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Increasing Fall Self-Efficacy and Awareness of Fall Risks Among Community-Dwelling Older Adults

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Abstract

Objective: The purpose of this study was to examine the effectiveness of a modified version of the Stepping On fall prevention program in increasing fall self-efficacy and awareness of fall risks in community-dwelling older adults.

Method: This research study utilized a quantitative, quasi-experimental pretest-posttest single-group design with a qualitative element. The fall prevention program was the intervention of this study. The Modified Falls Efficacy Scale (MFES) was a pre and post measurement tool. The Timed Up & Go Test (TUG), the Romberg test, and the Saint Louis University Mental Status Examination (SLUMS) were screening tools. Fourteen older adults aged 75 and above participated in the seven-session fall prevention program focusing on topics such as safe footwear, exercises, home hazards, medications, vision, and community mobility. Each weekly session included individualized short-term goal setting.

Results: Participants reported mean MFES pretest scores of 8.61 and posttest scores of 8.14. Although scores on the MFES showed a slight decrease in participant fall self-efficacy, this was not a statistically significant finding. Researcher-developed measures showed an increase in participants' confidence in their ability to prevent falls. Participants reported they increased their weekly exercise routines and made home modifications after attending program sessions. Approximately 71% of participants reported exercising more as a result of the program and over half (64%) of participants reported making at least one home modification.

Conclusion: A multifactorial, client-centered approach regarding fall self-efficacy, physical activity, and home safety can decrease fall risk and support healthy occupational engagement in everyday living. Occupational therapy can play a critical role in helping older adults in community-based settings to increase their fall self-efficacy and awareness of fall risks.

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Introduction and Statement of Problem

Falls and fall-related injuries are serious issues facing community-dwelling older adults (Rubenstein, 2006). With the rising number of adults over the age of 65, the occurrence of falls, fall-related injuries, and fall-associated costs will also rise significantly (Costello & Edelstein, 2008). A fall is defined as "an unexpected event in which the participant comes to rest on the ground, floor, or lower level" (Gillespie et al., 2009). Falls are the leading cause of preventable injury in adults over the age of 65, and can occur from several different intrinsic and extrinsic risk factors (Fortinsky, Panzer, Wakefield, & Into, 2009). Falls affect an older adult's overall physical and psychological health and can have a negative impact on occupational participation. While it may not be possible to prevent falls altogether, individuals who have a tendency to fall frequently can be enabled to fall less (Gillespie, et al., 2009).

Approximately one-third of adults residing within the community over the age of 65 and half of those over the age of 80 sustain at least one fall per year (Rubenstein & Josephson, 2006; Frick, Kung, Parrish, & Narrett, 2010). This means that out of the estimated 35 million older adults in the United States, around 12 million will fall each year (Frick et al., 2010). National medical costs in 2000 totaled $19 billion for non-fatal fall-related injuries and $179 million for fatal injuries (Costello & Edelstein, 2008; Wofford, Heuser, Moran, Schwartz, & Mittelmark, 2010). The medical costs of falls are projected to increase to $43.8 billion by 2020 (Wofford et al., 2010).

The implementation of effective fall prevention programs can reduce the economic costs of falls. Fall prevention programs also have the potential to decrease the number of serious injuries related to falls, hospitalizations and emergency room visits, while increasing occupational participation (Rubenstein & Josephson, 2006). Multi-factorial fall prevention

programs focus on incorporating education to increase awareness of intrinsic and extrinsic risk factors in regard to falls. Intrinsic factors, such as vision, balance, medical conditions, and polypharmacy, and extrinsic factors, including weather, socioeconomic status, social interaction, and home hazards, contribute to the risk of falls among older adults.

Occupational therapists play a key role in multi-factorial fall prevention programs. Occupational therapists view older adults holistically and approach fall prevention by examining the person's environment and making necessary environmental changes, educating individuals on behavioral adaptations in the home and community, and assessing risk factors that contribute to falling associated with aging (Clemson, Cumming, & Heard, 2003). Effective fall prevention programs should cover all intrinsic and extrinsic fall-risk factors, especially when skilled occupational therapists consider the physical, functional, environmental, and motivational status of an older adult.

The purpose of this study was to evaluate the ability of a multi-factorial fall prevention program to promote fall self-efficacy and reduce fall risk in older adults. Findings of this research may help occupational therapists and other healthcare professionals understand the importance of offering multifaceted fall prevention programs. Increasing awareness of falls and fall safety in older adults will help decrease falls and healthcare-related costs in the United States, promote engagement in occupations of older adults, and reduce negative consequences of injurious falls.

Literature Review

This literature review examined critical issues associated with falling: physical health issues, fear of falling, and intrinsic and extrinsic factors related to falling. It also reviewed

evidence-based research on fall prevention, such as interventions, factors influencing adherence to strategies, and cognitive-behavioral approaches for reducing fall risks.

Physical Health and Falls

Fall-related injuries are major determinants of disability, mortality and loss of functional independence in older adults. A meta-analysis of 12 randomized controlled trials evaluated various fall prevention interventions, provided information on types of available fall prevention interventions, and reviewed the evidence on the efficacy of these interventions (Rubenstein & Josephson, 2006). This meta-analysis showed that serious injuries can occur from falling, including lacerations, fractures to the wrist, shoulder, hip and ankle, and head injuries. Extensive physical and cognitive damage caused by secondary disabilities can also occur, and cause older adults to become dependent on assistive devices or other people to perform their daily activities (Rubenstein & Josephson, 2006). For example, between 25% and 75% of community-dwelling older adults who fracture their hips due to falling never recover the same level of function in ambulation or activities of daily living.

The loss of functional independence and impaired mobility associated with falling and subsequent hip fracture is significant because it is linked to an older adult's quality of life and state of morbidity. Quality of life involves the personal satisfaction, meaning and purpose that an individual gains through carrying out his or her daily activities. Frick, et al. (2010) conducted a meta-analysis of various fall prevention programs to determine the utility of these programs. This study analyzed the effectiveness of different interventions upon an older adult's quality of life. Frick, et al. (2010) reported on a self-assessed health-related quality of life measure with 1,400 clients with hip fractures to note how this type of physical, fall-related injury negatively impacted an older adult's quality of life. The disability and distress of fall survivors were also

measured. It was found that participants experienced decreased satisfaction with their health after falling, as well as a decreased perceived life expectancy from 9 to 7.3 years (Frick, et al., 2010).

Falling is closely linked to premature mortality. According to Rubenstein and Josephson (2006), approximately three-fourths of fatalities due to falls in the United States occur in the 13% of the population over the age of 65. The significant incidence of mortality, as well as the propensity for older adults to become injured due to age-related physiological changes (e.g. slowed protective reflexes) and clinical diseases (e.g. osteoporosis), can make even a mild fall dangerous (Rubenstein & Josephson, 2006).

Fear of Falling

Several studies have examined psychosocial issues related to falling to reveal that although not every fall results in serious injury, most falls do have a psychological impact. Fear of falling can be defined as a self-imposed anxiety, or maladaptive psychological state towards falling that creates negative outcomes for an individual (Fortinsky, et al., 2009; Li, Fisher, Harmer, &, McAuley, 2005). Fear can cause people to restrict mobility with the assumption that if they are not mobile, then they will not fall. A study of 256 community-dwelling older adults by Li, et al., (2005) analyzed the role of fall self-efficacy as a possible mediator of the relationship between exercise and fear of falling. This study found that the range of occupations that an individual is willing to participate in can be severely impacted by a reduction in mobilization due to fear (Li, et al., 2005).

Activities of daily living (ADLs) and instrumental activities of daily living (IADLs) involving physical exercise or mobilization can also be stopped or changed due to fear. Lampiasi and Jacobs (2010) examined the role of occupational therapy and physical therapy in

fall prevention in the home and environments where individuals complete ADLs and IADLs. This study found that almost all activities of daily living can be affected by fear of falling because they can be perceived as dangerous (Lampiasi & Jacobs, 2010). ADLs include dressing, bathing, toileting, feeding, grooming and functional mobility in the environment. IADLs such as laundry, housekeeping, and meal preparation can also be restricted or altered due to an individual's choice to limit his or her level of mobilization.

A serious consequence associated with loss of physical activity and falling in older adults is deconditioning. This occurs due to underuse of the musculoskeletal system. Fitzgerald, Hadjistavropoulos, and MacNab (2009) studied the relationship between fear of falling and functional ability in older adults. They found that older adults were restricting their participation in physical activity due to fear. If people limit exercise due to fear, then muscles will atrophy and coordination and balance can decline. The loss of these skills increases the likelihood of falling. According to the Centers for Disease Control (2009), approximately 25% of individuals over the age of 75 and living in the community restrict their activities because they possess a fear of falling. Older adults contribute to the decline of their own quality of life when they restrict their activities and lose the satisfaction and sense of purpose related to task participation.

Intrinsic Risk Factors for Falling

As older adults age, they are at a higher risk for falls due to many intrinsic factors. Intrinsic factors include vision loss, decreased balance and strength, polypharmacy (taking four or more medications), and various medical conditions. The more factors an older adult has, the greater his or her overall chance of falling. Research shows that one in three older adults over the age 65 and one in two adults over the age of 70, falls at least once a year (Roe et al., 2009). Of those older adults who fell, one in three was likely to fall again in the following year. The

likelihood that adults will experience a fall further increases with advancing age. However older adults are not falling simply because they are aging—the number of risk factors is increasing such as reduced vision and balance, chronic medical conditions, and polypharmacy (Roe et al., 2009).

Vision.

Vision decreases with age as visual impairments increase. This is a primary factor in increased fall risk. Visual impairment can be caused by different conditions, including age-related macular degeneration, glaucoma, cataracts and diabetic retinopathy. According to Källstrand-Ericson and Hildingh (2009) these conditions can impair and decrease depth perception, adjustment to light, contrast sensitivity, visual fields, and acuity. It is common for older adults to have more than one vision impairment condition. Källstrand-Ericson and Hildingh (2009) conducted a retrospective study of people 65 and older to determine whether a visual impairment was an underlying factor for fall risk. There were 98 subjects in this study, and 68 of those had experienced a fall. Of the 68 subjects, 41 of those were classified as having a visual impairment. Results showed that 76% of those who had fallen had some type of visual impairment.

Visual impairments can affect daily activities such as walking, transfers, and balance. Decreased depth perception causes older adults to have a difficult time determining the depth of the steps of stairs and raised parts of floors (NIH Senior Health, 2011). An older adult may not know how far to step or what part of the step to step on. Additionally, the rate of adjustment from dark to light and vice versa decreases with age. An older adult needs more time to adjust to new lighting conditions. Visual impairments make it harder for older adults to judge and interpret where they are walking, and this can lead to trips and falls.

Balance.

Older adults tend to have weakened muscles, decreased balance, difficulties during transfers, and unsafe gait patterns, which may contribute to increased fall risk. Some older adults develop a kyphotic posture that can misalign their spine and ultimately make it difficult to balance (Kato, Izumi, Hiramatsu, & Shogenji, 2006). With this posture, their center of gravity is not centered anymore but moved forward. This kyphotic posture and displaced center of gravity increases fall risk. Muir, Berg, Chesworth, Klar, and Speechley (2010) conducted a study to determine balance impairments in older adults at risk for falling. This study used the Berg Balance Scale and other assessments to examine the different balance impairments of 182 participants. Results of this study showed that 43% of those participants had experienced falls and demonstrated balance impairments. These older adults demonstrated weaknesses during the one leg stance and tandem stance, which produce the narrowest bases of support. Older adults need a wider base of support to improve their balance and reduce the likelihood of falls. Results of this study showed that problems with balance and limited stability were independent predictors of any fall the following year.

Medical conditions.

Some chronic medical conditions of older adults put them at risk for falls (Härlein, Dassen, Halfens, & Heinze, 2009). These include dementia, osteoporosis, arthritis, and traumatic brain injury. About 5% of adults age 65 and above have dementia; incidence of dementia increases to 30% for those over age 80 (Härlein et al., 2009). Older adults with dementia have problems with judgment, sense of awareness, executive functioning, and wandering (Härlein et al., 2009). Cognitive issues increase the risk of falling because older adults are less likely to be aware of their surroundings and it is possible that they can misstep or

lose their balance. Older adults can have dementia non-Alzheimer's type or dementia Alzheimer's type. Alzheimer's disease can weaken postural control, change gait patterns, and change in stride length (Härlein et al., 2009). In particular these conditions can cause problems with ambulation and can lead to falls.

