around the ankle and offer significantly better resistance against inversion. Thus, older adults with low vision should be advised to wear high-collared shoes for optimal ankle support.

Additionally, in a nested case control study by Tencer et al. (2004) specific shoe properties were studied to decrease fall risk. Shoe properties included heel height, heel width, amount of friction created, shoe style and shoe sole material. A total of 1,371 participants were studied over a two-year period, and incidences of falls were tracked, along with types of shoe worn and shoe properties. Results indicated that wearing shoes with low heel height and a large

sole surface area were best to reduce falls and injury (Tencer et al., 2004). The results of Menant et al. (2008) and Tencer et al. (2004) guided the project developers' recommendations in *Gearing Up for Guide Dogs: An Exercise Video* for proper shoes to wear while handling a guide dog.

Exercise Integration

Exercise that is integrated into daily routines is more sustainable in the long-term in comparison to structured exercise programs (Opdenacker, Boen, Coorevits, & Delecluse, 2008). The purpose of *Gearing up for Guide Dogs: An Exercise Video* is to promote older adults' physical readiness to handle a guide dog to increase their occupational participation. Successful integration of exercise into daily activities of older adults through lifestyle intervention may promote increased physical activity (Clemson et al., 2012; Opdenacker et al., 2008).

Lifestyle intervention. A study by Opdenacker et al. (2008) explored the effectiveness of both a structured exercise program and a lifestyle intervention for older adults. Both the structured exercise group and the lifestyle intervention group focused on flexibility, endurance, strength, and balance. The structured exercise group consisted of three weekly sessions where participants practiced strength training, with gradually increasing exercise intensity. On the other hand, the lifestyle intervention group received education concerning flexibility, endurance, strength, and balance, as well as coaching to integrate physical activities into daily routines. In addition, the lifestyle intervention group also received one-on-one coaching to tailor exercises to participants' needs, and behavior strategies were advised, including goal setting, discussion of barriers, motivational interviewing, and increasing self-efficacy, social support, and self-monitoring. Both the lifestyle intervention group and structured intervention group had a significant increase in total physical activity from pre-test to post-test (Opdenacker et al., 2008).

However, one-year follow-up results indicated that the lifestyle intervention group sustained increased total physical activity significantly more than the structured exercise intervention group. Therefore, lifestyle interventions are significantly more effective than structured exercise programs to promote long-term adherence and continued participation in physical activity (Opdenacker et al., 2008).

Another study by Clemson et al. (2012) was completed to study the effectiveness of a lifestyle integration functional exercise program to reduce falls in older adults with fall history. This three arm, randomized parallel trial consisted of three home-based intervention groups: the Lifestyle integrated Functional Exercise (LiFE) group, a structured exercise group, and a control group. A total of 317 participants who were 70 years or older and had experienced a fall within the past year were included in the study. The LiFE group consisted of incorporating balance and strength exercises into daily activities, multiple times per day. The structured exercise program consisted of seven balance exercises and six lower limb-strengthening exercises during tri-weekly sessions with a trainer. Participants in both the LiFE group and the structured group received information on the exercises over five sessions with two booster sessions and two follow-up phone calls. The control group received training for 12 gentle exercises over two sessions with six follow-up phone calls and one booster session. While this study focused on fall prevention, results indicated that lifestyle-integrated functional exercise can increase the exercise adherence in older adults while structured exercise did not promote adherence after one year (Clemson et al., 2008). Consequently, *Gearing Up for Guide Dogs: An Exercise Video* promotes lifestyle intervention and integrates effective exercises into daily life activities to facilitate participation in meaningful occupations.

Physical activity and quality of life. While integrated exercise is beneficial for adherence to an exercise program, simply increasing physical activity can also impact quality of life. Researchers found a significant positive relationship between quality of life and physical activity (Brown, Carroll, Workman, Carlson, & Brown, 2014; Perales, del Pozo-Cruz, del Pozo-Cruz, & del Pozo-Cruz, 2014). Perales et al. (2014) conducted a survey with 13,000 participants by mail in Australia to look for a correlation between moderate to vigorous physical activity and self-reported health and life satisfaction. A positive correlation was found between physical activity and the participants' quality of life. Similarly, Brown et al. (2014) conducted telephone interviews with 357,665 adult participants. Participants who regularly participated in some physical activity had a higher health-related quality of life, which was defined as lower odds of having 14 or more unhealthy days in the last 30 days (Brown et al., 2014). Having a guide dog increases the physical activity in older adults with low vision and therefore it may promote older adults' independence and meaningful occupational participation to improve their quality of life.

The purpose of *Gearing Up for Guide Dogs: An Exercise Video* is to increase meaningful occupational participation through exercises integrated into older adults' daily routines in preparation for handling a guide dog. Stretching and strengthening of the muscles most commonly used to handle a guide dog will prevent pain and injury while facilitating older adults' success in the GDB training program.

Conclusion

The population of older adults with visual impairment is growing (Harada, Natelson, & Triebel, 2013). As the older adult population grows, the need for low vision services for older adults will also increase (Harada et al., 2013). Challenges exist for people with low vision, including fear, difficulty with community mobility and engaging in meaningful activities

(Southall & Wittich, 2012; Rudman & Durdle, 2008). While facing these challenges, it is also important for older adults to receive sufficient training, education, and professional support in order to be successful with using a guide dog as an assistive device (Gramstad et al., 2014; Skymne et al., 2012). GDB provides support to its participants with many training and alumni resources. As an additional resource, the project developers designed *Gearing Up for Guide Dogs: An Exercise Video*. This video is based on integrating exercises into daily activities to promote long-term adherence (Opdenacker et al., 2008).

Guide dogs are beneficial assistive devices, and provide increased confidence, independence, and mobility to their owners (Miner, 2001; Whitmarsh, 2005). The purpose of *Gearing Up for Guide Dogs: An Exercise Video* is to increase meaningful occupational participation through exercises integrated into older adults' daily routines in preparation for handling a guide dog. Stretching and strengthening of the muscles most commonly used to handle a guide dog may prevent pain and injury while facilitating older adults' success in the GDB training program.

Statement of Purpose

The purpose of this project is develop an exercise video to better prepare older adults for the Guide Dogs for the Blind training program. For this project, older adults are defined as those who are age fifty-five or older. A video of strengthening exercises for the GDB website was developed for older adults to use before entering the GDB training program. The visual aspect of the video focuses on one portion of the body at a time to facilitate viewing of the exercises for participants with some vision intact. Narration in the video is descriptive and clear for older adults who are unable to view the exercises in the video.

Theoretical Framework

The theoretical model selected for this project is the Person Environment Occupation (PEO) model. The PEO model focuses on how performance is affected by personal factors, environmental factors, and occupational factors (Law et al., 1996). When a good transaction exists between these three factors, a person will perform at his/her best. This model considers the quality of activity performance to be the result of a constantly changing relationship between the person, his or her environment, and the activity being performed. Every factor must complement the other in order to facilitate optimal performance of the activity (Law et al., 1996). To ensure that all three factors compliment each other, the fit between the person, environment, and the activity needs to be assessed (Law et al., 1996). Analyzing the “fit” of the three factors can identify which factors need to be adjusted in order to enable best performance of activities, such as handling a guide dog, or integrating exercise into a daily routine.

