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The Relationship Between Injurious Falls, Fear of Falling, Social Isolation and Depression

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THE RELATIONSHIP BETWEEN INJURIOUS FALLS, FEAR OF FALLING,
SOCIAL ISOLATION AND DEPRESSION

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B.S., University of Connecticut, 2000

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of
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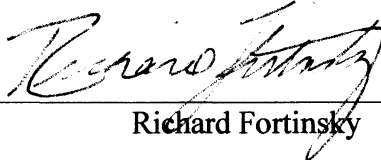
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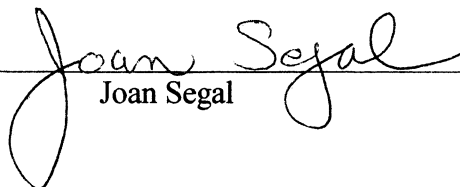
THE RELATIONSHIP BETWEEN INJURIOUS FALLS, FEAR OF FALLING,
SOCIAL ISOLATION, AND DEPRESSION

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Introduction

This thesis research is focused on the relationships between injurious falls, the fear of falling, social isolation, and depression. Specifically, this paper will investigate the implications of being injured during a fall in terms of its relationship to fear of falling, social isolation and depression.

More than one-quarter of adults ages 65 and older fall each year (Hausdorff, Rios, & Edelberg, 2001; Hornbrook et al., 1994). One third of persons aged 75 and older fall each year (Jensen, Lundin-Olsson, Nyberg, & Gustafson, 2002). During the 20th century, the number of persons in the United States over age 65 has increased significantly, jumping by a factor of 11. Under the Census Bureau's middle series projections, the number of older adults 65 and older will double by 2040 (US Census Bureau 1998). Most of this growth should occur between 2010 and 2030 and is a representative of the aging baby boomer population. Those aged 85 and over are the most rapidly growing older adult age group. In 1998, the oldest old made up about 10 percent of the older adult population and over 1 percent of the total population. It is expected that by 2050 the oldest old will make up 24 percent of older adults and 5 percent of the total population (US Census Bureau 1998).

This evidence suggests that the problem of falls in the older adult population will continue to grow well into the next three decades. As our nation confronts an increase in the older adult population we need to look for simple and cost effective ways to reduce their morbidity and mortality.

Falls are so widespread that they are considered to be the most common cause of injury in older people (Robertson, Campbell, Gardner, & Devlin, 2002). In 2000, About

1.6 million older adults were treated in our nation's hospitals for fall-related injuries while 373,000 were actually hospitalized (Boers, Gerschlager, Stalenhoef, & Bloem, 2001). Approximately 6 percent of Medicare claim expenditures are paid out annually for care related to fall injuries. Fractures account for 67 percent of total injury claims (Bishop et al., 2002). Fractures are a common occurrence after a fall. Tinetti found that "Approximately 1 in 10 falls results in a serious injury, such as hip fracture, other fracture..." (Tinetti, 2003). It was not until "Injury in America" was published in 1985 that injuries began to be seen as a preventable disease (Foege, 1985). Unfortunately, injuries occur so frequently that they are often seen as a common part of aging in modern society (Sattin, 1992) To be prevented, fall related injuries among older adults require creative public health prevention strategies.

Approaching fall prevention as a public health problem requires a different perspective. Injuries have conventionally been regarded as unavoidable accidents or behavioral problems. It is necessary to reexamine the paradigm of injuries in order to prevent their occurrence in the aggregate older adult population. In order to view falls and fall prevention from a public health perspective, the concept of injury as a disease will be examined.

Injuries can be viewed similarly to heart disease; there is a direct relationship between the host, agent, and environment. The host is represented by the faller, the agent is represented by the energy (often times mechanical force), and the environment is where the fall occurred (Sattin, 1992). Sattin also suggests injury is to be looked at as a disease with a short latency period (Sattin, 1992). The disease occurs due to rapid exposure to energy (mechanical) or perhaps from the absence of a specific body need,

such as oxygen (Sattin, 1992). The dose of the energy received and the host's response to the energy will determine if an injury will occur (Foege, 1985). A small transfer of energy is unlikely to cause any cell or tissue damage to the host.