Older adults who have osteoporosis are at a higher risk for falls. Osteoporosis occurs when the bones start to become porous and breakdown, which can lead to fractures (Cumming, 1998). Hip fractures are the most common and serious consequence of falls. Other age-related fractures occur in the neck of humerus, wrist, and ankle (Cumming, 1998). These are rarely as serious as hip fractures but can result in chronic health issues. One of the causes of fractures is that many older adults have low levels of Vitamin D. Older adults are often Vitamin D deficient because of poor diet and low levels of sun exposure. Vitamin D is essential for bone formation. Another bone-related condition is osteoarthritis; this is the most common form of arthritis in older adults (Arnold & Faulkner, 2009). Osteoarthritis can lead to impaired mobility, decreased lower extremity strength, and increased fall risk (Arnold & Faulkner, 2009).

Polypharmacy.

Older adults often take numerous medications for various medical conditions. Polypharmacy is defined as taking four or more medications and is common among older adults (Berdot et al., 2009). Taking a high amount of medications increases the risk of falls due to different side effects such as drowsiness, decreased postural reflexes, and extra pyramidal symptoms. With polypharmacy there is also a possibility for drug interactions (Berdot et al., 2009). Drug interaction is described as a change in how the drug reacts in the body when taken with certain other drugs (Berdot et al., 2009). Results from drug interactions include decreased or increased effectiveness of the drug, or unexpected effects on the body (Berdot et al., 2009).

Different types of medications can increase fall risk, especially anti-depressants, benzodiazepines, and neuroleptics (Cumming, 1998). In anti-depressants, the selective serotonin and reuptake inhibitors of the medication are factors that increase fall risk (Cumming, 1998). Anti-depressant medication can also lead to sedation, psychomotor retardation, gait abnormalities, and postural hypotension (Cumming, 1998). Postural hypotension causes blood pressure to drop when the person stands up; this can cause faints and falls of older adults (Cumming, 1998). Benzodiazepines and neuroleptics can have side effects of cognitive impairment, confusion, postural disturbances, sedation, dizziness, and visual disturbances (Ruddock, 2004). Polypharmacy can have many side effects that may lead to increasing risk of falls.

Extrinsic Risk Factors for Falling

Weather.

Several extrinsic factors contribute to falls in community-dwelling older adults. Unfavorable weather conditions can cause difficulty walking, especially during winter when ice, snow, hail, and rain commonly occur (Shigematsu et al., 2008). In a study of movement stability in reducing slip-related balance loss and falls among 41 healthy older adults, Pai, Wening, Runtz, Iqbal, and Pavol (2003) found that slips caused by unfavorable weather and other slippery surface conditions contributed to 25% of falls in participants. This was especially true for those with less than optimal movement and limited protective strategies to prevent a fall. Conversely, hot weather, along with vigorous activity in the heat, also creates a fall risk for older adults due to orthostatic hypotension (Rubenstein, 2006).

Even comfortable weather conditions are associated with older individuals falling, mainly from increased participation in outdoor activities (Faulkner et al., 2009). In a 4-year prospective

study of the relationship of physical and lifestyle factors on fall rates by Faulkner et al. (2009), a higher rate of engagement in outdoor recreational activities by participants exposed them to more community hazards and various risk-taking activities, causing more falls. Walking several blocks and climbing stairs in the community were seen as environmental hazards that exposed these participants to increased falls.

Community hazards occur when older adults perform activities and occupations outside of the home. Talbot, Musiol, Witham, and Metter (2005) surveyed 205 older community-dwelling adults who had fallen in order to determine what factors were responsible for their previous falls. The most reported reasons for falls in the community were from an uneven surface or uneven steps (40%) and objects on the surface or on a rug (24%). Outdoor glare from the sun, darkness and dimness from the environment, and eyeglasses issues were other reasons reported by 46% of the participants.

Socioeconomic status.

Older individuals of lower socioeconomic status and educational level have an increased fall rate. A population-based survey of factors relating to the prevalence of falls in older adults by Gill, Taylor, and Pengelly (2004) found that participants with a lower socioeconomic status experienced difficulty attaining and affording health services for health-related issues because of a lack of income. Decreased access to services was significantly associated with increased numbers of falls. This was especially true for participants who rated their health as fair or poor. Furthermore, participants with an annual household income of less than AUD 80,000 [(US $83,176)] had a greater risk for falling when compared to participants of a higher income level. Study participants with lower educational levels than a college degree were also more likely to

report a fall within the previous year. The authors suggested this may be due to decreased fall risk awareness and education.

Adaptive equipment and assistive devices.

Many falls are due to the misuse and nonuse of prescribed adaptive equipment and assistive devices by older adults (Stevens, Thomas, Teh, & Greenspan, 2009). Kraskowsky and Finlayson (2000) conducted a review of literature to examine the influence of different factors on older participants' views of these devices. The authors found a relationship between low socioeconomic status and rejection of equipment. An increased amount of falls in participants was due to decreased use and misuse of assistive devices and adaptive equipment in the household and community. These falls were especially common for those who had a lower education level, lived alone, were single, at a lower income level, or less healthy.

In a qualitative study of older adults' views on assistive devices for fall prevention by Aminzadeh and Edwards (1998), the rejection of assistive devices, most notably canes, walkers, wheelchairs, shower chairs, and grab bar rails prescribed for decreased mobility, were due to negative views of these aids held by participants. For example, one participant stated that cane use "symbolized old age" (p.302) and made older adults look "crippled, invalid, and worthless" (p.302). Assistive devices were also viewed by participants as ineffective, misprescribed by a rehabilitation therapist or nursing staff, and an equipment failure from misuse by the user.

Social interaction.

A loss of social interaction has been found to be related to fall risk. Calhoun et al. (2011) conducted a qualitative study of community-dwelling older adults who had sustained falls and found participants had decreased their social interaction due to the death of a loved one or close friend. This caused a reluctance to perform previous social routines and a loss of social roles due

to a physical, familial, or social loss. For example, a participant who recently lost multiple close family members stated, "In two-and-a-half years I lost my husband and five close relatives. It just has not left me in very good spirits most of the time, because I was close to all my relatives" (Calhoun et al., 2011, p. 3). Another participant mentioned, "We have stopped doing lots of things that we did do, because it would take us longer to get to a meeting" (Calhoun et al., 2011, p. 3). The loss of roles resulted in participants staying home more often, causing a sedentary lifestyle, a lack in physical activity, and eventual negative physiological changes, creating an increased risk of falls in the home (Calhoun et al., 2011).

Home hazards.

Home hazards are common cause of falls where older adults live. A study of home environmental hazards among community-dwelling elderly in Taiwan by Huang (2005) found that 89% of falls in the home were caused by home hazards. Of 1,212 participants studied, environmental hazards were found and recorded in 60% of participants' homes. An Environmental Hazards Checklist was used to identify commonly found home hazards in this study. Examples of hazards found were loose throw rugs lacking anti-skid material, broken or loose furniture, obstacles caused by clutter, poorly illuminated rooms, wet or slick flooring, high storage in rooms, and slippery bathtubs and showers.

A review of literature examining environmental hazards by Lord, Menz, and Sherrington (2006) found other potential hazards attributing to older adults falling in the home. High beds, uneven flooring due to a lack of home repairs, exposed extension cords, obstructed walkways, and a lack of handrails contributed to falls due to trips and slips inside the home.

A common area where many older adults fall in the home is the bathroom (Huang, 2005). Aminzadeh, Edwards, Lockett, and Nair (2000) surveyed the utilization of bathroom safety

devices and bathroom falls in 550 community-living older adults. The authors found that 176 (32%) of the 550 participants surveyed stated they had fallen within the year of the study. The bathroom was the area where participants fell most frequently. Of the 176 people who fell, 26 (15%) of those participants fell in the bathroom. A total of 31 accidental falls (including participants who fell more than once) were reported in the bathroom. Of the 31 falls in the bathroom, 17 were related to unsafe transfers during bathing and four participants reported injurious falls from incorrect toilet transfers.

Fall Prevention Interventions

Successful "aging in place" demands that older adults' homes and lifestyles accommodate the inevitable decline in functional ability that accompanies aging. According to the American Association of Retired Persons (AARP), nine out of ten older adults would prefer to remain in their homes and maintain their independence within the community (AARP, 2003) The increase in incidence of falls within the rapidly aging population has created a need for evidence-based research on effective fall prevention strategies and implementation of programs targeting reduction of fall risks.

Some existing fall prevention programs concentrate on minimizing single known risk factors for community dwelling adults (Greene, Sample, & Fruhauf, 2009). Twenty-three home assessments were conducted by occupational therapists in the Greene et al. (2009) study. This single-factor intervention identified home hazards that could lead to unintentional falls. Participants were urged to implement recommended modifications, install and use adaptive devices, and make behavioral changes to increase their safety in the home. In follow-up interviews conducted six months after the initial home evaluations, seven of the thirty-five participants reported they had fallen. Only one fall was linked to a previously identified home

hazard, and in that instance a reaction to the participant's medications and fatigue from a recent surgery may have been contributing factors. The other incidents took place during a wide variety of activities in which unpredictable circumstances preceded the falls; for example, one fall occurred while the person was jogging backward (Greene et al., 2009).

Participant compliance with any single intervention—whether medication management, increased exercise, or home hazard modification—may be lessened if they receive what appears to be competing and contradictory fall prevention advice from healthcare providers. For instance, it could be confusing for participants in a multi-factorial fall prevention program to learn how to move cautiously in their homes while being advised to increase their physical activity in the community. Nevertheless, everyday living requires many decisions involving competing goals and outcomes. Greene et al. concluded that interventions addressing a single risk factor may not encourage individuals to apply newly learned fall prevention skills to other occupational challenges and contexts (2009).

Most falls are due to a combination of risk factors, and there is a large body of evidence supporting multi-factorial fall prevention programs (Clemson et al., 2004; Clemson, Mackenzie, Ballinger, Close, & Cumming, 2008). Multi-factorial programs address two or more categories of fall risk because they recognize that client factors and contextual hazards interact dynamically and further increase the incidence of falls. For example, a person who has taken sleep medication might arise in a confused state, slip on a loose floor rug, and not have the strength or dynamic balance to prevent a fall and avert injury. Multi-factorial fall prevention programs endorse a holistic approach by acknowledging the complexity of life circumstances that can interact and lead to falls.

Researchers agree that the effectiveness of either single factor or multi-factorial interventions depends on participants' continued post-intervention adherence (Gibson, Greene, Sample, & Cabrera, 2010; Whitehead, Wundke, & Crotty, 2006). Gibson et al. defined adherence as "follow through or compliance with fall prevention recommendations" (2010, p. 219). Participants who gave themselves high marks for fall prevention knowledge went on to implement home modifications recommended by the occupational therapists. Conversely, participants who did not express a concern for falling or didn't believe modifications would have any effect on their fall risk incorporated none of the recommended changes into their home environment (Gibson et al., 2010).

Factors Influencing Adherence to Fall Prevention Strategies

Many older people believe falls are inevitable and not preventable. Sixty older adults, with a mean age of 78 years, were interviewed for a qualitative study conducted by Whitehead et al. (2006). Individuals were recruited for the study because they had recently visited the hospital emergency room as the result of a fall. Participants were asked about their attitudes about falls and injury prevention, and although 75% thought falls were a concern for their age group, only about half believed falls were preventable. More importantly, 48% of the sample hadn't given any thought to how they could prevent a future recurrence (Whitehead et al., 2006). Denial of fall risks or reduced fall self-efficacy may be a barrier for adherence to intervention strategies. Participants who were least likely to implement changes proposed within a home assessment were those who believed their homes were already "safe enough" (Whitehead et al., 2006). The lack of adherence to intervention protocols remains a substantial stumbling block for health professionals who are dedicated to promoting health and well being in older adults.

Adherence may require an internalization of fall prevention strategies. A randomized controlled study by Nikolaus and Bach (2003) demonstrated that participants who experienced two or more falls in the year prior to recruitment were significantly more likely to make changes to their routines to include fall prevention strategies than participants without a history of falls. Three hundred and sixty older adults (mean age of 81 years) received home assessments and instruction in the use of adaptive devices to make the home safer. Over the 12 month trial, there was a 31% lower fall rate for participants in the intervention group and a 37% lower fall rate in the subgroup of participants who had previous history of falls (Nikolaus and Bach, 2003). The link between implementation of home modifications and decreased incidence of falls highlights the importance of personal factors that influence adherence (Nikolaus & Bach, 2003). Strategies for fall prevention need to address individual characteristics of older adults, the unique nature of falls, and the varied contexts that contribute to the occurrence of falls.

While some older adults acknowledge they have a fear of falling, others reject the idea that they are personally at risk (Fortinsky et al., 2009; Yardley et al., 2006). In semi-structured interviews across six European countries, sixty-nine older adults (aged 68 to 97 years) discussed their views on falls, the need for strength and balance training and installation of home adaptations (Yardley et al., 2006). A majority of the participants did not perceive they were at risk for falling even though risk factors were present, including poor mobility and reported previous history of falls. One man said it was potentially insulting to be offered advice on fall prevention as he had 70 years of competence and experience in performing everyday activities. A very active woman (aged 82 years) declared that she regularly cleaned her home and washed the windows and didn't feel she needed any help yet even though she admitted to nearly falling because of a slippery loose rug in her living room. Yardley et al. (2006) stated that

overconfidence (defined as a perception of self-efficacy that is not warranted based on an individual's fall risk) itself was a risk factor.