This model takes into account the many characteristics within the person and how these characteristics affect his or her performance in activities. PEO analyzes personal capabilities such as motor movements, sensory capacity, cognitive function, and general health. Self-efficacy, cultural background, and personality traits are also taken into account. This project addresses the personal element of PEO by concentrating on the older adults’ physical abilities. A prerequisite for the GDB program is to be able to walk the guide dog for at least twenty minutes everyday. Because decline in muscular strength occurs throughout the aging process, some older adults may not meet this prerequisite. *Gearing Up for Guide Dogs: An Exercise Video* may help to strengthen the muscles necessary for walking a guide dog for a minimum of twenty minutes daily.

The environment aspect of PEO considers more than the physical features of one's surroundings. The PEO model defines "environment" as a combination of "cultural, socio-economic, institutional, physical, and social" considerations (Law et al., 1996, p.16). The environment can also be described as the context in which a person performs an activity. A person's environment is continuously changing and can affect behavior positively or negatively depending on the condition of the environment (Law et al., 1996). With use of an exercise video, older adults can perform the exercises at their own convenience and in an environment that is familiar. The video can be viewed at any time of day and in any environment, including the comfort of home. This gives older adults the ability to choose when and where they prefer to practice the exercises. When the older adult is accepted into the GDB program, the exercises from the video can again be practiced during the training program on the GDB campus. Participants can ask trainers for help with the exercises, which will provide the older adults with peers' social support and assistance from program trainers on campus.

The third element of PEO, "occupation," is defined as a task or activity selected and performed by an individual (Law et al., 1996). A person chooses to participate in occupations to meet personal wants and needs. The chosen occupations may depend on his or her different roles in life. To facilitate participation of the exercises, *Gearing Up for Guide Dogs: An Exercise Video* identifies how to incorporate exercises into meaningful daily occupations. The video includes exercises that can be done while completing daily tasks such as washing dishes, unloading groceries, or brushing teeth. Participants may choose to individualize the exercises based on preferred activities that fit into their personal roles and occupations. While a comfortable, familiar environment can facilitate use of the exercises in the video, effective use of the exercises may lead to improved function of the necessary muscles used while handling a

guide dog. When the environment, the exercises, and physical abilities of the older adult compliment each other, optimal occupational performance can be achieved.

Methodology

Design

The project developers proposed a three-part project that consisted of an exercise video, a train-the-trainer session, and follow-up phone call implementation. As older adults may be deconditioned and physically unprepared for the GDB program, strengthening exercises are needed to prepare the muscles used during mobilization with a guide dog. The project developers created a home exercise video to be posted on the GDB website for older adults to access and use before beginning the training program. DVDs of the video may be available by mail for participants who do not have access to the internet. An audio-only version would be available for participants who do not own a television or computer, or who are unable to see the screen due to low vision or blindness.

The video demonstrates simple ways in which older adults can integrate exercises into daily activities and takes into account the learning style of older adults when using descriptive language. The project developers intend to promote participation in exercises for older adults to integrate into daily activities. Adding the exercises to an already-established routine can increase compliance and ensure greater participation and habit building for older adults.

Secondly, the project developers proposed implementation of a one- to two-hour train-the-trainer course. The course would educate the trainers how to integrate the exercises into the on-campus training program curriculum. Education related to older adult learning styles would also be provided. As older adults continue the exercise program post-graduation, they will benefit from maintenance of muscle strength and decreased pain and injury.

Finally, the project developers recommended that GDB implement a monthly follow-up phone call to older adults for one year post-graduation from the program. The implementation of the follow-up phone call would help to motivate older adults to continue participation in the exercise program and would provide continued encouragement and support. The goal of this portion of the project was to ensure continuous participation of the exercises post-graduation.

Agency Description

Guide Dogs for the Blind is a 501(c)(3) non-profit charitable organization and functions as a community training guide dog school to serve those who are blind or who have low vision (Guide Dogs for the Blind, 2014). All services are provided free of charge and include training for individuals and their dogs, veterinary care, and support once the dogs and participants return home. The costs to fund the program are provided through donors, grants, honor or memorial gifts, bequests, and estate planning options. Fundraising events are also held each year to raise money and increase awareness of the program.

To be accepted into the GDB training program, participants apply through a simple application process. Numerous application options are available, including: online application, phone call, e-mail, recording information onto a CD, or typing or brailing information. After receiving an application, admission staff coordinates and determines class placement for each applicant accepted for training. During the screening process, individual needs are identified for a personalized match between the dog and participant. Participants reside as far away as Canada and throughout the United States and are provided with transportation to and from campus free of charge.

Additional services provided by GDB include a robust volunteer program to raise, train and socialize the dogs so that they are ready to be paired with a program participant. Puppy

raisers are responsible for teaching their puppies good manners and basic obedience (Guide Dogs for the Blind, 2014). After the grown puppies return to the GDB campus, they are ready to begin training classes with a staff dog trainer. After dogs complete a training class and can guide participants safely, they are matched with a participant for a two-week training program. In this program, participants learn how to perform daily tasks with their dogs, handle the dogs, and venture out in the community. These classes consist of six to eight participants with a ratio of one instructor for every two participants. Once participants and guide dogs are fully trained, a formal graduation ceremony occurs and the dogs are presented by the volunteer puppy raisers to their new owners. A typical guide dog works for eight to 10 years before retiring, and the participants can repeat the training process with a new dog, as needed.

Target Population

The proposed target population for this project is older adults, age 55 and older who have low vision and desire to participate in the GDB program. The majority of this population experiences low vision from macular degeneration, diabetic retinopathy, retinitis pigmentosa, or hypoxia at birth. Most of these eye conditions occur after age 40 and older, with the exception of hypoxia at birth. In addition to symptoms of low vision, the older adults may experience muscle weakness and fatigue when transitioning from a long cane to a guide dog. With this project, the project developers hope to facilitate the physical transition for older adults into the program through the exercise video and provide additional support after graduation from the GDB program.

Project Development

The project developers first met with Ms. Theresa Stern, Vice President of Outreach, Admissions and Alumni Services at GDB on October 18, 2014. The purpose of this interview

was to better understand how to improve the accessibility of GDB training program for the older adult population. During the visit to GDB, the project developers attended a graduation ceremony for six program participants and explored the campus. Through this interview, the project developers learned that the muscles used with a long cane are different from muscles used when handling a guide dog. Due to possible decline in mobility and muscle strength that comes with aging, older adults may have deconditioned muscles leading to fatigue when handling a guide dog. A list of questions and answers from this interview is provided in Appendix A. After the interview, the project developers discussed ideas with Dr. Kitsum Li, faculty advisor, and proposed to create a home exercise video, train-the-trainer course and follow-up phone calls. Ms. Stern agreed to the proposal by email on October 30, 2014, thus the site verification information was completed (Appendix B).