Among many considerations, the interactions between the host, agent and environment must be considered when creating injurious fall prevention programs in order to successfully mediate the effects of injurious falls and ultimately the decrease in the quality of life for older adults. The ensuing cascade of adverse effects include a fear of falling, social isolation, and depression. Along with these effects also come financial burden and increases in morbidity and mortality. Recognizing that injurious falls cannot always be prevented, a portion of public health efforts should be directed towards strategies that can decrease their fear of falling post fall, preventing its consequences. Increased morbidity, mortality, and especially healthcare expenditures provide incentive for public health initiatives aimed at fall prevention.

Background

Falls

Not only are falls a common occurrence for most older adults but the rate of falls increases significantly as adults advance in age (Nevitt, Cummings, & Hudes, 1991; Peel, Kassulke, & McClure, 2002). Approximately 30% of community-dwelling adults aged 65 and older fall at least once per year, and 15% will fall twice or more per year (Campbell et al., 1990; Tinetti, Speechley, & Ginter, 1988; Tromp, Smit, Deeg, Bouter, & Lips, 1998).

Falls have serious consequences on both physical functioning and quality of life for older adults (Cesari et al., 2002). The ensuing cascade of events that often occur post fall related injuries can include trips to the emergency room, hospitalization, stays in extended care facility and finally the ultimate consequence of death. Approximately 5% of all falls result in fracture while 5%-11% of falls result in other serious injuries (Oakley et al., 1996; Rivara, Grossman, & Cummings, 1997; Rubinstein, 1994; Tinetti & Speechley, 1989; van Weel, Vermeulen, & van den Bosch, 1995). A fall could result in considerable functional limitation and disability (Speechley & Tinetti, 1991). Falls often result in a decrease of mobility, which can lead to the loss of independence (King & Tinetti, 1995). Approximately 25% of injury deaths among older adults aged 65 or older can be directly linked to fall-related hip fractures, while those affected increases to 34% in the frail elderly aged 85 or older (Peek-Asa & Zwerling, 2003). Injurious falls were found to be fatal in 2.2% of cases (King & Tinetti, 1995).

Due to the frequency of falls and injurious falls it is important to look at the financial effect. About 15% of those falls resulted in an injury that required another visit

to the hospital related to the fall (Hendrie, Hall, Arena, & Legge, 2004; Mahoney, Eisner, Havighurst, Gray, & Palta, 2000). Older adults discharged from the hospital had more than four times the fall rate in the first two weeks after hospitalization when compared to three months later (Runge, 1993). Falls are the cause of approximately 10% of emergency department visits and 6% of urgent hospitalizations among older adults (Bishop et al., 2002; Runge, 1993; Sattin, 1992). The costs of fall injuries among older adults were in excess of 20 billion dollars in 1994 (CDC, 1994). The significant financial burden of older adults falls is expected to grow to over 43.8 billion dollars by the year 2020 (Englander, Hodson, & Terregrossa, 1996). The cost per fall injury in 1998 was \$19,440 dollars (Ranson & Emmett, 2003; Rizzo et al., 1998). These figures of costs do not account for the years of potential lost life, lost productivity, lost quality of life, and lost independence.

Other important potential consequences of falling include: long periods of lying resulting from inability to get up from the ground or floor, fear of future falls, decreased activity and mobility, and ultimately death (King & Tinetti, 1995).

While efforts aimed at fall prevention in the general population need to be focused on decreasing or eliminating commonly present risk factors (Cesari et al., 2002), it is also important to acknowledge that falls and injurious falls cannot always be prevented. For this reason, it is crucial to develop protocols for alleviating the impact of the consequences of injurious falls. Once a client falls in the community it will be important to investigate their level of fear related to future falls in an attempt to establish a baseline for comparison later. In several studies it has been found that between 43% and 73% of older adults who have experienced a recent fall recognize they have a fear of

falling (Campbell et al., 1990; Hill & Stinson, 2004; King & Tinetti, 1995; Speechley & Tinetti, 1991).