An unrealistic self-assessment of functional capacity, either being timid or overconfident, may deter individuals from pursuing strategies to enhance their personal safety and avert falls (Fortinsky et al., 2009). Older adults interviewed in this study were classified as either *timid*, *congruent*, or *overconfident*, based on their self-reported balance confidence and known risk factors. Between 26% and 42% of the 329 participants interviewed met the researchers' criteria for being overconfident. Self-assessment of low fall risk despite observable risk factors might jeopardize a person's safety. Fortinsky et al. recommended that fall prevention programs target recalibration of confidence levels so that the levels were more congruent with the participants' physiological and environmental risk factors (2009).

Adherence is enhanced if fall prevention strategies are presented in a clear, straightforward manner. Tinetti et al. (2008) conducted interviews of 123 people with hypertension and identified fall risks to investigate how individuals make decisions regarding medication management. Participants (aged 70+ years) were found to be less likely to consider modifying their medication regime if the decision-making process for weighing the benefits against the risks of using these medications was perceived as too complex. Information about the adverse side effects of multiple medications was deemed too complicated to warrant consideration. Through further investigation of participants' adherence to revised medication protocols, Tinetti et al. (2008) found that when participants were provided with simplified, specific recommendations by their health care providers, they were more likely to follow the medical advice.

Some older adults believe that recommended adaptive devices will not prevent falls. A common theme throughout studies examining attitudes about compensatory tools was participants' desire to maintain independence and sense of control over their lifestyle choices. Older adults from six different countries perceived adaptive devices (such as raised toilet seats and bathtub transfer benches) as socially stigmatizing and unnecessary (Yardley et al., 2006). Whitehead et al. (2006) reported that participants who were adamant about maintaining a youthful lifestyle were less inclined to continue supporting intervention guidelines that restricted their active engagement in life, despite having a history of falls. Adaptive devices have been shown to increase falling risks when they are not used properly or do not fit the older person's needs (Kraskowsky & Finlayson, 2001). However, the incidence of falls declined in one reviewed study with participants who believed modifications increased their personal safety in the home and demonstrated a willingness to integrate them into daily routines (Gibson et al., 2010).

Group recreational activities have the potential to provide social contact, structure and a sense of purpose that will facilitate long-term exercise adherence. Litt, Kleppinger, and Judge (2001) recruited 189 older women (aged 59 to 78 years) for participation in a resistance program that targeted either upper extremity strength or lower extremity strength. Three moderators of exercise were assessed: readiness for exercise, self-efficacy, and social support for exercise participation. While participants' motivation and self-efficacy were influential in enrollment in and satisfaction with the exercise program, social support was found to be the best predictor of long-term adherence. The social networking that developed within the context of the group exercise program contributed significantly to participants' improved adherence. Litt et al. (2001) found that older participants were motivated to continue an exercise regime if the activity was

freely chosen, generated feelings of enjoyment, and finally, if peers, family members, and health care professionals also supported the participants' physical and social engagement in exercise.

Cognitive-Behavioral Approach for Reducing Fall Risks

Fall prevention programs utilizing a cognitive behavior framework facilitate a collaborative approach to addressing fall risk concerns. A multi-factorial fall prevention program developed by Zijlstra et al. (2009) studied the effects of using a cognitive behavioral approach on development of realistic and adaptive views of fall risks. In this randomized controlled study, 280 participants (70+ years of age) were encouraged to analyze the factors precipitating their prior falls, initiate a sequence of problem solving steps, and then generalize learned safety concepts to other facets of their daily life.

Zijlstra et al. (2009) proposed that cognitive restructuring of beliefs on fall self-efficacy provided a means for internalizing prevention strategies and induced lasting behavioral change. Study results supported their hypothesis: The number of recurrent fallers was significantly less for subjects in the intervention group than the control group. This difference between groups remained significant at the final assessment that occurred 14 months post-study (Ziljstra et al., 2009). Engaging participants in an exploration of how and why to establish new routines and rituals enhanced personal safety and health promotion in a meaningful and purposeful way.

Stepping On, a group-based community fall prevention program developed by Clemson et al. (2004), encourages participants to proactively integrate behavioral changes into their lifestyle, improve their fall self-efficacy, and maintain these occupational adaptations over time. In the Clemson et al. study, the Stepping On program was led by an experienced geriatric occupational therapist and consisted of seven group sessions (two hours each week over a seven week period) and a follow-up home visit. Weekly topics included personal risk appraisal,

medication management, balance and strength exercises for moving about safely, home hazards and community safety, foot wear, and low vision issues pertinent to fall risks. At the end of the intervention, the 157 subjects who received the intervention protocol improved their fall self-efficacy, demonstrating a 31% reduction in falls relative to the control group (Clemson et al., 2004).

The group-based format of the Stepping On program was developed within a cognitive behavioral framework that encourages social interaction among peers—sharing stories and collaborating on ways to reduce fall risks without sacrificing quality of life. Moreover, in accordance with cognitive behavioral principles, individuals are recognized as being the experts on their own life experience. Their personal stories become a source for other participants' exploration into how to create and maintain new habits and routines conducive to an active, enriched lifestyle (Clemson et al., 2004).

In another study, Clemson et al. examined the feasibility and efficacy of their *Lifestyle approach to reducing Falls through Exercise* (LiFE) program that involved embedding physical exercise and balance skills into daily self-care activities (ADLs) and activities such as meal preparation, shopping and household maintenance (IADLs). The researchers based their rationale for inserting skills into daily routines on a common reason given for not engaging in standard exercise programs—not having enough time (Clemson et al., 2010). Thirty-four community-dwelling older adults (age of 70 or greater) were recruited and then randomized into two groups: one group participated in the LiFE program while the other group did not.

Four of the researchers of the LiFE study had expertise in occupational therapy and were therefore skilled in performing activity analyses of ADLs and IADLs. They educated and trained 17 participants on how to incorporate balance and strength activities into participants'

daily occupations of grooming, meal preparation and housecleaning. For example, participants were instructed to sway to the limits of their balance while washing dishes at the sink or to purposefully squat slowly to pick up clothes from the floor.

LiFE intervention strategies became progressively more challenging with an emphasis on safety precautions as participants mastered the embedded skills. Personal goal setting was encouraged for short-term achievements. Outcome measures were incidence of falls, balance and strength capacity, self-efficacy and quality of life. The LiFE intervention group demonstrated a significant reduction with an associated positive impact on fall self-efficacy and perceived quality of life. These results further supported the effectiveness of a cognitive behavioral approach to fall prevention (Clemson et al., 2010).

Our study evaluated the effectiveness of a partially replicated version of the Stepping On program for residents living in an independent housing facility in Northern California. The cognitive-behavioral approach was emphasized and integrated into the program's behavioral and environmental interventions. Cognitive-behavioral strategies such as self-reflection, understanding of problems, and identification of alternative solutions, were introduced to facilitate participants' self-confidence and independence in decision making that could lead to positive behavioral change and decreased fall risk.

Statement of Purpose

The purpose of this research was to determine whether participation in a structured fall prevention program by community-dwelling older adults leads to increased fall self-efficacy and positive behavioral changes in relationship to fall risks.

Research Questions

1. Will older adults report increased fall self-efficacy after participating in a structured fall prevention program?
2. Will older adults report increased exercise rates after participating in a structured fall prevention program?
3. Will older adults report making one or more modifications to their homes to decrease fall risk after participating in a structured fall prevention program?

Theoretical Framework: Occupational Adaptation

Occupational Adaptation (OA), developed by Schkade and Schultz in 1992, served as the theoretical framework for this research. This framework asserts that a person's interaction with the occupational environment produces a "press" for an occupational response (Schkade & Schultz, 1992). The OA framework further assumes that a person has a strong internal motivation to achieve competence in everyday activities. This is conceptualized as a "desire for mastery." When people attempt to gain competence performing new skills, they need to adapt to contextual demands of the environment. This dynamic interaction of three elements, person, occupational environment, and occupation, is defined as an occupational challenge within the OA framework (Klinger, 2005).

Occupations, Adaptation, and Occupational Adaptation

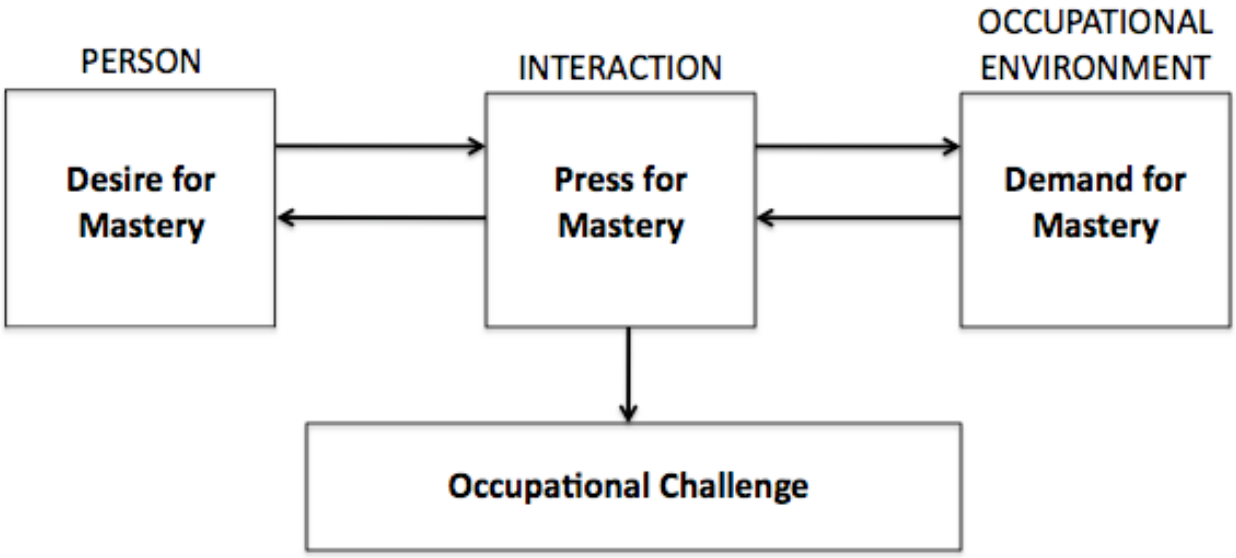
Schkade and Schultz (1992) theorized three main constructs involved in OA: occupation, adaptation, and occupational adaptation. Occupations have three properties: they actively involve the person, are meaningful, and include a process that is a tangible or intangible product. Adaptation involves the person's change from adaptive capacity to relative mastery. Adaptive capacity involves the person's ability to recognize when there is a need to modify and change a

previous response pattern to meet the challenges of the desired occupation. Once this has been met, the individual moves toward relative mastery. As individuals display effective occupational responses when confronted with occupational challenges, they increase their competence and relative mastery of their environment. Individuals increase their competence and relative mastery of their environment when they respond with effective occupational responses in challenging situations.

Press for Mastery

OA explores the adaptation process and interplay between individuals and their occupational environment. The person has a desire for mastery of an occupation, while the environment makes a demand for mastery from the person (Schkade & Schultz, 1992). An example of this is an older adult who has recently been discharged from the hospital and issued a front-wheel walker (FWW) from a rehabilitation therapist. The person has a desire to master ambulation without falling while using her new device in order to leave her home and shop at the grocery store. The environment of the grocery store she frequents has small aisles, is constantly filled with other customers, and creates a fall risk. This busy environment now creates a demand for mastery from the person to be able to maneuver her FWW safely, without falling. The interaction between these two elements creates a "press" for mastery in the individual, prompting her to adapt to the contextual demands of the given occupation (Schkade & McClung, 2001). An occupational challenge occurs as a result of this interaction and requires the person to create an adaptation to achieve mastery and meet the demands of the occupational environment (Schkade & Schultz, 1992).

Figure 1: Press for Mastery



Adaptive Response Behaviors

OA assumes that a person responds to occupational challenges with existing habits, routines, and previous learned behaviors, even if these behaviors may be maladaptive to the desire for mastery. Schkade and Schultz (1992) proposed that three progressing levels of adaptive response behaviors occur during an occupational challenge: hyperstable (primitive), hypermobile (transitional), and stable (mature). A person responding to an overwhelming situation is likely to use a hyperstable behavior. This response behavior is similar to using a defense mechanism and interferes with adapting to a situation (Schkade & McClung, 2001; Schkade & Schultz, 1992). An example of this is found again with the older adult using a FWW for the first time to master ambulation. The individual will use poor body mechanics during ambulation, thus decreasing functional mobility and producing a greater risk of falls.