Project Implementation

The next phase of this project consisted of creating a draft video. The project developers proposed the following timeline: By end of February, 2015 a list of exercises would be compiled for the video. By March 15, 2014 a draft script of the exercise video would be provided for review by GDB staff members. Upon approval of the video script, a draft video would be filmed by the end of May, 2015. In Fall 2015, the video would be finalized and the train-the-trainer session would be conducted to teach the trainers how older adults learn and how to facilitate continuation of the exercises from the video. The end goal is a self-sustaining home exercise program and volunteers or staff will provide follow-up phone calls to older adult participants to encourage ongoing participation in exercise.

While the above timeline was proposed, the actual timeline is as follows. On February 12, 2015 the project developers met with Ms. Stern to discuss the next steps. The conclusion was

made that the train-the-trainer and the follow-up phone call portions would not occur. The trainers at GDB are very knowledgeable about the muscles used when walking a guide dog, so it would not be necessary to include the train-the-trainer portion. The trainers then spoke with the project developers and shared their experience and knowledge about the muscles involved when walking with a guide dog. With this knowledge, the target muscle groups for the exercise video became clearer. In this visit, the project developers each walked blindfolded with a guide dog in order to better understand the muscles used and different motions involved.

On March 6, 2015 the project developers met with Ms. Kerry Murphy, the Nursing Supervisor at Guide Dogs for the Blind. Ms. Murphy reported that one in 10 participants in the training program suffers from shin splints. Some participants also wear improper footwear for walking. She emphasized the need for balance and core strength to be included in *Gearing Up for Guide Dogs: An Exercise Video*. Because of the information Ms. Murphy shared, the project developers tailored the exercises in the video specifically to address each of these issues.

After meeting with Ms. Murphy, the project developers compiled a list of exercises and created the exercise video script, as shown in Appendix C. Descriptive language was used to clarify each exercise in detail so that the older adults will be able to mentally visualize the exercises based on the audio portion alone. The video script was sent to Dr. Kitsum Li, faculty advisor, on March 20, 2015, for feedback. On March 27, 2015, the project developers emailed Ms. Stern and Ms. Murphy with the draft script and received feedback from Ms. Stern on March 30, 2015 and from Ms. Murphy on April 1, 2015. After receiving this feedback, more edits were added to the script. The video was filmed on April 24, 2015 and the editing process began. The video was heavily edited by Ms. Carrie Payne, with feedback from Dr. Kitsum Li on September

2, 2015. Another round of edits was finalized, and the video was sent to Ms. Stern on November 5, 2015 along with a survey to obtain feedback.

Project Evaluation

In order to evaluate the effectiveness of the project, Ms. Stern and two other staff at GDB completed a survey using SurveyMonkey. A copy of this survey is provided in Appendix D. The survey consisted of four questions rated on a Likert scale. A fifth question was open ended for participants to provide any suggestions or additional comments regarding the video. Three survey responses were obtained (Appendix E). For the first question, all three responders noted that based on the audio description, the exercises were “Very Easy” to follow. For the second question, all three responders agreed that based on the visual demonstration, the exercises were “Very Easy” to follow. For the third question, two responders thought that the suggestions of how to integrate exercises into daily routine were “Very Helpful,” while the other responder reported the suggestions being “Somewhat Helpful.” Overall, two responders reported that the video can be used to prepare older adults for the Guide Dog for the Blind training program “Very Well” and one reported “Somewhat Well.” For the open-ended question, one responder said “They are all good exercises. They appear to be geared to the individual who has yet to embrace a ‘very active’ lifestyle.” The second response to the open-ended question was: “I thought it was great! One suggestion is to make it clearer which exercises are for warming up immediately before walking with a guide dog, and which are for increasing strength and flexibility in preparation for training with a new guide dog.” The third responder left the open-ended question blank.

Ethics and Considerations

Many steps were taken to maintain the AOTA Code of Ethics throughout this project. The ethical principle of veracity is defined as the duty of the occupational therapist(s) to provide accurate, complete, and objective information (Reed et al., 2010). Veracity is maintained in this project through providing participants with accurate information. The project developers disclosed their status as occupational therapy students and stated the intent to facilitate older adults' physical capacity to handle a guide dog. The ethical principle of beneficence is defined as a concern for the safety and well being of the persons who receive occupational therapy services (Reed et al., 2010). Beneficence was accomplished by always considering how our actions may affect the well-being of older adults and any interactions with program staff. This project aims to improve occupational participation of older adults who may be sedentary or deconditioned and lack muscle strength and/or endurance. Facilitation of older adults' participation is key, specifically within the activity of handling a guide dog.

The ethical principle of nonmaleficence is defined as the avoidance of any actions that may cause harm (Reed et al., 2010). Nonmaleficence was accomplished through the avoidance of instructing older adults to complete any actions or movements that could put them at risk of injury or harm. The beginning of the video verbally states that all older adults should consult their doctor if they are uncertain if the exercises are safe for their current physical condition. Viewers are also informed that they are free to stop the exercises if they are uncomfortable or wish to stop at any time. Older adults were recruited for participation to demonstrate the exercises in the training video. Written consent from each older adult was obtained before videotaping, using the form in Appendix F. Before signing the consent form, older adults were

informed in detail that the final video may be available on the internet through the GDB website and that some hard copies on DVDs may be distributed to applicants to the GDB program.

Discussion, Summary and Recommendations

The project developers met many challenges in the planning and implementation of the project. The planning process to film the video went smoothly as the video script was written and edited. Feedback was received from staff at GDB and Dr. Kitsum Li, and was included into the script. Because the project developers wanted the video filming to be as professional as possible, a student from the communication department was recruited to film the video. Actors were also recruited from GDB, and were instructed to bring two solid color shirts, one dark and one light shirt, to increase contrast between the actor and the background in the video.

While many factors were anticipated and planned for, not all elements of implementation went as planned. The biggest challenges occurred after the video was filmed with numerous technology glitches and editing work that took longer than anticipated. Also, each of the project developers faced personal challenges during the planning and implementation processes, which could not have been anticipated. These life challenges, mixed with technology glitches contributed to the lessons learned over the course of the project.

Lessons learned. Many lessons were learned in this process. One difficult lesson was the importance of maintaining backups of all video clips, and versions of the video on multiple devices. A few different occurrences of footage getting deleted added stress to the process. Additionally, while two cameras were used for filming, some footage was shaky and blurry. Clear shots are very important in the video in order to increase ease of viewing for the audience. Attempts were made to obtain the best shots possible, however, the footages are not flawless, and the project developers proceeded as best as possible with the shots obtained. Thankfully, the

project developers only had to film the footage once, which was a positive outcome of the process.