Fear of Falling

Falls with or without injuries have the potential to cause a loss of confidence that results in reduced physical activity, increased dependency and social withdrawal (Cesari et al., 2002). According to Tinetti et al, 48% of those over the age of 75 who had fallen in the previous year had a fear of falling (Lach, 2005; Tinetti, Williams, & Mayewski, 1986). This fear of falling is associated with functional impairments (Kressig et al., 2001); as well as excessive immobilization and reduction in socialization (S. Murphy & Tickle-Degnen, 2001), ultimately leading to social isolation. Between 25-50% of the entire population of older adults are afraid of having a fall (Arfken, Lach, Birge, & Miller, 1994; Howland et al., 1993; Tinetti, Mendes de Leon, Doucette, & Baker, 1994). It was found that 47% of their sample was afraid of falling (Howland et al., 1998). More over, 35% stated that certain activities were avoided due to a fear of falling. In a separate study conducted by Howland et al., fall history was assessed and 36% stated that they had had a fall within the past five years that required medical attention. Fifty-five percent of that same sample reported being afraid of falling on some level (Howland et al., 1998). Fear of falling also appears to exert a restricting effect on social contacts (Howland et al., 1998; Howland et al., 1993). Fear of falling may reduce social interaction and therefore is a threat to physical and mental well-being of older adults (Arfken et al., 1994; Howland et al., 1998). Fear of falling is independently associated with reduced levels of participation in recreational physical activity (Bruce, Devine, & Prince, 2002). This decrease in recreation may signify a self imposed social isolation due to the fall. A result

of a fall could include considerable functional limitation and disability. Fear of falling can lead to both a restriction in activity and a decrease in independence (Fletcher & Hirdes, 2004; Maki, Holliday, & Topper, 1991; Tinetti et al., 1994). It has also been shown that fear of falling may leads to a self initiated limitation of activities of daily living and thus cause excessive immobilization and lessening of social contacts (S. L. Murphy, Williams, & Gill, 2002).

Social Isolation

According to Seeman, social isolation is "...disengagement from social ties, institutional connections or community participation" (Seeman, 1996). This can result in the lack or minimizing of social contact and/or communication. Social isolation can simply be a lack of a support system or a small or nonexistent social network. By not having social support and/or social networks an elder's health can suffer.

There is a substantial association between social networks and health; several studies have shown that social isolation is associated with a variety of negative health consequences (Bassuk, Glass, & Berkman, 1999; Brummett et al., 2001; House, 2001; Palinkas, Johnson, & Boster, 2004). This association is so strong that the evidence linking the two is congruent with the epidemiological evidence linking smoking and health together (House, Landis & Umberson, 1988). Social isolation, an established risk factor for poor health outcomes in older adults, may be within the cascade of events that can occur after an injurious fall. When we better understand the relationship between injurious falls and social isolation, we can create effective post fall interventions to prevent the negative consequences of social isolation.

Mortality

Since 1979 it has been established that social aspects of health have a serious impact on mortality (Berkman & Syme 1979). According to Smedley and Syme, about half of all the mortality of elders in the US is linked to social and behavioral factors (Smedley & Syme, 2001). Overall, socially isolated individuals have two to four times the risk of all-cause mortality compared with those who have more ties to friends, relatives and community (Eng, Rimm, Fitzmaurice, & Kawachi, 2002). Another study showed that the fewer social ties one had the more likely they were to die during a 9-year follow up study (Berkman & Syme, 1979). Men with moderately low social ties had twice the risk of dying from accidents or suicide as compared to those men with many social ties (Eng et al., 2002). People who are socially isolated are at an increased risk for all cause mortality as well as a variety of specific health concerns (Berkman, 1995).