The next level of adaptive response is the hypermobile (transitional) behavior. This stage includes random, uncoordinated, nonsystematic behaviors and is associated with high

levels of energy that have no direction for progressing toward an occupational adaptation (Schkade & Schultz, 1992). For the older adult using a FWW, various unproductive solutions such as holding the device far away from the body and using bad posture during mobility are attempted. These attempts increase the individual's risk of falling with the device and provide no resolution to the problem.

The final adaptive response level is the mature behavior that focuses on a solution-oriented premise in which the person responds appropriately and effectively to an occupational challenge (Schkade & McClung, 2001). This mature behavior combines mobility and stability to produce an occupational response that drives the person toward relative mastery of the occupational challenge. The older adult with the new FWW who has produced a mature response realizes she needs to position the device close to her body and stand upright using the FWW to enhance her base of support. The mature behavior decreases her risk for falling with an effective adaptive response to the occupational challenge.

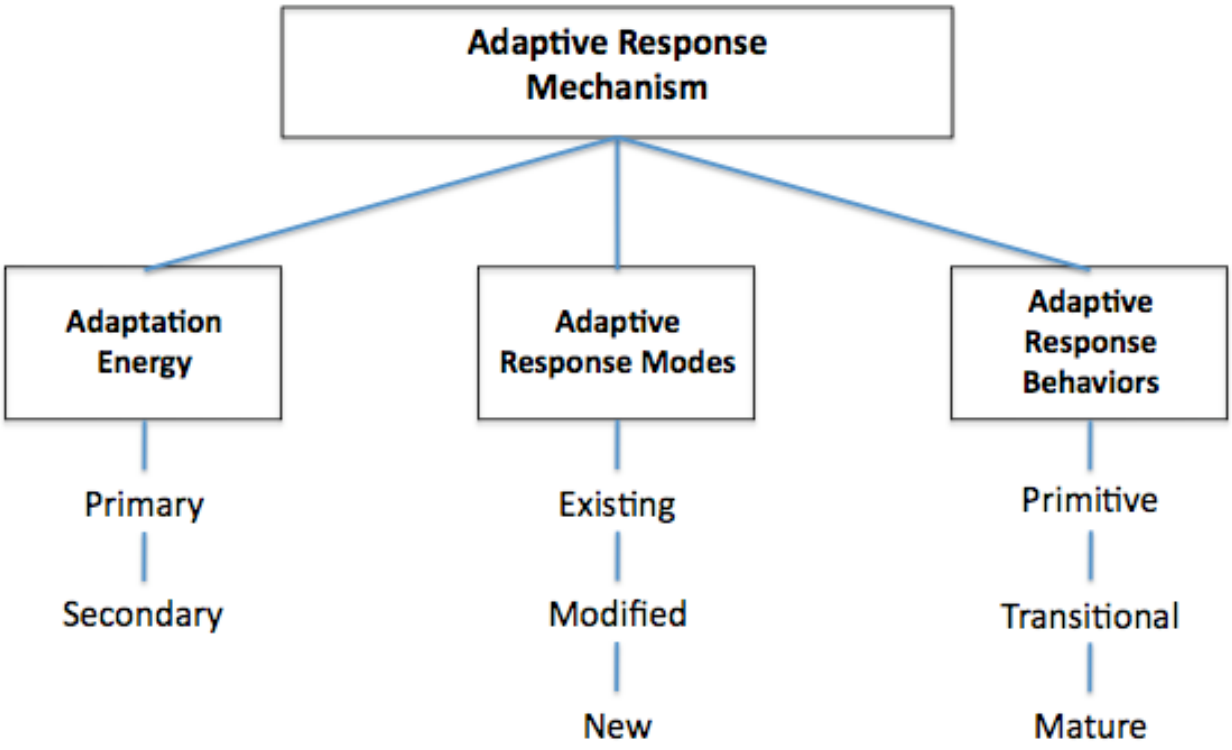
Adaptive Response Modes

The person and the occupational environment interact together during an occupational challenge requiring an adaptive response to the occupation, depending on the person's relative mastery (Schkade & Schultz, 1992). There are three adaptive response modes that occur in a sequential process: existing, modified, and new. The individual's first response will be to use existing patterns. These existing patterns are responses the person is accustomed to using and requires the least amount of energy. If the adaptation is not successful, the individual will attempt a modification to the adaptive response creating the modified mode where new energy is created to support the person in adapting to the occupational challenge. The third mode is a new response to the occupational challenge. OA proposes that adaptation energy is not limitless and

the consumption of this energy is unique for each individual. With a decrease of adaptation energy, the assistance of another individual such as an occupational therapist may be required to create an occupational adaptation and prevent any dysfunction that can occur at this time (Schkade & Schultz, 1992).

OA considers the competence of a person as a key factor contributing to occupational functioning. Overall, the person goes through an internal adaptation process acquired through experience and knowledge from exploring and attempting to master the occupational environment (Schkade & Schultz, 1992). Gaining this competence is an ongoing process of adapting to the demands of the environment and occupations throughout life. By going through the entire OA process, change and motivation occur, which are affected by the desire, demand, and press for mastery in the person. The motivation to change occurs when the person's choice of occupation is meaningful and desirable, and the demand for mastery within the context of the occupation is manageable.

Figure 2: Adaptive Response Mechanism



Application of Occupational Adaptation Frame of Reference to Research

The occupational adaptation frame of reference was used to frame this research. Participants in this study engaged in meaningful everyday occupations such as walking their dogs, exercising, going out with friends, and spending time with their loved ones. The occupational adaptation frame of reference provided a structure for understanding participants' occupations and their occupational performance. Through this framework, the researchers determined the participants' adaptive responses to their occupational challenges, which were derived from the interaction between them as a person, the occupational environment, and occupation. The environment was then assessed to determine the barriers and support factors that influenced the demand for mastery. OA was used to guide this research with the intention

that participants would adapt their occupations and the environment to overcome their occupational challenges and decrease their risk of falling.

Each participant was unique in terms of strengths, weaknesses, and challenges related to fall risk. At the beginning of the program, researchers spent time with participants in group discussions and one on one conversation to understand their occupational role expectations and general adaptive responses. Participants shared their stories and experiences with the group. Understanding how participants coped or responded to an occupational challenge helped the researchers to understand how to effectively educate them about occupational adaptation (DeGrace, 2007).

Another basic element of the OA model is the environment (DeGrace, 2007). OA defines the environment as where occupation occurs; each environment includes physical, social, and cultural contexts (DeGrace, 2007). Many participants shared the various locations of where their falls occurred, such as the bathroom, bedroom, outdoors, and the stairs. All of these environments had different characteristics that contributed to the participant falling; these environments created a demand for mastery (DeGrace, 2007). The fall prevention program implemented for this study addressed home and community hazards and provided strategies to help participants handle these hazards. The occupational challenge was a result of the interaction between the participants' desire for mastery and the environment's demand for mastery (DeGrace, 2007). This challenge takes place constantly and demands an adaptive response from the individual when confronted with the occupational challenge (DeGrace, 2007).

Another part of the adaptive response process is adaptive response modes. The three modes consist of an existing adaptive response, a modified response, and a new response (DeGrace, 2007). When confronted with an occupational challenge, individuals usually respond

with an existing adaptive response. An example of this is how an older adult gets up after a fall. The existing response would be to get up by any means necessary without thinking about the process. When the existing response mode is not effective to mastering the occupational challenge, the individual will respond with a modified response or a new response. Following the example, one older adult was educated about how to get up from a fall safely in one of the sessions of the program then used this process to get up from a fall. By using the new process of getting up safely, the individual created a modified response. Another example of a new response for this individual could be wearing a safety alert pendent around his or her neck. This is a completely new way to respond to the occupational challenge of falling by electronically alerting someone that he or she has fallen and needs help. In conclusion, the fall prevention program implemented for this study focused on increasing participants' adaptive responses to their occupational challenges.

Methodology

Design

This study was a modified replication of the Stepping On program developed by Clemson et al. (2004). Stepping On was chosen because it has been shown to be effective in preventing falls and improving self-efficacy, lower limb balance, and strength in older adults. Stepping On was based on extensive research performed by an occupational therapist experienced in working with older adults. The research design for this study was a quantitative, quasi-experimental pretest-posttest design with a qualitative element. The independent variable was the modified Stepping On program. The dependent variables perceived were fall self-efficacy, exercise rates, and home modifications made to the home after program participation.

Participants

The target population for this study was adults over the age of 65 who lived in the community, and were concerned about preventing falls. The sample population was interested in maintaining overall health and wellness and who had a fear of falling, or a history of falls. The sample population was drawn from residents at an independent living facility in Northern California. This facility housed 330 residents, ranging from 65 to 105 years old during the time of the study. The average age was 87. The facility offered independent living, assisted living and skilled nursing care for older adults.

The eligibility criteria to participate in this study was that individuals had to be over the age of 65 and live in either the independent living or assisted living sections of the facility. Participants expressed an interest in fall prevention for one of the following reasons: they were interested in maintaining health and functional independence through engaging in the program, were fearful of falling, or had a history and/or concern for falling. There were no enrollment restrictions based on race, ethnicity or gender. Adults with cognitive or mental disabilities were not included in this study. Participation was limited to individuals who were fluent in English. Translation services could not be provided as there were insufficient resources to support them.

The methods of participant recruitment used were purposive, convenience, and snowball sampling. The Clemson et al. (2004) study recruited 310 participants using these means. This study aimed to obtain a minimum sample of 30 participants. The end number of participants was 14. Due to time constraints, this study used fewer data collection instruments than the original study and did not administer follow-up sessions.

Recruitment strategies for this study were based on methods used by Clemson et al. (2004). Researchers met with the activities coordinator in October 2011 to discuss facility goals

for this research and gain advice about the best way to contact participants. The staff informed researchers that residents responded well to visual notifications and that fall prevention was a huge concern at the center. The first recruitment strategy used was to create an introductory flyer promoting the program. This flyer was given to residents at their monthly council meeting in February 2012 (Appendix A). A recruitment letter was also created and placed in the resident's individual mailboxes at this time (Appendix B). This letter provided an explanation of the study, requested participation in the program, and informed those who were interested to contact researchers by phone or email. Individuals who wanted to know more about the study were asked to attend a brief informational meeting in which the outline, purpose and anticipated outcomes of the modified replication of Stepping On were discussed. Additional recruitment flyers were handed out and posted on bulletin boards in the independent and assisted living buildings at that time (Appendix A). Reminder letters were sent out to individuals who expressed interest in the program prior to the initial intervention group (Appendix C).

Intervention

Participants engaged in a modified replication of the Stepping On fall prevention program for seven sessions, meeting for two hours each session. Researchers used the Stepping On Fall Prevention Manual (Clemson et al., 2004), and followed the indicated format to structure each session. Programming covered a range of topics as listed in Table 1.

Table 1: *Weekly Program Topics*

Week	Topics
Week 1:	Introductions, collect baseline data, fill out questionnaires for fall risk appraisal; complete Modified Falls Efficacy Scale, Timed Up and Go test, Romberg's test and SLUMS; goal setting, introduce balance and strength exercises.
Week 2:	Review and perform exercises; how to move safely in the home.
Week 3:	Hazards in and around the home; how to remove or reduce the hazards; exercise.
Week 4:	How to move safely in the community; safe footwear and clothing; exercise.
Week 5:	Poor vision and fall risk; benefits of vitamin D and calcium; hip protectors; exercise.
Week 6:	Medication management; review of exercises; more strategies for moving safely in the community.
Week 7:	Review of topics covered in the program; fill out post-surveys/tests and data questionnaires; complete Modified Falls Efficacy Scale.

Modifications were made to the original Stepping On program in weeks one through seven and in the follow up session. The researchers made a decision to tailor the program for the facility after reviewing the literature and speaking with staff about effective ways to motivate active participation. The modification was for participants to create two long-term goals in week one and one short-term goal every week thereafter. The researchers created a worksheet to enable participants to keep track of their goals (Appendix J). All goals were specific and measurable. Long-term goals focused on what participants wanted to accomplish by the end of the program. Short-term goals were completed weekly and were focused on each session's weekly topic. For example, short-term goals for week six were derived from the topic that was discussed that week, which was medication management. Researchers emphasized that participants should write short-term goals in a way that helped them make progress towards accomplishing their long-term goals.

At the beginning of every session, researchers facilitated a group discussion of successes and barriers related to achievement of goals established the previous week. At the end of every session, participants created new weekly goals. Researchers were available one-on-one for participants who wanted assistance with defining short-term goals that were specific, measurable, attainable, realistic, and that could be achieved within one week. During every session, researchers took notes to record participant comments regarding goal setting and the weekly topics. Due to time constraints and liability issues, individual, on-site home hazard assessments and follow-up booster sessions at three and twelve months were not done as part of this study.