Project outcomes. Because of time constraints, project developers cannot assess the effectiveness of older adults' physical performance based on use of *Gearing Up for Guide Dogs: An Exercise Video*. However, the responses received from staff at GDB through SurveyMonkey were very positive and the suggestions were helpful. The project developers acknowledge the validity of these responses, and believe that with more time, the recommendations in the open-ended portion could be addressed. Also with more time, further research could be completed on the effectiveness of the exercises and how well older adults are prepared for the GDB program after participating in the exercises. Another suggestion for improvement would be to consult additional professional help from Physical Therapists and Community and Mobility Specialists to tailor an integrated exercise program specifically for older adults applying to the Guide Dogs for the Blind program. With more time, the project developers would be able to include specifically-tailored exercises in the video for participants with varying level of fitness.

Project limitations. Some limitations existed for this project. One limitation was the time constraint of the academic semester contributing to the inability to measure whether use of the exercise video is beneficial for users. Another limitation was the skill of the project developers and the lack of experience filming and editing a video. Further, it was difficult to find current and relevant research regarding guide dogs and the muscles used when handling a guide dog. However, expert opinions from Guide Dogs for the Blind dog trainers and other staff members helped to fill in gaps in research. Future research could investigate if the use of the video, and the use of integrated exercise, contributes to increased muscle strength, balance, and therefore greater success transitioning from a long cane to a guide dog.

Conclusion

Older adults' participation in daily activities can be hindered by low vision, which can increase functional disability through a decreased ability to see and interact with their environment (Travis et al., 2004). While older adults with low vision experience many difficulties, the use of assistive devices positively influences their engagement in meaningful occupations. Assistive devices support and increase older adults' ability to complete everyday tasks (Fok et al., 2011). Guide dogs serve as an assistive device by helping their owners to venture safely into the community.

The purpose of *Gearing Up for Guide Dogs: An Exercise Video* is to increase meaningful occupational participation through exercises integrated into older adults' daily routines in preparation for handling a guide dog. Further, with the use of a home exercise video, the project developers aimed to facilitate greater participation of older adults in the GDB program. The video demonstrates exercises that stretch and strengthen the muscles most commonly used when handling a guide dog. It is hoped that participation in exercise using the video will facilitate the success of older adults who apply, participate, and graduate from the GDB training program. It is also hoped that guide-dog use will promote older adults' independence, occupational participation, and improved quality of life.

This project is relevant to the field of occupational therapy because of the connection between the use of a guide dog with increased community mobility and increased participation in meaningful activities. Use of a guide dog improves older adults' confidence when traveling alone in the community and facilitates continued participation in enjoyable activities (Miner, 2001; Tencer, 2004). The GDB is a charitable program that helps countless individuals to maintain their independence despite low vision. Through collaboration with the GDB, the project

developers hope that the creation of *Gearing Up for Guide Dogs: An Exercise Video*, will improve older adults' community mobility skills and facilitate success in safe handling of a guide dog, leading to an increase in occupational participation.

In addition, the exercise video offers suggestions of how to integrate the exercises into daily activities. As discussed in the Occupational Therapy Practice Framework: Domain and Process (3rd ed.), the domain of occupational therapy covers performance patterns that include the importance of routines in occupational performance (American Occupational Therapy Association, 2014). Exercise that is integrated into daily routines is more sustainable in the long-term in comparison to structured exercise programs (Opdenacker et al., 2008). Long-term adherence to exercise may lead to increase in muscle strength, and older adults may be more successful, in handling a canine companion with which to venture safely in the community.

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Appendix A: Questions Asked of Ms. Theresa Stern on October 18, 2014**Needs:**

- 1. What are the unmet needs of the training program?**
 - Barriers to marketing, bringing more people into the program.
 - Seniors might think that they are too old, or that a person must be completely blind to have a guide dog.
 - Conditioning and the physical ability of older adults in training classes leads to losing mobility and stopping ability to use a guide dog.
 - Maybe Guide Dogs needs a training class of just older adults.
- 2. Are there any concerns about guide dog program throughout the process?**
 - Barrier in terms of marketing to bring people in
 - Seniors sometimes think they are too old for a guide dog, or that you have to be totally blind to be eligible
 - Another problem is with the cutting back of resources, it's harder and harder for people to get comprehensive cane training. People who apply to us to come get a guide dog, only about 50% of those people actually qualify, and 80% of the time that they don't qualify, it's because they don't have those skills.

Demographics:

- 1. What ages are the "older adults"? (Average age of guide dog owners)**
 - Average age of guide dog owners: 51
- 2. Have any of them been afraid of dogs?**
 - May sometimes be a barrier for people who haven't had experience with dogs in the past. Some cultures are more afraid of dogs than others.
- 3. What eye conditions are most common for the older adults getting trained at GDB? (What is the level of low vision?)**
 - A lot of age related vision loss such as: macular degeneration, diabetic retinopathy, and retinitis pigmentosa. The cut-off level for low vision is 20/200.

Training Process:

- 1. Does training program continue until trainer feels that the person is competent in caring for the dog? Or is there a time limit?**
 - The training program lasts two weeks on campus. Only special scenarios will continue training if a person specifically requests it and does not feel comfortable with the dog, but this rarely happens.

2. What financial obligations do the participants have to be in the program?

- The participants pay for dog food, but can get the food delivered to the house through Natural Balance. The vet costs are split so they can feel like they contribute something so it's a team effort.

Follow up:

1. Are there any other aspects of the program you would like us to focus on? (website?)

- Possibly adding pictures or a story on the website about older adults and their experience with a guide dog

2. What suggestions do you have for modifications/changes in the training program

- (See Needs question #2).

3. What are the most common breeds of dog that become guide dogs?

- Most common breeds of dogs: Labs and Golden Retrievers

4. Are there any recommendations that have been proposed/carried out in the past?

- Previous recommendations: Changing the student-teacher ratio, home program option, bringing a family member along with you, training with other older adults
 - Student-teacher ratio was changed and it has been very successful

5. Is the agency opposed to advertising more?

- Agency is open to more advertising
 - More images of older adults that they can relate to
 - Biography of someone who is older adult and got their first guide dog after age 65
 - Pamphlets on low vision to put in doctors offices

Other information from Ms. Stern not included in questions above:

- Gait and muscle use changes from cane use to guide dog. Since cane proficiency is necessary for acceptance into the program, GDB is considering introducing a cane-training program.
- Talking to the nurses on campus, attending a training session, and talking with other staff members are possibilities for acquiring more information.
- Another suggestion would be to cooperate with other agencies that serve seniors, such as The Lifehouse in San Francisco for advertising and community partnerships.

Appendix B: Site Selection Verification Form

Dominican University of California

Department of Occupational Therapy

OT 5110: ICE Proposal: Site Selection Verification Form

Student Names:

Valerie DeRoos and Skyler Moon

Title of capstone project or research:

Increasing Occupational Participation of Older Adults with Low Vision Through an Occupation-Based Exercise Video

Background and Rationale:

Currently, Guide Dogs for the Blind (GDB) in San Rafael trains both older adults and younger adults how to utilize a guide dog within the same training program. However, the current training program may not meet older adults' needs. Older adults may be less physically fit and experience muscle pain and a lack of endurance during the training program. It is necessary to implement a muscle-strengthening exercise regimen to facilitate the success of older adults.