Physical health

Socially isolated older adults are more likely to partake in increased risk behaviors such as smoking, drinking alcohol, and being sedentary (Eng et al., 2002). Several studies have shown that being socially isolated increases the risk of having coronary conditions and cardiovascular disease (Eriksen, 1994; Kaplan et al., 1988; Sorkin, Rook, & Lu, 2002). In one study by Brummett et al, it was found that socially isolated individuals were two and a half times more likely to have mortality related to the heart (Relative Risk = 2.43) (Brummett et al., 2001). Social isolation in women has been shown to be related to an increase in breast cancer. Breast cancer is one of the most common cancers that affect women, aside from skin and lung cancer. In fact, one in three women who are diagnosed with cancer will be diagnosed with breast cancer (Miller et al.,

1996). Michael et al demonstrated that, on average, socially isolated women were more adversely affected by breast cancer (Michael, Berkman, Colditz, Holmes, & Kawachi, 2002). Overall their scores were lower for role function, vitality, and physical function on the Health Related Quality of Life (HRQol) scale. According to the researchers, pre-diagnosis level of social integration was an important factor in measuring future scores on the HRQol (Michael et al., 2002). One important implication suggested by this study is that by knowing women's social integration level, we may be able to predict their survival rates post treatment. Another study found that that being socially isolated increases the incidence of the common cold (Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997), and that the rate of colds decreased with an increased level of social integration. Simple interventions, such as motivating older adults to leave their home for an occasional social event decrease the risk of acquiring a cold. The odds ratio dropped from 3.0 for the less socially integrated, to 1.5 for the moderate group, and 1.0 for the highly social integration group (Cohen et al., 1997). African Americans tend to rely more heavily than Caucasians on their informal social networks to meet their disease management needs (Ajrouch, Antonucci, & Janevic, 2001; Ford, Tilley, & McDonald, 1998). Social support is significantly associated with improved diabetes management among African Americans (Ford et al., 1998).

Mental health

Social isolation has also been shown to be associated with poorer cognitive function in older people (Bassuk et al., 1999; Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000).

The multifaceted nature of social networks lends itself to the existence of various components that can be utilized in the prevention of social isolation. The most common of these components are family, friends and neighbors. These components each possess positive health benefits. For example, having family support is very important in averting institutionalization (Hooyman & Kiyak, 1999, Felton & Berry, 1992)..

Depression

Major depression is among the negative consequences associated with a lack of satisfactory social integration (Rubinstein et al, 1994). In a study by Dorfman et al (1995), subjects with risk factors for social isolation had a correlation with being depressed by twice as much (Dorfman et al., 1995). Having smaller social networks, fewer close relationships, and lower perceived adequacy of social support have all been linked to depressive symptoms (Barnett & Gotlib, 1988). Individuals who are socially isolated typically have very low social support. Social support was shown to have a strong negative relationship to depression ($r = -0.47$) (Holahan & Holahan, 1987). Studies that have tested the emotional aspects of social support have demonstrated that those with lower levels of social support have both a greater number depressive symptoms and depression (Blazer, Hughes, & George, 1992; Hays, Steffens, Flint, Bosworth, & George, 2001; Koenig et al., 1997; Oxman, Berkman, Kasl, Freeman, & Barrett, 1992). Social support is an effective buffer in moderating depressive symptoms (Aneshensel & Stone, 1982; Ramos & Wilmoth, 2003).

Several studies have reported that less satisfying social relationships are associated with a greater number of depressive symptoms (Blazer et al., 1992; Koenig et

al., 1997; Oxman et al., 1992). Social support, or the absence of social isolation, has been shown to moderate the effects of depression (Blixen & Kippes, 1999)