Ethical and Legal Considerations

In order to conduct the research study, the researchers obtained approval from the Dominican University of California Institutional Review Board for the Protection of Human Subjects (IRBPHS Application, #9064) on February 7, 2013 (Appendix M).

Researchers utilized The Occupational Therapy Code of Ethics (American Occupational Therapy Association, 2005) to guide professional conduct throughout the study. Participation in this study required informed consent. Participants received a copy of the Research Participant's Bill of Rights (Appendix E), Consent To Be A Research Subject (Appendix F), and Consent to be Photographed/Videotaped (Appendix G). The researchers utilized the ethical principles of veracity and autonomy when they asked participants to read, review, and sign the consent forms prior to participation in the study.

Researchers employed the ethical principles of confidentiality and nonmaleficence to ensure participant privacy and avoid imposing harm upon participants. Data were kept confidential but not anonymous. Pseudonyms were assigned in the baseline/post data collection

sheets. A designated researcher kept a master list of the participants, which included participants' names, informed consent to be a research subject, and consent to be photographed/videotaped, in a locked cabinet in her office. All other forms completed during the course of this study, including transcripts of any videotapes, pre-study assessments and questionnaires, baseline and post-study assessments, researcher-derived progress notes, observations, and journals, were stored in a locked cabinet in the researcher's office. The coded data were stored in a separate locked cabinet from the master file of participants. Computerized data were stored on the researcher's password-protected computer. All tapes and data will be destroyed after one year following the completion of the research study. Only the researchers and the supervising faculty member have access to the data.

Researchers demonstrated veracity throughout the course of this study by providing comprehensive, accurate and objective information to participants. There was potential for participants to have some psychological discomfort during this program. To minimize potential risk participants were informed that they could choose not to participate in any group discussion, take a break, or leave the study at any time. The weekly schedule of topics and the program agenda were provided to the participants at the beginning of the study. The following week's topic was identified at the end of each session. Support materials that included additional resources for supplementary information were made available to participants. During exercise portions of the study, researchers supervised participants and provided stand by assistance to address the potential for physical risks associated with movement. Participants were encouraged to hold onto tables, chairs, or personal assistive devices such as canes or walkers, to safely maintain their postural integrity during sessions.

The researchers possessed the qualifications necessary to safely implement the fall prevention program and to foster a safe environment for the participants during the implementation of the seven sessions. All researchers had previously completed academic coursework in Human Anatomy, Human Physiology, Human Movement Analysis, and Occupations of Adults/Seniors. Each of the four researchers had also completed 120 hours of fieldwork experience in occupational therapy that contributed to providing a safe context for the subjects' participation in discussions and activities.

Researchers purchased The Stepping On Fall Prevention program manual as used in the Clemson et al. study (2004). The SLUMS, Romberg Test and TUG instruments are widely used in the public domain, published in textbooks, and publicly accepted clinical assessments that are covered under the fair use policy for nonprofit educational purposes and restricted access for use by students. The researchers asserted additional diligence by requesting written permission to use the MFES and TUG assessments. These instruments were used in accordance with fair use policies.

Data Collection

This research study used a modified version of the Stepping On fall prevention program developed by Clemson et al. (2004). Due to time constraints and resource availability, not all of the assessments performed in the Clemson et al. research were used in this study. Mandatory home assessments were not included as part of this modified program, but were offered to participants upon request. A six-month follow up was not feasible based on time constraints.

Participants were asked to review three Dominican University of California documents, Research Participant's Bill of Rights (Appendix E), Consent to be a Research Subject (Appendix F), and Consent for Photograph/Video Usage (Appendix G). Participants were advised that they

could refuse to take part in any activity and could leave the program at any time without concern for any adverse effects. The latter two documents requested written acknowledgement of their informed consent.

All data collection occurred during the first two sessions and the last session of the fall prevention program. Accommodations were made for individuals who wanted to participate in the program but were unable to attend the first session. At either the first or second session, participants completed a written questionnaire, the Health History and Falls Questionnaire (Appendix H), developed by the researchers. This questionnaire was modeled after similar documents administered in other fall prevention research. It included questions regarding the participants' socio-demographic status, history of falls in the previous 12 months, brief medical history, and frequency and type of community health services used.

The researchers assessed participants' cognitive ability using the Saint Louis University Mental Status Examination (SLUMS) in order to determine whether or not the participants met the inclusion criteria for this study. Inclusion criteria required participants in the research study to score greater than or equal to 21 of 30 possible points on the SLUMS. This indicates no impairment is evident in cognitive ability (Tariq, Tumosa, Chibnall, Perry, & Morley, 2006). Because the modified Stepping On program used a cognitive-behavioral approach to learning, the SLUMS served as an effective screening tool for identifying participants' mental status. Older adults were not excluded from participation in the fall prevention program implementation regardless of their cognitive level. Since the researchers administered all program assessments including the SLUMS, they were not blinded to the participants' scores. The SLUMS cognitive assessment was completed by participants in the last session to reduce the potential for bias. All but one of the participants met the inclusion criteria for cognitive ability.

The Modified Falls Efficacy Scale (MFES) was administered at the beginning and at the end of the intervention program to determine whether any changes in participants' self-assessment occurred as a result of attending the fall prevention program. The MFES addresses a broad range of indoor and outdoor activities that might increase a person's fall risk. Participants rated their perceived level of confidence for performing various activities without falling. The MFES was the primary assessment tool used for this study because it helped the researchers answer the research question: Will older adults report increased fall self-efficacy after participating in a structured fall prevention program? The MFES is a reliable and valid measure of fall self-efficacy (Hill, Schwarz, Kalogeropoulos, & Gibson, 1996).

The Timed Up & Go (TUG) test has been utilized extensively in fall prevention literature and has high test-retest reliability and validity. Shumway-Cook, Brauer, & Wollacott (2000) found that when used as a sole assessment of fall risk, the TUG test correctly classified 13 of 15 fallers (87% sensitivity) and 13 of 15 nonfallers (87% specificity). The TUG test was used in this study as a screening tool to determine the physical ability of participants. The TUG test provided researchers with an assessment of participants' dynamic balance and walking gait. The TUG test required participants to stand from a hard, armless chair, walk three meters, turn around, walk back and sit down. According to the authors of the TUG test, functional mobility is strongly correlated to the time required to complete the task. A high risk (83% probability) for falling is predicted for older adults who take longer than 14 seconds to complete the TUG protocol (Shumway-Cook, Brauer, & Wollacott, 2000). This test's predictive values include community-dwelling older adults who ambulate independently or with an assistive device such as a cane or walker.

The Romberg Test assesses proprioception, defined as an internalized sense of body position in space when a person's eyes are closed (Lundy-Ekman, 2007). During the Romberg Test, the participant's static balance was assessed while the participant stood with feet together and eyes open. With eyes occluded, the participant's balance was then assessed for one minute's duration. If the person swayed, this was referred to a "positive result." Close supervision of the participant was required because excessive sway could result in a fall. The Romberg Test served as a screening tool for participants in this study because this program had an exercise component and participants' safety was of utmost importance.

Researchers emphasized goal setting to facilitate participants' active involvement in session objectives. Participants' comments about their goals were gathered as descriptive anecdotes throughout the course of the study. A topic or theme related to fall prevention was presented and discussed at each session of the program. Participants were asked to write informal short-term goals that pertained to the session topic as a homework assignment (Appendix J). For example, participants created goals to assess their homes and make modifications that would create a safer living space. Outcomes for these goals were reviewed at the beginning of the subsequent group session. Participants' successes and barriers for completion of their goals were discussed together with how routines could be restructured to increase the likelihood of successful outcomes.

As part of the modified Stepping On program, participants were asked to perform exercises on a weekly basis. They were given the option to perform either the program-supplied set of exercises or choose another preferred form of exercise. Participants were asked to complete a researcher-developed questionnaire during the final session (Appendix I). This tool helped to answer the research question: Will older adults report increased exercise rates after

participating in a structured fall prevention program? At the final session, participants completed a program satisfaction survey (Appendix K).

The importance of assessing potential hazards that increase risk for falls in the home was discussed in session three of this fall prevention program. Because of time constraints, the researchers elected not to perform the individual home assessments outlined in the Stepping On Manual. Participants were instead asked to complete a home assessment form and create personal goals for improving their safety within their homes. Participants' responses on the questionnaire (Appendix I) completed during the final session provided insight on the research question: Will older adults report making one or more modifications to their homes to decrease fall risk after participating in a structured fall prevention program?

Data Analysis

A master list of participants' names was created to separate any identifying information from the data in order to maintain anonymity. The results of all questionnaires and surveys were compiled and analyzed based on the number of responses.

Researchers used the Modified Falls Efficacy Scale (MFES) to collect pre- and post-test data. The MFES is a self-report measure of participants' confidence in performing a range of activities of daily living without falling. Researchers used descriptive and inferential statistics to examine differences between the pre- and post-data for fall self-efficacy. The one-tailed t-test was utilized as an analysis tool for the MFES.

Participants completed a post study self-report questionnaire (Appendix I) during the last session. Researchers were interested in learning if participants made changes in their exercise routines and home environment as a result of participation in the fall prevention program. To gain participant feedback about the effectiveness of the program, participants were asked to share

their experiences with setting short-term personal goals. Participants also completed an End of Program Survey (Appendix K). This qualitative data was analyzed for reoccurring themes that helped to determine the effectiveness of the modified Stepping On program.

Results

The modified Stepping On fall prevention program was implemented at an independent living facility in Northern California for seven sessions from February 17 through April 13, 2012. Data were collected pre and post intervention, as well as at the end of each seminar. The research was designed to answer the following questions:

1. Will older adults report increased fall self-efficacy after participating in a structured fall prevention program?
2. Will older adults report increased exercise rates after participating in a structured fall prevention program?
3. Will older adults report making one or more modifications to their homes to decrease fall risk after participating in a structured fall prevention program?

Demographic Data of Participants

Demographic data of the participants is found in Table 2. Twenty-six residents of the facility had originally registered for the fall prevention program. Ten of the twenty-six who had originally signed up for the program did not attend the first session for various personal reasons before the initial program start date, thus a total of sixteen participants attended the first session. Of the remaining sixteen participants, two older adults did not meet the inclusion criteria for this research study, but were encouraged to continue attending the fall prevention sessions. Thirteen females and one male participated in the study. Participants were all of Caucasian origin, with at least two years of college education. Three participants reported they had previously participated

in a fall prevention program.

Forty-three percent of participants stated they used a type of assistive device for mobility. This included 36% who used a four-wheel walker (4WW), 21% who mobilized with a single-point cane (SPC), and 14% who used both a 4WW and a SPC during different times of the day. Over half (53%) of the participants stated they did not use assistive devices for mobility. The most frequently reported medical condition among participants was a visual impairment (43%), followed by knee arthritis (29%), and hypertension (29%). Participants were also asked whether they had attended a fall prevention program in the past. Twenty-one percent stated they had attended a prior program, and 79% stated they had never attended a previous program.

The Timed Up & Go Test (TUG) and Romberg Test were used as pre-intervention screening tools to determine fall-risk levels for program participants. Five of fourteen participants were not initially screened because they did not attend the first session. The nine initially screened participants were found to have a mean TUG score of 18.9 seconds. According to Shumway-Cook, Brauer, & Woollacott (2000), older adults who complete the TUG in 14 seconds or greater have an 83% probability to be at a high risk for falls. Of the nine participants who participated in the pretest measures, only one scored below 14 seconds. Three of the nine participants who performed the Romberg Test had a positive score. Participants who score a positive in the Romberg Test normally show sway or imbalance during the test and are at higher risk for falls.

Table 2:

Demographic Table

Participant	Gender	Age	# of Falls ≤ a year	Fall Location	Cause of fall	TUG time (sec)	Romberg score
1	F	79	10	Kitchen, elevator	Tripped	N/A	N/A
2	F	76	1	Living room	Felt weak	N/A	N/A
3	F	87	0	N/S	N/S	12.7	Negative
4	F	83	4	Outdoors, bedroom	Lost balance	34.3	Negative
5	F	78	0	N/S	N/S	15.0	Positive
6	F	92	2	Living room	N/S	24.2	Positive
7	F	94	2	Outdoors, kitchen	Tripped, slipped	N/A	N/A
8	F	87	1	Outdoors	Tripped	14.1	Negative
9	F	88	0	N/S	N/S	15.1	Negative
10	F	84	1	Lecture hall	Foot went numb	20.7	Positive
11	M	75	0	N/S	N/S	18.5	Negative
12	F	76	0	N/S	N/S	15.4	Negative
13	F	80	2	Sidewalk, bedroom	Level of sidewalk	N/A	N/A
14	F	89	2	Living room bathroom	N/S	N/A	N/A

Note. N/S = Not stated. Participant did not provide an answer in the health history and falls questionnaire. N/A = Not available. Participant's data was not collected during time of study. TUG = Timed Up and Go.

Findings

Research Question #1: Will older adults report increased fall self-efficacy after participating in a structured fall prevention program?