Older adults experience learning style changes throughout the aging process, which should be considered in the design of the training program. Learning occurs best when the subject material relates to older adults' previous knowledge of a related subject. When a motor task is presented to older adults in a random order, older adults learn better than if the same task was always practiced in the same pattern. This information on older adult learning style will be utilized to create a video that teaches older adults exercises to strengthen the muscles necessary to successfully handle a guide dog. The purpose of this project is to provide an online resource

for older adults to strengthen their muscles prior to the start of the training program. The exercise program will be maintained when the older adults will be on-campus participating. After completion of the program, older adults can continue to utilize these exercises to maintain the strength necessary to handle their guide dogs.

Name of Proposed Site: Guide Dogs for the Blind, San Rafael

Person with whom you will be working: Ms. Theresa Stern

Type of facility: Guide Dog Training Program

Address: 350 Los Ranchitos Road, San Rafael, CA 94903

Email: Tstern@guidedogs.com

Phone #: 800-295-4050

Contact Person (include title) related to approval at the site:

Ms. Theresa Stern, Director of Alumni and Outreach Services

Has initial contact been made? Yes, Ms. Stern approved our proposal to provide a home exercise video, train-the-trainer course, and follow up phone call by email on October 30, 2014.

During our needs assessment with Ms. Stern on October 18, we discussed additional possibilities of returning to talk to the nurses on staff, or Jane, the Outreach Manager and Ms. Kristin Lucas, the Director of Training and Orientation and Mobility, if more information is needed. Other ideas discussed were to conduct telephone interviews with older adults who have graduated from the training program, to follow a guide dog team to learn more about the mobility process, and to attend a training class. Ms. Stern seems very open to anything we would like to contribute to GDB regarding older adults throughout the process of the training program.

Describe the proposed intervention(s), e.g. manual or planned presentation:

Older adults may also be less fit than their younger counterparts and need to strengthen muscles to have an effective gait when utilizing a guide dog. To remediate part of this issue, we propose to create a video for the GDB website. Our proposed project is to create a home exercise video for older adults to utilize before they begin the training program. By creating this exercise program, we intend to promote participation in exercises for older adults to improve mobility and ease of gait with the guide dog. Different muscles are used when walking with a guide dog as compared to walking with a cane. Strengthening exercises will help best prepare older adults for the physical demands of the GDB training program. The video exercise program will demonstrate ways in which older adults can integrate these exercises into daily activities. The video will take into account the learning style of older adults and will use descriptive language to describe the exercises in detail for older adults with low vision. Exercises will be simple and easy to integrate while accomplishing a variety of daily tasks. This video will be accessible online on the GDB website. In addition, we will provide a train-the-trainer course and a follow-up phone call to check in with participants to encourage continued use of the exercise program after graduation.

Describe any potential problems and your plan for addressing problems:

A potential problem that may occur in the implementation of the home exercise video is that the video may be difficult to see for older adults with severe low vision. To address this, we will ensure the exercise movements in the video are focused on specific body areas to facilitate viewing for those with moderate vision impairments. To do this, we will tape specific parts of the body at a time (legs, arm, etc.) to make the exercise movements more clear. The clothing of the persons in the video will also contrast with the walls of the room we use for filming. Another

potential problem is the older adults may not have access to the internet to view the video. In this case, the home exercise video may be mailed to the participant as a DVD for their home viewing.

If the older adult does not have a DVD player or a computer to watch the DVD, we can mail them large visuals and a CD with audio instructions of the exercises featured in the video.

Signatures (students):

_____ **Date** _____

_____ **Date** _____

_____ **Date** _____

_____ **Date** _____

Faculty advisor signature:

_____ **Date** _____

Appendix C: Gearing Up for Guide Dogs: An Exercise Video Script

Opening shot in video: Title screen

“Gearing Up for Guide Dogs: An Exercise Video”

These bullet points will be shown while the paragraph below is read.

The purpose of these exercises is to:

1. Prevent shoulder pain and injury
2. Maintain balance and core muscle strength for continued guide dog use
3. Prevent shin splints

(BIG LETTERS, HIGH CONTRAST, with voice reading the paragraph below)

Hi. This video introduces some easy exercises you can integrate into your daily activities. These exercises strengthen the muscles commonly used when handling a guide dog, and will help prepare you for the Guide Dogs for the Blind training course. You can continue using these exercises once you graduate from the program to ensure continued muscle strength and agility while handling your guide dog. It is our hope that this video will prevent future pain and injury as you learn to walk with your dog. Stretches shown in this video help lengthen the muscles that can become tight after walking with your guide dog. If you are concerned about whether these exercises are right for you, talk to your doctor before attempting the exercises shown in this video. If at any time during your exercise you feel faint, short of breath, dizzy, or physically uncomfortable, please stop the exercise immediately and consult with your doctor.

Chapter 1: Arms/Upper Body

Warm up:

Shoulder Shrugs

Begin by sitting upright with your arms hanging down at your sides. Raise your shoulders up toward your ears. Then relax your shoulders back down to the starting position. Repeat this up and down motion ten times. Breathe in while you raise your shoulders, and breathe out while you relax your shoulders.

Shoulder Rolls

Begin by sitting upright and raise your shoulders up toward your ears and continue moving them backwards in a circular motion. Repeat these backward shoulder circles ten times. Then repeat the shoulder circles, this time rolling your shoulders in a circular motion up and over toward the front of your body in a forward motion. Repeat this ten times. These warm-up exercises can be done while sitting in a chair, anytime and anywhere.

Stretch:*Shoulder Stretch*

Begin lying on your back and cradle the back of your head in the palm of your right hand. With your left hand at your side and your palm facing your leg, bend your elbow so that your fingertips point up toward the ceiling. Press your left elbow against the side of your body. Slowly let your left hand fall to the side so the back of your hand lowers as far as possible to the surface and until you feel a stretch in your left shoulder. Now cradle the back of your head in the palm of your left hand. With your right hand at your side and your palm facing your leg, bend your elbow so that your fingertips point up toward the ceiling. Press your right elbow against the side of your body. Slowly let your right hand fall to the side so that the back of your hand lowers as far as possible to the surface and until you feel a stretch in your right shoulder. Repeat 10 times with each arm. This exercise can be done in the morning or evening while lying on your bed.

Pectoral Stretch

Begin standing tall at any doorway in your house. Stand in the doorway so that your body is aligned with the doorframe, as if you were about to walk through the doorway. Extend both arms out to the side so that your arms form a "T" or cross perpendicular to the door frame. Holding onto both sides of the doorframe with your hands, take a step forward and gently lean your body through the doorway until you feel a mild to moderate stretch across your chest. Hold for 15 seconds and repeat 4 times. This exercise should be pain-free. This stretch can be done while exiting any room in the house where there is a doorway.