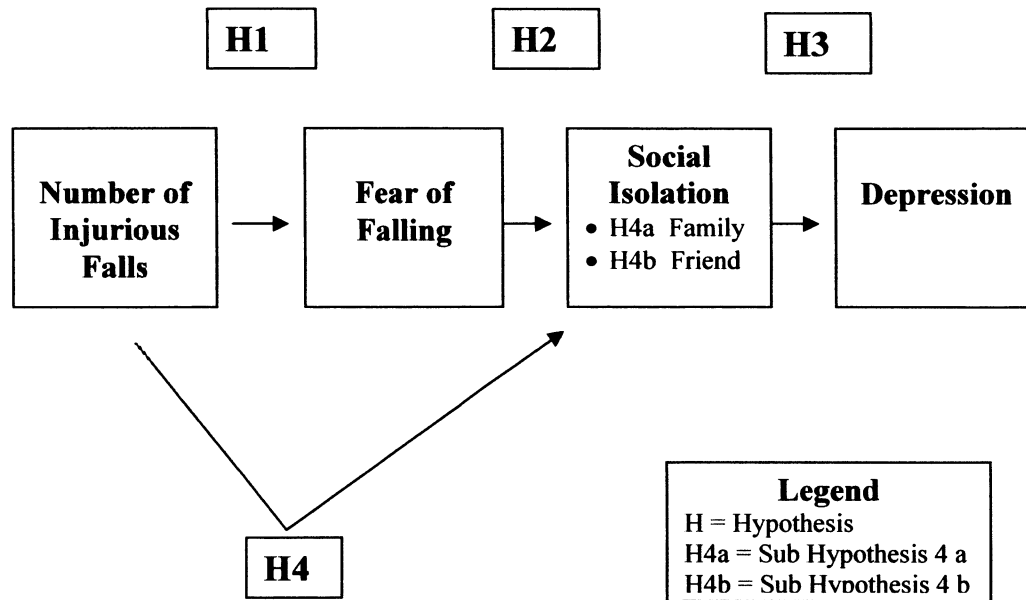
Social support moderated some depression diagnosis-functional disability associations. Less social interaction was independently associated with basic disability (Travis, Lyness, Shields, King, & Cox, 2004). According to Blixen and Kippes, social support plays an important role in moderating the effects of depression on these subjects' quality of life (Blixen & Kippes, 1999).

Hypotheses

The literature review has explored various aspects within the cascade of events that can occur in those who have experienced an injurious fall. This paper will identify the relationships that exist between injurious falls, fear of falling, social isolation, and depression among older adults. This series of events begins with a fear of falling, which leads to social isolation, followed by depression (Figure 1).

- Hypothesis One (H1): A greater number of injurious falls will be associated with a higher degree of fear of falling.
- Hypothesis Two (H2): A higher degree of fear of falling will be associated with a greater degree of social isolation.
- Hypothesis Three (H3): A greater degree of social isolation will be associated with a greater degree of depressive symptoms.
- Hypothesis Four (H4): A greater number of injurious falls will be associated with a greater degree of social isolation.
 - Hypothesis Four a (H4a): A greater number of injurious falls will be associated with a greater degree of family social isolation.
 - Hypothesis Four b (H4b): A greater number of injurious falls will be associated with a greater degree of friend social isolation.
- Additional Analyses were conducted to examine these hypotheses (H1- H4) in sub groups:
 - Males and females were examined for associations with each of the four main hypotheses.
 - Young older adults and old older adults were examined for associations with each of the four main hypotheses.
 - Those who live alone and those who live with someone were examined for associations with each of the four main hypotheses.

Figure 1. Conceptual Model Guiding Hypotheses



Research Methods

Study Sample and Data Collection Procedures

This study was conducted as part of a larger parent study entitled Behavioral Intervention to Prevent Falls in Older Adults (Panzer, 2005). Subjects were recruited as part of this larger study testing the ability of a multimedia approach to prevent falls. The specific aim of the parent study is to address cognitive and behavioral aspects of fall prevention that are often overlooked (Panzer, 2005). Subjects were recruited in a variety of ways including mailings, telephone calls (based on a list of subjects that were in previous studies), flyers, meetings at local resident housing complexes, in support groups, and referrals from subjects already enrolled in the study. The study was approved by the University of Connecticut Health Center Institutional Review Board (IRB).

Inclusion criteria were: age 60 or older, community dwelling, English speaking, and ambulatory (use of a cane as well as the occasional use of a walker was permitted). Moreover participants had to be regularly losing balance or regularly falling based on self report.

Exclusion criteria were: dependent in bathing, dressing and toileting; regular use of either a walker or wheelchair, or failure to complete the Mini-Cog (see appendix d), a brief cognitive test (Borson, Scanlan, Brush, Vitaliano, & Dokmak, 2000); and functionally blind or deaf.