Three measures were used to report the results of fall self-efficacy. The first measure of reported fall self-efficacy measured by pre and post MFES assessments indicated 50% of participants had improved fall self-efficacy levels, while the other 50% of participant scores either remained the same or decreased as shown in Table 3.

The second fall self-efficacy measure was a self-report confidence score on the End of Program Survey (Appendix K). Participants were asked to indicate on a scale of 1-10 how confident they felt in their ability to prevent a fall after participating in this program. All participants (100%) reported an increased confidence level with scores ranging from 6-10. Participants were also asked "Did you avert a potential fall during this program?" Sixty-four percent of participants reported yes. Participants' average attendance was 5.6 of 7 sessions. A positive correlation was found between the number of potential falls averted and number of sessions attended ($r = .0557$, $p < .05$).

The third measure of fall self-efficacy was obtained during the final group discussion session. Participants were asked as a group, "What is the major thing that you gained from the program over the past six sessions." Responses fell into two main categories: "increased fall awareness" and "confidence in amount of personal knowledge" as seen in Table 4.

Table 3

The Modified Falls Efficacy Scale (MFES) Results

Participant	MFES Pre-test score	MFES Post-test score	Change in score
1	9.1	6.1	-3.0
2	10	9.5	-0.5
3	9.3	9.5	+0.2
4	8.9	6.6	-2.3
5	9.1	9.8	+0.7
6	5.0	6.7	+1.7
7	7.4	7.1	-0.3
8	9.5	9.1	-0.4
9	8.5	7.1	-0.6
10	8.7	9.1	+0.4
11	9.5	10.0	+0.5
12	9.5	6.7	-3.2
13	6.9	7.3	+0.4
14	9.2	9.2	N/C
	Mean: 8.6	Mean: 8.1	Mean: -0.5

Note. N/C denotes no change

Table 4

Quotes of Participants' Responses: Conclusion of the Program

Category 1: Increased Fall Awareness
"After a fall, I used your technique to get up and it was successful."
"I think it made us conscious of all of these things that can make us slip."
"This reminds me that I have to remember to be aware all the time."
"I take proper steps to help prevent falls."
"Trying to be more careful about falling backwards in my small kitchen."
Category 2: Confidence in Amount of Personal Knowledge
"The sessions helped me with my concentration."
"I feel more confident."
"Falls are preventable."
"The exercises helped to increase my confidence."
"I feel better prepared since learning how to get up from a fall."

Research Question #2: Will older adults report increased exercise rates after participating in a structured fall prevention program?

Seventy-eight percent of participants reported an increased rate of exercise after program participation, according to the questionnaire (Appendix I) as indicated in Table 5. In this report, participants were asked whether they changed their exercise routine through a Likert Scale ranging from 0 (*not exercising at all*) to 6 (*I changed my exercise routine dramatically*). All participants stated they were involved in at least two exercise sessions weekly, either at home or in classes at the facility. The mean number was 3.4 exercise sessions per week.

During the final session, participants were asked what they gained most from the program. Participants commented positively on exercises from the Stepping On Manual, as seen in Table 6. Participants stated they were now more aware of exercising, began exercising independently, and enjoyed the exercise portions of each weekly session.

In The End of Program Survey (Appendix K), 36% of participants ranked *learning more exercise techniques* as their first choice for the most helpful aspect of the program, and 71% of participants ranked it second. Given a list of exercise participation, 78% of the participants ranked *outdoor walking* as the exercise they performed most often. The Stepping On exercises were ranked second by 57% of participants.

Table 5

Exercise Change Results

Participant	Exercise changes score	# of exercise sessions per week
1	5	3
2	6	5
3	5	3
4	4	2
5	4	2
6	3	2
7	5	5
8	5	6
9	1	5
10	4	2
11	4	3

12	5	3
13	4	4
14	2	2
	Mean: 4.1	Mean: 3.4

Note. Exercise changes score definition: 0 = Not exercising at all. 1 – 2 = Somewhat less. 3 = Same amount as before. 4 – 5 = Somewhat more. 6 = I changed my exercise routine dramatically.

Table 6

Quotes From Focus Group Regarding Exercise Changes

Category 1: Exercise
"The (Stepping On) exercises really helped."
"Balancing on one foot is very important to do."
"I really enjoyed some exercises."
"I did the balance exercises in the halls."
"It is good to do the exercises every time (session)."
"I do the chair exercises when I watch television."

Research Question #3: Will older adults report making one or more modifications to their homes to decrease fall risk after participating in a structured fall prevention program?

The majority of participants (64%) reported making modifications to decrease fall risk. Participants made an average of 1.64 (range of 0-5) changes to their homes to reduce risks for in-home falls (See Table 7). *Organized clutter* ranked as the home modification that was done the most, with 43%, followed by *changed dark lighting in rooms* (14%), and *moved high shelved*

items to lower shelves (14%). At the conclusion of the fall prevention program, participants were asked how this program changed their views on safety in their own homes and their willingness to modify their homes to decrease fall risk. The following sample quotes from participants regarding perceptions of home modifications included: "I went and got a night-light. It's LED. It doesn't use much energy and is very bright," "This course has made me neater. I line my shoes up, so they aren't all over the place," and "I'm aware of loose carpets now."

Table 7

Home Modification Results

Participant	Home modification changes score	# of modifications made in the home
1	5	5
2	3	3
3	3	2
4	3	1
5	1	0
6	3	2
7	6	4
8	3	2
9	1	0
10	3	2
11	2	0
12	5	2

13	1	0
14	1	0
	Mean: 2.9	Mean: 1.6

Note. Home modification changes score definitions: 0 = *My home has been changed for the worse*. 1 – 2 = *Made no changes at all*. 3 – 4 = *Made only a few changes in my home*. 5 = *Somewhat more*. 6 = *I changed my home completely.*

Discussion

The results of this study suggest that older adults who participate in a multi-factorial fall prevention program can make proactive changes in their lifestyle that decrease their risk of falling. This observation supports the positive results reported in other fall prevention research.

One of this study's questions was whether older adults' self-efficacy would increase after participation in this multi-factorial fall prevention program. Participants did report an overall improvement in their confidence levels in the post study questionnaire and survey. On the other hand, MFES scores did not reflect any change in participants' self-efficacy. One possible explanation for the absence of change between the pretest and posttest scores was that the MFES questions targeted activities no longer performed by participants. That is, participants could not respond using concrete everyday examples – rather, they had to develop "what if" scenarios before evaluating their level of confidence in a given situation.

Most participants received all meals, light housekeeping, and laundry services as residents of the independent living facility. Yard work was performed by the facility's landscaping maintenance staff. In addition, the single-story architectural design facilitated residents' safety and reduced the potential for falls that might occur within the home or campus. Residents might have perceived their environment was already "fall-proof" and safe enough. For these reasons, the researchers question the construct validity of the MFES for this group of

community-dwelling older adults.

Participants in this program reported that they were aware of fall prevention strategies prior to enrollment. Tacit knowledge and exposure to fall risk education may have contributed to the minimal change in fall self-efficacy scores on the MFES. From the onset, participants were fairly confident in their ability to prevent falls (pretest mean average score of 8.61 out of 10) and sustained that level of confidence (posttest mean average score of 8.14 out of 10) throughout the program. Despite previous exposure, participants reported during the post-program discussion that session topics were a worthwhile enhancement of existing knowledge. Other adults agreed when one participant stated that the program "helped me remember to remember." Because of this renewed attention to strategies that could prevent falls, participants responded they would definitely make more effective lifestyle choices to decrease their risk of falling.

At the beginning of each session, participants were encouraged to discuss their previous week's activity goals and identify occupational challenges that may have been barriers to achievement of these goals. Results of this study supports other research findings which demonstrate that participants' goals are more likely to be achieved when the goals are written down, and are measurable and achievable within a specific timeframe (Melville, Baltic, Bettcher, & Nelson, 2002; Muse, 2005). Participants also stated they made more informed decisions regarding shoe purchases, exercise, and home modifications after weighing potential consequences of fall risky behavior. This study's cognitive-behavioral approach to learning facilitated participants' problem-solving and helped them recognize their active role in preventing falls. Open-ended questions posed by the researchers enabled participants to formulate individualized solutions and gain mastery of their person-environment fit.

In addition, participants recognized that falls were not inevitable and unavoidable.

Statistics may predict that one of every two adults (80 years and older) will fall each year, but the group's consensus was their decision to attend a fall prevention program aligned them with the 50% of older adults that would not sustain a fall.

The second research question pertained to whether participants increased the amount and type of exercise they engaged in after completing the program. Participants did report they were exercising more on a weekly basis at the conclusion of the program. However as a group, they identified no particular preference for the type of exercise performed. This may be because as residents of the facility, they have a plethora of free exercise classes and activities from which to choose. Participants agreed that the exercises presented and performed at each session of the fall prevention program were a useful addition to their fitness regime. They stated that their performance of the sessions' exercises was enhanced by group discussion about the benefits of exercise; this may have led to positive changes in the participants' frequency of exercising.

The third research question was whether having an increased understanding of environment-related fall risks within the home would lead participants to make modifications that improved their home safety. The mean number of modifications (1-2 adaptations) may have been even larger if researchers had been able to perform home assessments that were a component of Clemson et al.'s (2004) Stepping On program. Participants may have perceived that their homes were already "safe enough" or been reluctant to invite the student researchers into their residences.

Findings from this study on the effectiveness of multi-factorial fall prevention programs are consistent with current literature. Rubenstein and Josephson (2006) posited that participation in these programs can lead to reduced number of falls and fall-related injuries with the additional benefit of improved self-efficacy.

Recommendations and Limitations

The purpose of this research study was to evaluate the ability of a multi-factorial fall prevention program to promote fall self-efficacy and reduce fall risk in community-dwelling older adults. The small sample size (n=14) limited outcome analysis in terms of statistical significance and generalizability to other older adults. Of the 29 residents of independent living facility who initially enrolled in the fall prevention program, 13 chose not to participate in the program because of medical conditions, conflicts in their social calendars, and other personal obligations. Two adults who attended the fall prevention program were not included in this research because they did not meet the study's inclusion criteria of cognitive status. A larger initial recruitment of participants to offset the many factors contributing to attrition in attendance for this age cohort is recommended for future studies. A two-group quasi-experimental design could then be used with a larger pool of participants. This would enhance the rigor of the study, reduce the risk of compromising internal validity, and provide an opportunity to produce findings with statistical significance.

This program was implemented at an independent living facility in an affluent county in northern California. The participants were of Caucasian ethnicity, well-educated, and with a higher socioeconomic status on average than older adults living elsewhere in the state and U.S. (U.S. Census, 2011a). This cohort of older adults may have greater access to health services and educational media promotion on fall prevention strategies, and be afforded more ongoing healthy senior learning opportunities at this facility than adults living in other communities. Therefore this research study's findings may not be generalized to adults of different socioeconomic and formal education levels. Implementation of this fall prevention program with a more diverse group of older adults is recommended for further study.

According to an U.S. Census Bureau brief (U.S. Census, 2011b), women outnumber men by nearly double in the age bracket of 80-85 years, however, the female to male participant ratio was 13:1 for this study. Older men were significantly underrepresented in this study and this is significant as their perspectives, life stories, and experiences regarding fall self-efficacy may be different from their female counterparts. Recruiting of more males for future studies would facilitate a better understanding of the effectiveness of fall prevention programs across genders.

The cognitive-behavioral approach used in the program emphasized relating personal narratives about previous falls, active group discussion, and problem solving. Participants were encouraged to disclose personal information about their history of falls, including falls that occurred during the program. This level of participation may have been a limitation. Some participants may have been reluctant to share this type of information because of feelings of embarrassment or a concern about the social stigma associated with falling as an older adult. There may have been peer pressure to conform to group norms. For example, one participant who exercised vigorously was cautioned by others to "take it easy." Participants need to be encouraged to reflect on their unique circumstances and create an individualized plan for preventing falls.

The Clemson et al. (2004) Stepping On program utilized as a foundation for this study was developed by an occupational therapist with over 12 years' experience in geriatrics and group facilitation. Furthermore, content experts were invited to introduce session topics during the weekly group discussions on fall prevention. In contrast, this fall prevention program and study were conducted by novice student researchers with limited experience as group facilitators. Advanced preparation and planning of sessions as well as access to the Stepping On Manual helped to minimize the impact of the researchers' inexperience on the participants' learning and

performance of skills.

The design and implementation of this fall prevention program differed from Clemson et al. (2004)'s Stepping On program due to constraints on facility use, budget, liability issues, and researchers' availability. The Clemson et al. (2004) study included a post-program home safety assessment; this component was not included in the present study. Although the fourteen participants in this program were given the option to obtain a complementary home evaluation, only one elected to do so. Participants were encouraged to assess their own homes following an educational session module on identifying in-home fall risks. Some participants reported making one or more modifications to their residences as a result.