Strengthen:*Side Arm Raises*

Begin by picking up any 1-2 lb. object that easily fits in your hand, preferably a cylindrical object that can be easily grasped, such as a cup, a can of soda or a can of food. Place the object in your right hand. Lower your right arm straight down to your side. Without bending your wrist, turn your right hand so your palm is facing forward while holding onto the object. With your right arm straight, lift your arm to your side, away from your body as in a jumping jack until your arm reaches shoulder height. Hold for three seconds and slowly bring your arm back down to your side. Repeat ten times with your right arm. Switch the object to your left hand. Lower your left arm straight down to your side. Without bending your wrist, turn your left hand so that your palm is facing forward. With your left arm straight, lift your arm to your side, away from your body as in a jumping jack until your arm reaches shoulder height. Hold for three seconds and slowly bring your arm back down to your side. Repeat ten times with your left arm. This exercise can be done when unloading the dishwasher, groceries, or anytime you are handling a suitable cylindrical object. Once again, it can be done with a cup, can of soda, or a can of food.

Diagonal Reaching

The purpose of this exercise is to move a light-weight object from one side of your body at hip level to the opposite side of your body above head level in order to strengthen the shoulder. Your left shoulder will be doing most of the heavy work as you walk with your dog, so completing this sequence with your left arm is most important. For descriptive purposes, we use the example of putting groceries away into a high cupboard. Begin standing and face the counter. Place the grocery bag on the right of your body with the cupboard to the left of your body. Reach with your left hand to grab the grocery item from the bag and reach your arm across your body diagonally to place the item into the high cupboard. This exercise can be done when transferring any item in a diagonal fashion from a lower position to a higher position or vice versa such as unloading the contents of a grocery bag into an upper cupboard, removing items from an upper cupboard and placing them on the counter, or picking up items from a lower cupboard and placing them on the counter.

Chapter 2: Legs/Lower Body

Warm up:

Ankle circles:

Begin sitting with legs straight out in front of you, or lying down on your back with your legs straight and knees pointing toward the ceiling. This exercise involves movement of the ankle and foot only, while keeping your legs stable. First, complete 5 ankle circles with each foot circling to the right. Then make 5 ankle circles with each foot circling toward the left. Then, move your right foot to form the alphabet A-K in the air. Repeat with your left foot. The ultimate goal of this exercise is to form all 26 letters in the entire alphabet with each foot. However, when starting out, you may want to complete just a few of the letters and slowly work up to the entire alphabet. This exercise can be done when lying in bed, or relaxing on the couch during commercials while watching TV.

Stretch:

Towel Stretch:

Begin sitting on a chair with your right leg extended out in front of you. Holding one end of a bath towel in each hand to create a sling, place the arch of your right foot in the middle of the towel sling. While holding both ends of the towel, pull the towel ends toward your body with your right knee straight and your right ankle bending toward you. You should feel a nice stretch along the back of your lower leg. Hold this position for 15-30 seconds, then relax. Now extend your left leg and place the middle of the towel sling in the arch of your left foot while holding both ends of the towel, one end in each hand. Keep your left knee straight and pull the towel ends toward your body with your left ankle bending toward you. Hold this position for 15-30 seconds, then relax. This exercise can be done when lying in bed, relaxing on the couch, or when drying off after showering in a sitting position.

Strengthen:*Side-Step:*

Begin by standing in front of a long counter, such as a kitchen or bathroom counter. Face the counter and place both hands on the counter surface. Stand up straight, use the counter to steady yourself. Take a step about the width of your hips to the right with your right foot. Bring your left foot to meet your right foot so you are standing with your feet together. Slide your hands along the counter as you continue to take another step to the right with your right foot. Again, bring your left foot to meet your right. Repeat this sequence three more times to the right. Then switch directions by taking one step about the width of your hips to the left with your left foot. Bring your right foot to join your left. Slide your hands along the counter as you continue to take another step to the left with your left foot. Bring your right foot to meet your left. Repeat this sequence three more times to the left. This exercise can be done before or after brushing your teeth while in the bathroom, or before or after doing dishes in the kitchen.

Backwards Kick

Begin by standing in front of a counter, such as a kitchen or bathroom counter. Stand up straight, and place your hands on the counter to steady yourself. With your feet hip-width apart, shift your weight to your left foot, and slowly kick your right leg back behind you, while keeping your knee straight. Keep your right foot raised slightly off the floor for 3 seconds and then place it back down to the starting position. You should feel tightening at your right buttock when your leg is raised off the ground behind you. Repeat 10 times with your right leg. Now, shift your weight to your right foot, and slowly kick your left leg back behind you, while keeping your knee straight. Raise your left foot slightly off the floor for 3 seconds and then place it back down to the starting position. You should feel tightening at your left buttock. Repeat 10 times with your left leg. This exercise can be done after you wash your hands in the bathroom, or before or after doing dishes in the kitchen.

Heel-Toe Raises

Begin by placing your hands on a counter to maintain your balance. Stand with a straight back, legs shoulder-width apart, and your feet pointing toward the counter. Keep your knees straight and make sure to hold onto the counter firmly. Shift your weight back to your heels and flex your ankles so that your toes come slightly off the ground. Hold for three seconds. Shift your weight back into your feet as you stand normally. Then shift your weight to the balls of your feet, raising your heels off the ground as high as you feel comfortable with and hold for three seconds. Lower your heels back down to stand normally. Repeat 10 times shifting your weight first into your heels, then to normal standing, then to the balls of your feet and back to normal standing while holding onto the counter at all times. This exercise can be done when you are standing in front of the kitchen or bathroom sink. You can complete this exercise before or after brushing your teeth, washing your hands, or doing dishes.

Standing Calf Stretch:

Begin standing and facing a wall with both feet together. Place your hands against the wall at shoulder level. Both feet should be pointed toward the wall. Take one step backwards with your left foot while keeping your left heel flat on the floor as much as possible. Your left leg should also be kept straight. Bend your right knee in front and lean toward the wall until you feel a stretch through the back of your left calf. Hold this stretch for 15 seconds. Switch legs by straightening your right leg and bringing your left foot to meet the right foot. Now take a step backwards with your right leg and press your right heel into the floor. Keep your right leg straight. Bend your left knee toward the wall until you feel a stretch in your right calf. Hold this stretch for 15 seconds. Repeat 3 times on each leg. This exercise can be done before walking your dog.

Chapter 3: Abdomen**Warm up/ Stretch:***Side-to-Side Stretch*

Begin sitting in a chair. Raise both arms all the way above your head with your elbows straight and interlace your fingers together. Point your index fingers toward the ceiling. Lean sideways to your right until you feel a stretch at the left side of your body. Return your body to an upright position. Now lean toward your left side until you feel a stretch to the right side of your body. Return your body to an upright position. Repeat 5 times on each side. This exercise can be done while sitting in a chair before or after putting on your socks and shoes, before a meal, or before or after a walk with your dog.