The larger study used trained research assistants to consent participants and to conduct in-home interviews. Each interview lasted approximately 45-60 minutes. In addition to the informed consent and Privacy agreement (per HIPAA), each participant

underwent a brief cognition test called the Mini-Cog (Borson et al., 2000). There were three paper surveys administered following the Mini-Cog. The surveys were the Activities-specific Balance Confidence (ABC), the Centers for Epidemiologic Depression (CES-D) and the Lubben Social Network Scale (LSNS) respectively. The CES-D was self-administered to decrease researcher bias. In addition, participants were asked a series of questions regarding their fall history, demographic data and social history. Finally, the research assistant reviewed with each participant how to keep a fall diary before leaving the initial visit. This initial visit was the only collection point for the data used in this thesis, although there were several more data collection points for the larger study.

Measures

Demographics

Demographic data gathered in the parent study included age, gender, and living arrangements (table 1).

Falls and Injurious Falls

Falls were defined as the total number of self reported falls during the past year. Participants were asked how many falls occurred during the past 12 months. For every fall mentioned, participants were asked if they had been injured during that fall. For this study, the sum of the number of injurious falls was calculated.

Activities-Specific Balance Confidence (ABC) Scale

The Activities-specific Balance Confidence (ABC) scale is a 16-item scale that asks participants to rate on a continuum ranging from 0 (no confidence) to 100 (completely confident) their level of balance confidence when performing specific activities of daily living (Powell & Myers, 1995) (see Appendix 1). This instrument has been proven to be both reliable and valid to measure fear of falling with a Cronbach alpha of 0.92 (Hotchkiss et al., 2004; Myers et al., 1996).

Lubben Social Network Scale (LSNS)

The Lubben Social Network Scale (LSNS) is an 18 item questionnaire that is designed for use with older adults (see Appendix 2). The LSNS has been used in this research study because it closely examines the type and extent of the most common aspects of social networks-family, friends and neighbors. Scores for the two sections of the LSNS-18 being used in this paper, friends and family, range from 0-60. When examining the variable of social isolation, the total LSNS will be used. As the social network score decreases, the extent to which an individual is socially isolated increases. Having a social network score will indicate whether a subject is socially isolated, at high risk for social isolation, at moderate risk for social isolation or at low risk for social isolation. This has been proven to be both reliable and valid with a Cronbach Alpha level for the total score of 0.82, family subscale of 0.82, friend subscale or 0.87, and neighbor subscale of 0.80 (Lubben, Gironda, & Lee, in press). For the purposes of this thesis research, only the family and friend information was collected, without the neighbor section. The subset of both family and friend social isolation will be looked at separately in relation to injurious falls. This will serve to examine how injurious falls relate to

certain aspects of social networks (Lubben & Gironde, 2003; Lubben, Gironde, & Lee, 2002). Specifically the scoring of the total LSNS will read as follows:

- 0-15-----Socially isolated
- 16-30----High risk for social isolation
- 31-46----Medium risk for social isolation
- 47-60----Low risk for social isolation

The scoring of the subscale of family and friends will read as follows:

- 0-7-----Socially isolated
- 8-15----High risk for social isolation
- 16-22----Medium risk for social isolation
- 23-30----Low risk for social isolation

For purposes of hypothesis testing the LSNS score was used as a continuous variable.

Centers for Epidemiologic Depression (CES-D) Scale

The Centers for Epidemiologic Depression (CES-D) scale was used to assess the subjects' level of depression. The CES-D is a 20 item scale that was self-administered by each participant (see Appendix 3). Each question has the same four answers, which are assigned a number value from zero to three. The scoring of each CES-D item reads as follows: 0 = Rarely or None of the time (less than 1 day), 1 = Little or Some of the time (1 or 2 days), 2 = Sometimes or Moderate (3 or 4 days), and 3 = All or Most of the time (5 to 7 days).

In order to calculate the depression score, the scorer must reverse score the question numbers 4, 8, 12, and 16 so that 0 = 3, 1 = 2, 2 = 1, and 3 = 0. If the total is 16

or greater, the participant may have experienced some depression in the past week (Radloff, 1977). For purposes of hypothesis testing the CES-D score was used as a continuous variable. The CES-D scale has been proven reliable and valid in previous studies with a Cronbach alpha of 0.78 (Boey, 1999; Cheng & Chan, 2005).