This present study did not implement the 3-month and 12-month booster sessions that were part of the original Stepping On program. Including this data may have enabled the researchers to evaluate whether participants maintained their fall self-efficacy, continued performance of weekly exercises, and adherence to home safety modifications over time. In addition, self-reports of subsequent falls may have further supported the effectiveness of this multi-factorial fall prevention program.

Implications for Occupational Therapy

Occupational therapy focuses on improving quality of life by enabling people to continue participating in meaningful daily activities throughout their lifespan. Normal aging is a degenerative process. However, through evaluation and analysis of the everyday interactions of client factors, activity demands, and contextual challenges, occupational therapists can assist older adults in maintaining important social roles and occupations. Occupational therapists have the necessary professional expertise to devise restorative and compensatory interventions that address fall risks of older adults. The continued involvement of occupational therapists in the

planning and implementation of multi-factorial fall prevention programs will facilitate older adults' healthy occupational engagement in everyday living and improved quality of life.

Conclusion

Falls and injuries from falls are a worldwide problem affecting the health and well being of older adults living in their community. Over one-third of adults over the age of 65 experience at least one fall each year due to various intrinsic and extrinsic risk factors (Frick, et al., 2010). A multi-factorial fall prevention program consisting of interventions that address these various risk factors can decrease the likelihood of falls through increased fall-risk awareness and changes in everyday habits and routines. Occupational therapists and other health care providers need to consider the unique challenges of the aging process from the perspective and life experience of the older adult. Fall prevention programs can enable older adults to restore functional capacity with improved nutrition, exercise, and medication management, and adapt their environment to maintain autonomy, healthy living, and quality of life.

Education on fall prevention strategies and fall risks can facilitate older adults' awareness of fall safety and lead to increased fall self-efficacy and active participation in meaningful occupations. In this study, participants reported increased confidence in their self-assessment of fall risks, increased participation in weekly exercise, and were amenable to making home modifications to improve their safety. With implementation of multi-factorial fall prevention programs to a broader spectrum of older adults, occupational therapists and other healthcare providers can disseminate valuable education and promote healthy aging and quality of life.

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Appendix A

DOMINICAN UNIVERSITY of CALIFORNIA 1890

STEPPING ON

Building Confidence and Reducing Falls

DATES: FRIDAYS, TBA

Concerned about falling? Come and join the program

What is it? Dominican University Occupational Therapy graduate students are presenting a fall prevention program for 7 weeks, once a week for 2 hrs each session.

Why? This program will improve your self-confidence, provide education on fall prevention strategies, and encourage lifestyle changes to improve personal safety. Stay on course with healthy aging and enhanced quality of life!

When? TBA The Redwoods Facility

Appendix B

November 21, 2011
Dear _____:

Our names are Dona Anderson, Brian Dinozo, Heather Enrile and Brittany Hutchison. We are Occupational Therapy graduate students from Dominican University of California in San Rafael. We are writing to you because we want to invite you to participate in the Stepping On fall prevention research study at The Redwoods in Mill Valley. We have clinical experience through many fieldwork opportunities, community practice labs, and many significant classes. In having this clinical experience we are able to conduct this study in a safe, efficient, appropriate, and competent manner with the supervision of our thesis advisor, Dr. Ruth Ramsey.

This is a research study to evaluate the effectiveness of the Stepping On program (Clemson et al., 2004) to increase awareness of risks for falling, increase overall confidence in performing daily activities, and improve physical fitness. This will support your ability to maintain your independence in the community. This program is research based with the goal of reducing the likelihood of falls among older adults. This program is a 7-week course that focuses on fall prevention. It is designed to enhance confidence, encourage safe mobility, and promote fall prevention strategies and techniques. Each weekly 2-hour sessions will cover pertinent topics related to fall prevention: exercises, safe mobility, home hazards, community safety, vision, vitamin D, medication management, and much more. Throughout the program there will be weekly goal setting for you to see how much you have progressed. Each week handouts will have helpful and useful information that can be applied to everyday activities.

We hope that you will choose to participate in our graduate research study utilizing the Stepping On fall prevention program. This study will be implemented this coming spring of 2012 at The Redwoods. If you are interested in joining this research please call Heather Enrile at (510) 585-5177 or email heather.enrile@students.dominican.edu to sign up. If you have any questions, comments, or concerns please feel free to contact Heather Enrile directly at (510) 585-5177 or Dr. Ruth Ramsey, our thesis faculty advisor and department chair of Occupational Therapy at Dominican University, the phone number is (415) 257-1393 or email at ruth.ramsey@dominican.edu

Thank you and we hope to see you soon.
Sincerely,

Dona Anderson, OTS
Brian Dinozo, OTS
Heather Enrile, OTS
Brittany Hutchison OTS

Appendix C

November 21, 2011

Dear Residents and Future Research Participants:

Our names are Dona Anderson, Brian Dinozo, Heather Enrile and Brittany Hutchison. We are Occupational Therapy graduate students from Dominican University of California here in San Rafael. We sent a letter a few weeks ago about inviting you to participate in the Stepping On fall prevention program at The Redwoods in Mill Valley. We are sending this letter to remind you that we will be starting the program in a few weeks. If you are interested in signing up please call Heather Enrile at (510) 585-5177 or email at heather.enrile@students.dominican.edu

The Stepping On program is a 7-week course that focuses on reducing falls and building confidence in daily activities. Each session is 2 hours in length and will cover a broad range of relevant strategies for fall prevention: community mobility, vision, home hazards, exercises, and medication management. This program is designed to increase confidence in performing everyday activities and overall quality of life. Strategies and techniques of fall prevention will be addressed using an educational format that encourages group participation. Participants will be asked to set weekly goals of areas they wish to improve such as increasing amount of exercise, reducing home hazards, or managing medications more effectively.

We hope that you will participate in this program and assist us with our research on healthy aging and fall prevention. The Stepping On Program will start on TBA. If you have any questions, concerns, or comments please contact Heather Enrile at (510) 585-5177 or email her at heather.enrile@students.dominican.edu

Thank you once again for your time and we hope to meet you soon.

Sincerely,

Dona Anderson, OTS

Brian Dinozo, OTS

Heather Enrile, OTS

Brittany Hutchison, OTS

Appendix D

Dominican University of California
Letter of Permission to Agency Directors

Mr. Jim Sanchez
Program Director
40 Camino AltoMill Valley, CA 94941

Dear Mr. Sanchez:
This letter is to confirm that you have been provided with a brief description of our Master's thesis research project to implement the "Stepping On" Fall Prevention program at The Redwoods. We are occupational therapy students from Dominican University of California and have clinical experience through several fieldwork opportunities and have taken many relevant classes so that we may conduct this study safely, efficiently, competently, and effectively.

As we discussed, we will make every effort to ensure that our data collection does not interfere with any regularly scheduled workshops or programs. We would also like to ensure you that your residents will be treated with the utmost respect, discretion and sensitivity throughout the study. If you have any questions regarding the research you may contact me at 619-277-6135. If you have further concerns you may contract my thesis advisor, Dr. Ruth Ramsey at 415-257-1393 or the Institutional Review Board for the Protection of Human Subjects at Dominican University of California by calling 415-257-0168.

After completion of our research study in May 2012, we will be happy to share the results of our research with you.

If our request to visit your establishment and to conduct the "Stepping On" fall prevention intervention program with your residents meets with your approval, please sign and date this letter below. Please feel free to contact me if you have any questions about this project.

Thank you very much for your time and cooperation.

Sincerely,

Brittany Hutchison
143 Jewell St. #5
San Rafael, CA 94901

I agree with the above request

Signature

11/16/11
Date

Appendix E

DOMINICAN UNIVERSITY of CALIFORNIA
RESEARCH PARTICIPANT'S BILL OF RIGHTS

Every person who is asked to be in a research study has the following rights:

1. To be told what the study is trying to find out;

2. To be told what will happen in the study and whether any of the procedures, drugs or devices are different from what would be used in standard practice;

3. To be told about important risks, side effects or discomforts of the things that will happen to her/him;

4. To be told if s/he can expect any benefit from participating and, if so, what the benefits might be;

5. To be told what other choices s/he has and how they may be better or worse than being in the study;

6. To be allowed to ask any questions concerning the study both before agreeing to be involved and during the course of the study;

7. To be told what sort of medical treatment is available if any complications arise;

8. To refuse to participate at all before or after the study is stated without any adverse effects. If such a decision is made, it will not affect h/her rights to receive the care or privileges expected if s/he were not in the study.

9. To receive a copy of the signed and dated consent form;

10. To be free of pressure when considering whether s/he wishes to agree to be in the study.

If you have other questions regarding the research study, you should ask the researcher or her/his advisor. You may also contact The Dominican University of California Institutional Review Board for the Protection of Human Subjects by telephoning the Office of Academic Affairs at (415) 257-0168 or by writing to the Associate Vice President for Academic Affairs, Dominican University of California, 50 Acacia Avenue, San Rafael, CA. 94901.

Appendix F

Consent to be a Research Participant

Dona Anderson, Brian Dinozo, Heather Enrile and Brittany Hutchison are graduate students in the Department of Occupational therapy at Dominican University of California. We are conducting a research study designed to look at preventing falls and promoting healthy occupations in older adults. The researchers are interested in implementing a modified Stepping On fall prevention program with the goal of assisting older adults increase their self-confidence and reduce their fall risk. I am being asked to participate because I am an older adult interested in decreasing my fall risk.

Procedures:

If I agree to be a participant in this study, the following will happen:

1. I will participate in two-hour weekly sessions for seven weeks, which will include:

Week 1:	Introductions, collect baseline data, fill out questionnaires for fall risk appraisal; complete Modified Falls Efficacy Scale, St. Louis University Mental Status Examination, Timed Up and Go test, and Romberg's test; goal setting, introduce balance and strength exercise.
Week 2:	Review and perform exercises; how to move safely in the home; exercise.
Week 3:	Hazards in and around the home; how to remove or reduce the hazards; exercise.
Week 4:	How to move safely in the community; safe footwear and clothing; exercise.
Week 5:	Poor vision and fall risk; benefits of vitamin D and calcium; hip protectors; exercise.
Week 6:	Medication management; review of exercises; more strategies for moving safely in the community.
Week 7:	Review of topics covered in the program; fill out post- surveys/tests and questionnaires; complete Modified Falls Efficacy Scale.

2. I will fill out one survey and one questionnaire regarding health history, fall history, and self-efficacy at the beginning of the seven-week program. The Modified Falls Efficacy Scale, St. Louis University Mental Status Examination, Timed Up and Go test, and Romberg's test will be administered at the beginning of the Stepping On fall prevention program. The Modified Falls Efficacy Scale will be administered again at the end of the program.

3. All personal references and identifying information will be securely stored, and all participant information will be stored using pseudonyms only, thereby assuring confidentiality regarding the participant's information. The master list for these pseudonyms will be kept Ms. Hutchison in a locked file, separate from other data. Only the researchers and their faculty advisor will see the surveys, questionnaires, and data. One year after the completion of the research, all written materials will be destroyed.

4. On request I will be given a written summary of the relevant findings and conclusions of this project. Such results may not be available for six to nine months.

Risks and/or Discomforts:

- I understand that my participation involves minimal physical risk in that I may experience brief postural instability during the exercise portion of the program.
- I may also experience some psychological discomfort given the nature of discussing individual fall history and confidence in my ability to move.
- I will be discussing topics of a personal nature and I may refuse to answer any question that causes me distress or seems an invasion of my privacy.
- I may elect to stop participating in the study at any time and may refuse to participate before or after the study is started without any adverse effects.

Benefits:
The anticipated benefit of this study is that I may by improve my self-efficacy, self-confidence, make better decisions, and learning new fall prevention techniques.

Questions:
I have talked to Ms. Anderson, Mr. Dinozo, Ms. Enrile or Ms. Hutchison about this study and have had my questions answered. If I have further questions about the study, I may contact Ms. Hutchison at brittany.hutchison@students.dominican.edu or the research supervisor, Dr. Ruth Ramsey, Associate Professor and Thesis Advisor, Dominican University's Occupational Therapy Department, (415) 257-1393. If I have any questions or comments about participation in this study, I should talk first with the researchers and the research supervisor. If for some reason I do not wish to do this, I may contact the Dominican University of California Institutional Review Board for the Protection of Human Subjects (IRBPHS), which is concerned with the protection of volunteers in research

projects. I may reach the IRBPHS Office by calling (415) 257-1389 and leaving a voicemail message, by FAX at (415) 257-0165 or by writing to the IRBPHS, Office of the Associate Vice President for Academic Affairs, Dominican University of California, 50 Acacia Avenue, San Rafael, CA 94901.

Consent:
I have been given a copy of this consent form, signed and dated, to keep. PARTICIPATION IN RESEARCH IS VOLUNTARY. I am free to decline to be in this study or withdraw my participation at any time without fear of adverse consequences. My signature below indicates that I agree to participate in this study.