Strengthen:*Chair Marching*

This is an exercise to strengthen the stomach muscles used in walking. It feels as if you are marching with your legs while sitting. Begin sitting in a chair and keeping your back straight lean slightly forward from the back of the chair. To measure the distance between your back and the chair, put your fist between your back and the chair to measure one fist-length away. Remove your hand and place your arms at your sides. You can stabilize your body by holding onto the seat of your chair. You should feel your stomach tighten as you lean forward. With your feet flat on the floor, raise your right upper leg off the chair and right foot off the ground, keeping your knee bent and hold for 3 seconds. As your leg rises off the chair, you should feel your stomach tighten. Lower your foot back to the ground. Repeat on the left side by raising your left upper leg off the chair and left foot off the ground keeping your knee bent and hold for 3 seconds. Return your foot to the ground. Repeat 10 times, 5 times with each leg. This exercise can be done while sitting in a chair before or after putting on your socks and shoes, before a meal, or before or after a walk with your dog.

Chapter 4: Proper Footwear

Another component of pain and injury prevention when walking with your guide dog is wearing proper footwear. Walking shoes provide cushion that support the arch of the foot, where most of the weight rests while walking. The cushion in your walking shoes should be flexible near the ball of the foot, which allows for better flexibility of your foot while walking.

Research shows that shoes with heels that are less than one inch high with thick cushioned soles are optimal to increase stability when walking. Shoes with firm, slip-resistant soles are recommended for wearing both indoors and outside to reduce the risk of falling. Wearing thick socks can also increase your comfort when wearing shoes and reduce the risk of blistering.

Change your socks as often as needed to keep moisture from building up on your feet and causing blisters.

Closing credits will contain an audio and text listing of our names, and acknowledgements to Ms. Theresa Stern, Ms. Kerry Murphy, Dr. Kitsum Li, the dog trainers, and Guide Dogs for the Blind for their help and support. (We may include a brief description from each of us about why these exercises are needed, the importance of integrating the exercises into daily activities, however, this description can be filmed at a later date.)

Appendix D: Gearing Up for Guide Dogs - An Exercise Video Project Evaluation

The following survey was administered via SurveyMonkey.

"Gearing Up For Guide Dogs: An Exercise Video" Project Evaluation

1. Based on the audio description in the video, how easy was it to follow along with the exercises?

Very Easy

Somewhat Easy

Neutral

Somewhat Difficult

Very Difficult

2. Based on the visual demonstration in the video, how easy was it to follow along with the exercises?

Very Easy

Somewhat Easy

Neutral

Somewhat Difficult

Very Difficult

3. Were the suggestions on how to integrate the exercise into a daily routine helpful?

- Very Helpful
- Somewhat Helpful
- Neutral
- Could be more Helpful
- Not at all Helpful

4. How well do you think this video will prepare older adults for the Guide Dogs for the Blind training program?

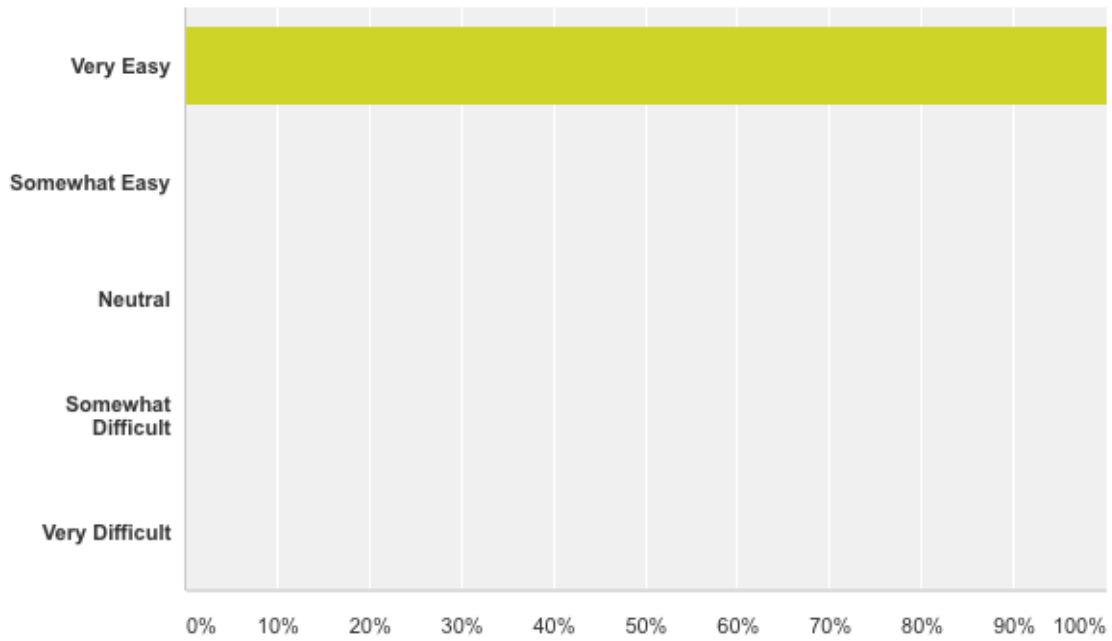
- Very Well
- Somewhat Well
- Neutral
- Somewhat Poorly
- Very Poorly

5. Please add any recommendations you may have to improve or change the video.

Appendix E: SurveyMonkey Responses

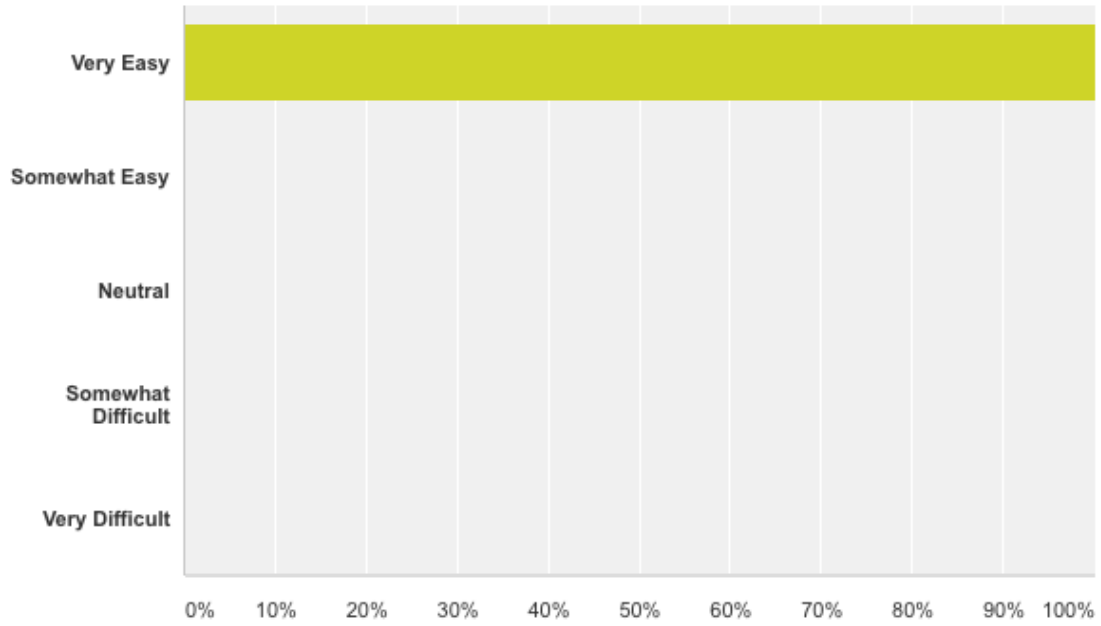
Based on the audio description in the video, how easy was it to follow along with the exercises?