SUBJECT'S SIGNATURE	SIGNATURE OF RESEARCHER
_____	_____
DATE	DATE
_____	_____

Appendix G

DOMINICAN UNIVERSITY of CALIFORNIA
PHOTOGRAPHY CONSENT FORM / RELEASE

I, (print name)_____, hereby grant permission to Ms. Anderson, Mr. Dinozo, Ms. Enrile, and Ms. Hutchison, to take and use: photographs and/or digital images of me for use in educational materials. These materials might include printed or electronic publications. I further agree that my name and identity may be revealed in descriptive text or commentary in connection with the image(s). I authorize the use of these images without compensation to me. All negatives, prints, and digital reproductions shall be the property of Ms. Anderson, Mr. Dinozo, Ms. Enrile, Ms. Hutchison, and Dr. Ramsey.

_____
Date

_____
Subject's name

Appendix H

HEALTH HISTORY AND FALLS QUESTIONAIRRE

Demographic Information

1. Name:_____ 2. Today's Date: _____

3. Gender: M F 4. Age: _____ 5. Ethnicity: _____

6. Relationship Status: ❒Single ❒Married ❒Divorced ❒Widowed

7. Highest level of education completed (check one):

❒ High School/GED ❒Some College ❒ 2-Year College Degree

❒ 4-Year College Degree ❒ Master's Degree ❒ Doctoral Degree

❒ Professional Degree ❒ Other _____

8. Have you attended a fall prevention program in the past? Y N

Fall History

9. Have you ever experienced an accidental fall? Y N

10. Number of falls within the last year: _____

11. Location of your accidental fall: Outdoors / Stairs / Kitchen / Bathroom / Living Room / Bedroom / Other:

_____

12. Loss of consciousness? Y N 13. Able to get up after the fall? Y N

14. Was the fall witnessed? Y N 15. Time on the floor (minutes)? _____

16. Associated dizziness: Y N 17. Heart Palpitations: Y N

18. Cause of the fall (if known or suspected): _____

_____

_____

19. Injuries incurred from the fall:

_____

_____

Medical History

20. Stroke:	Y	N	21. Diabetes (Type I or II):	Y	N
22. Knee arthritis:	Y	N	23. Hypertension:	Y	N
24. Hip arthritis:	Y	N	25. Hypotension:	Y	N
26. Hip fracture:	Y	N	27. Cognitive impairment:	Y	N
28. Visual impairment:	Y	N	29. Inner ear problems:	Y	N

30. Current list of medicines: _____

_____

_____

31. Number of hospitalizations during the last year: _____

32. Are you currently receiving any of the following rehabilitative services? (Check all that apply):

❒Physical Therapy (PT) ❒ Occupational Therapy (OT)

❒Exercise Physiologist/Cardiac Rehabilitation ❒ Other _____

Mobility

33. Stairs in your home?	Y	N
34. Are you able to go out into community?	Y	N
35. Use assistive device for mobility?	Y	N

If yes, please describe what assistive devices are used: _____

_____

36. Do you receive assistance in completing your daily activities? : Y N

If yes, describe what assistance is needed:

_____

_____

37. Current Level of Function (check one):

❒ Independent ❒ Need some assistance ❒ Dependent

38. Number of people in your home, including yourself: _____

39. Number of days spent in bed, over the last 2 weeks: _____

40. Practice good foot care? Y N

41. Wear comfortable/sensible shoes? Y N

42. How confident do you feel about your ability to prevent a fall? (Circle One:)

(10 = Very confident, 1 = Not at all confident)

10 9 8 7 6 5 4 3 2 1

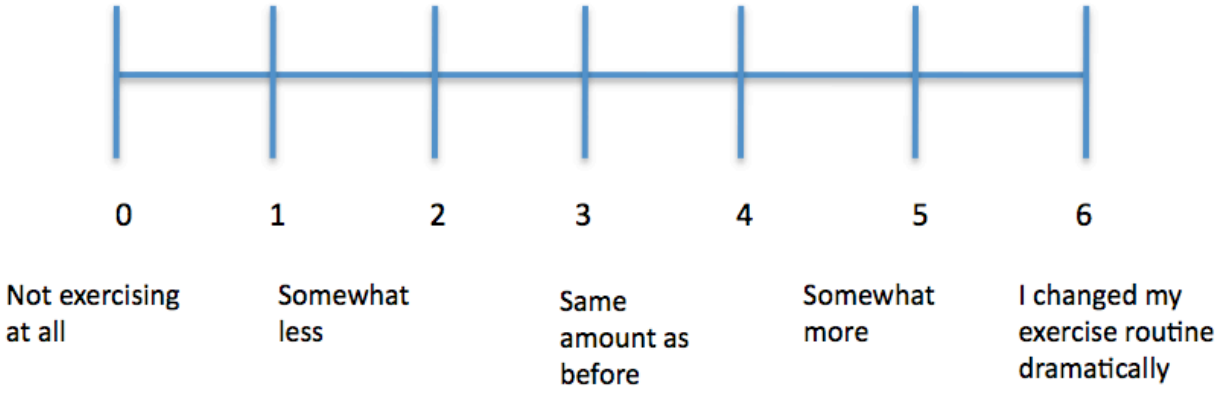
Appendix I

Exercise/Home Modification Questionnaire

Exercise

1. Have you changed your exercise routine?

(Place an X below)



2. Have you increased your exercise routine because of the Stepping On program?

❒Yes ❒No

2a. If yes, are you exercising more than you were two months ago?

❒Yes ❒No

3. What do you do for exercise on your own? (Check all that apply)

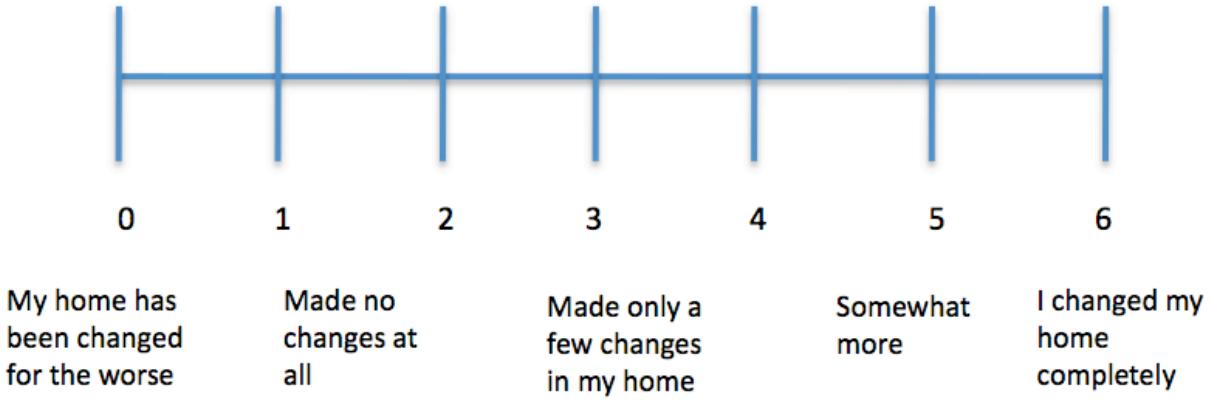
❒ "Yoga with Hillary"
❒ "Joy of Tai Chi"
❒ "Strength training w/ Gloria or Eric"
❒ "Gentle Chair Yoga"
❒ Other: _____

❒ Individual exercises at home
❒ Stepping On Program Exercises
❒ Outdoor walking
❒ "Balance with Eric"

❒ "Hatha Yoga w/ Mary"
❒ "Move with Julia"
❒ "Exercise with Donna"
❒ I am not participating in any exercise programs

Home Hazards

4. **Have you made any changes in your home in the last two months? (Place an X below)**



3. **What type of home modifications have you made? (Check all that apply)**

❒ Replaced loose floor rugs
❒ Organized clutter
❒ Moved high shelved items to lower shelves
❒ Added a non-slip surface to the floor of a room
❒ Other: _____
_____
_____

❒ Changed dark lighting in rooms
❒ Covered loose cords
❒ Added handrails to room(s)
❒ None

❒ Added a shower/bath chair to bathtub
❒ Fixed uneven flooring
❒ Added/moved a telephone to a new room

Appendix J

Goal Writing Worksheet

"If you don't know where you are going,

you will wind up somewhere else." – Yogi Berra quote

Hot tips:

Long and short term goals are specific, can be measured and have stated deadlines. Long-term goals are achieved by taking "baby steps." Reaching short-term goals help you know (and celebrate!) that you are making steps toward what you want to accomplish. It is all about taking one step at a time.

If your goal is "to walk a mile" will you walk that mile in 30 minutes or 3 days? If your goal is "to use my cane more consistently," how can you hold yourself accountable? Here is another way to say that: "I will put my cane by the door and use it whenever I leave my home for the next 7 days"

Personalize your goals with that "just-right" challenge:

not TOO lofty, not too EASY

My Long-term goals:

My goal: I will _____

_____.

(include an action - be specific – and timeframe)

My goal: I will _____

_____.

(include an action - be specific – and timeframe)

An example: I will be walking, at least 3 miles a week, by the end of this program.

My Weekly Goals:

Here are two examples: I will ***attend 3 Impaq Strength & Flexibility classes*** and exercise for at least 15 minutes, before the next Stepping On session. OR I will install 3 night-lights in my hallways before next Friday.

Session 1: I will_____

Session 2: I will_____

Session 3: I will_____

Session 4: I will_____

Session 5: I will_____

Session 6: I will_____

Appendix K

Name: _____

End of Program Survey

1. **Please rank the top 3 most helpful sections about the program in the spaces below:**
    a. ____ Sharing prior fall experiences
    b. ____ Problem-solving in a group setting
    c. ____ Learning more exercise techniques
    d. ____ Moving around the environment safely
    e. ____ Learning about home and community hazards
    f. ____ Learning the importance of a well-balanced diet
    g. ____ Learning about the importance of vision for preventing falls
    h. ____ Setting goals for yourself to decrease the amount of falls in the future
2. **Since the start of the fall prevention program, has your confidence in your ability to prevent falls changed? If so, how much?**
    a. ____ Much more confident
    b. ____ Somewhat more confident
    c. ____ About the same as before
    d. ____ Somewhat less confident
    e. ____ Much less confident

3. Did you fall during the course of this program?

a. Yes ____

b. No ____

4. Did you avert a potential falling event during this program?

a. Yes ____

b. No ____

- If yes, how did you avert this fall?

5. On a scale of 1-10, how confident do you feel about your ability to prevent a fall after participating in this program? (Please circle)

Very Confident **Not at all confident**

10 9 8 7 6 5 4 3 2 1

6. Do you have any suggestions about how to improve this fall prevention program?

Appendix L

DOMINICAN UNIVERSITY of CALIFORNIA 1890

Confidentiality Agreement for Human Subject Research Assistants

Human subject research includes confidential and personal matters, some of which may involve a subject's rights of privacy protected by law, attorney-client privileged communications, and proprietary information. I agree to maintain confidentiality with respect to any private or personal information that I become aware of, or have access to, during the course of my activity as a researcher or research assistant. In providing support to a research project, I am considered a "confidential employee." I am prohibited from releasing information to or discussing information with anyone not employed in this specific research project, except as I am directed by the faculty advisor or as is necessary in the ordinary course of performing my duties in the research activity.

I agree to maintain confidentiality of these matters while I am working on the research project and following the completion of my work association on this activity.

At all times during my participation, I shall promptly advise the primary investigator and faculty advisor of any knowledge that I may have of any unauthorized release or use of confidential or personal information, and shall take reasonable measures to prevent unauthorized persons from having access to, obtaining, or being furnished with any such information.

Print Name:_____

_____ _____

Signature Date

The policies were explained to me by:

_____ _____

Name Title

Office of Institutional Research for Protection of Human Subjects
50 Acacia Avenue San Rafael, CA 949401 (415) 485-3278

Appendix M

DOMINICAN UNIVERSITY of CALIFORNIA 1890

February 7, 2012

Brittany Hutchison
143 Jewell St #5
San Rafael, CA 94901

Dear Brittany:

I have reviewed your proposal submitted to the Dominican University Institutional Review Board for the Protection of Human Subjects (IRBPHS Application, #9064). I am approving it as having met the requirements for an expedited review.

In your final report or paper please indicate that your project was approved by the IRBPHS and indicate the identification number.

I wish you well in your very interesting research effort.

Sincerely,

Martha A Nelson

Martha Nelson, Ph.D.
Chair, IRBPHS

cc: Dr. Ruth Ramsey

Institutional Review Board for the Protection of Human Subjects
Office of the Associate Vice President for Academic Affairs • 50 Acacia Avenue, San Rafael, California 95901-2298 • 415-485-3278
www.dominican.edu