Answered: 3 Skipped: 0



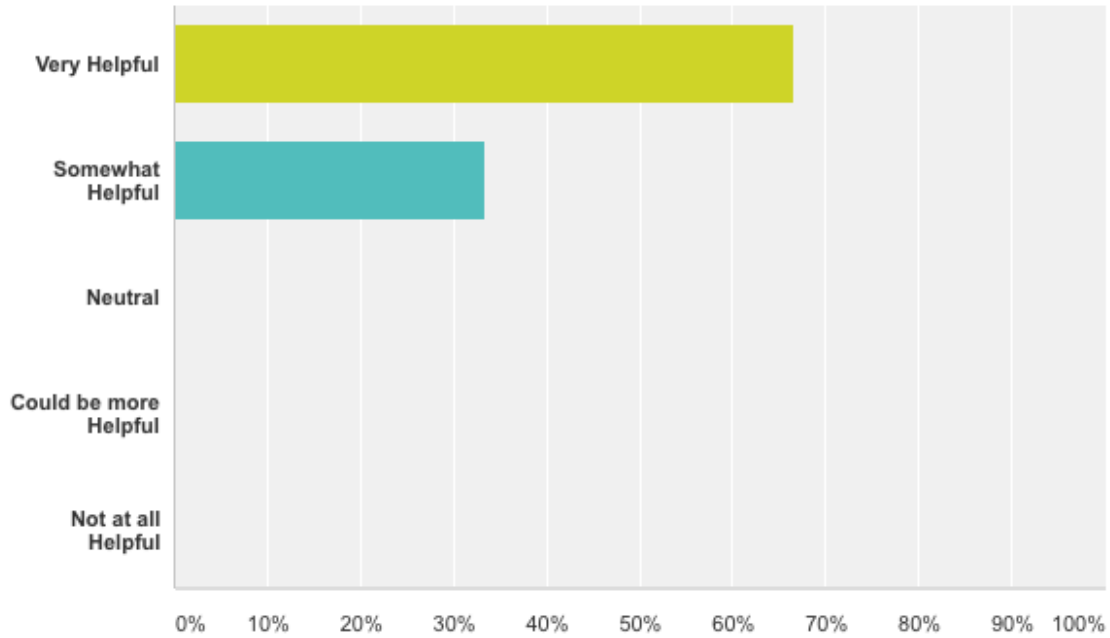
Based on the visual demonstration in the video, how easy was it to follow along with the exercises?

Answered: 3 Skipped: 0



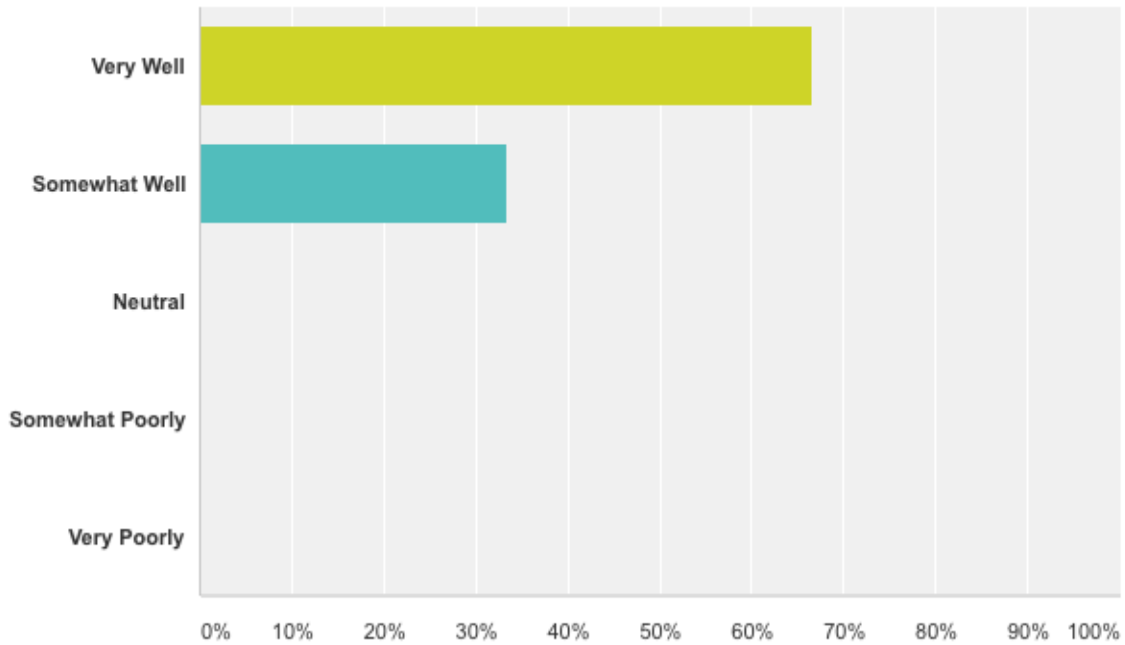
Were the suggestions on how to integrate the exercise into a daily routine helpful?

Answered: 3 Skipped: 0



How well do you think this video will prepare older adults for the Guide Dogs for the Blind training program?

Answered: 3 Skipped: 0



Please add any recommendations you may have to improve or change the video.

Answered: 2 Skipped: 0

Responses (2) | Text Analysis | My Categories

Categorize as... | Filter by Category | Search responses

Showing 2 responses

They are all good exercises. They appear to be geared to the individual who has yet to embrace a very 'active lifestyle'.
11/5/2015 4:21 PM [View respondent's answers](#)

I thought it was great! One suggestion is to make it clearer which exercises are for warming up immediately before walking with a guide dog and which are for increasing strength and flexibility in preparation for training with a new guide dog.
11/5/2015 4:19 PM [View respondent's answers](#)

Appendix F: Consent Form

I, _____ (print name), hereby give my consent to the Occupational Therapy Department of Dominican University of California to utilize my image in the instructional exercise video to be posted on the Guide Dogs for the Blind website and for distribution to future trainees in the Guide Dogs for the Blind program.

Signature: _____

Date: _____