Statistical Analysis

Descriptive statistics were examined for all study variables. Data was cleaned and examined for outliers. SPSS version 12 was used to analyze the data (SPSS 12.0, 2003). Using a sample size estimate table for correlation tests, it is noted that with a sample size of 58 (as in this study), and assuming an alpha level of 0.05 and a power of 0.80, Pearson's correlation coefficients ≥ 0.35 were considered statistically significant (Polit & Beck, 2004). Using correlation analysis (Pearson's Correlation), the relationship between the number injurious falls and fear of falling; fear of falling and social isolation; social isolation and depression; and finally the number of injurious falls and each of the two subscales of the LSNS was determined to test the hypotheses. Pearson's Correlation also was used to analyze any potential relationships between injurious falls, fear of falling, social isolation, and depression in the following subset of sample members (see table 3):

- Males
- Females
- Young Older Adults
- Old Older Adults
- Those who Lived With Others
- Those Who Lived Alone

Results

The initial sample size was 68 subjects. Ten subjects had to be deleted due to incomplete data; 3 subjects did not complete the LSNS, 2 subjects did not complete the CES-D, and 5 subjects had missing demographic data.

The mean age of the study sample ($n=58$) was 78.5 years, the median 79, and the mode was 80. There were 39.6% males and 60.4% females. Those who live alone comprised 53.4% of the sample while 46.6% lived with someone. The entire group had a mean of 2.15 falls in the last 12 months and a mean of 1.5 injuries. The mean ABC score for the entire group was 69.73, median of 70, mode 73. The mean total LSNS for the entire group was 35.17, median 37, mode 36. The mean CES-D score for the entire group was 12.36, median 11, and mode 5 (see table 1).

Hypothesis 1:

There was no significant correlation between number of injurious falls and fear of falling. Pearson's correlation coefficient was -0.06 , $p = 0.68$ (see table 2).

Hypothesis 2:

There was no significant correlation between fear of falling and social isolation. Pearson's correlation coefficient was 0.14 , $p = 0.30$ (see table 2).

Hypothesis 3:

There was no significant correlation between social isolation and depression.

Pearson's correlation coefficient was -0.17, $p = 0.19$ (see table 2).

Hypothesis 4:

There was a significant correlation between number of injurious falls and social isolation. Pearson's correlation coefficient was -0.40, $p < 0.05$ (see table 2).

Hypothesis 4a: There was no significant correlation found between number of injurious falls and family social isolation. Pearson's correlation coefficient was -0.20, $p = .12$ (see Table 3).

Hypothesis 4b: There was a significant correlation observed between number of injurious falls and friend social isolation. Pearson's correlation coefficient was -0.43, $p < 0.05$ (see Table 3).

Additional Analyses:

- Males

There was no statistically significant correlation found when testing H1, H2, H3, and H4 (see Table 4, row 1).

- Females

There was a statistically significant correlation observed when testing H4. The Pearson's correlation coefficient was -0.53 , $p < .05$. There was no statistically significant correlation found when testing H1, H2 or H3 (see Table 4, row 2).

- Young Older Adults

There was no statistically significant correlation found when testing H1, H2, H3, or H4 (see Table 4, row 3).

- Old Older Adults

There was no statistically significant correlation found when testing H1, H2, H3 or H4 (see Table 4, row 4).

- Live Alone

There was a statistically significant correlation observed when testing H3. The Pearson's correlation coefficient was -0.35 , $p = .05$. Additionally, there was a statistically significant correlation observed when testing H4. The Pearson's correlation coefficient was -0.46 , $p < .05$. There was no statistically significant correlation found when testing H1 or H2 (see Table 4, row 5).

- Live With Someone

There was a statistically significant correlation observed when testing H4. The Pearson's correlation coefficient was -0.37 , $p = .05$. There was no statistically significant correlation found when testing for H1, H2, or H3 (see Table 4, row 6).

Discussion

The conceptual model proposed here in this thesis postulates a potential cascade of events that could lead a person from injurious falls to depression (see figure 1). The results of the sample as a whole ultimately did not support this conceptual model. However, within the sample the live alone sub-group had statistically significant relationships with H3 and H4. The live alone sub-group also had a noticeable relationship with H1.

Results suggest that there is a strong positive relationship between injurious falls and social isolation. This follows the conceptual model (H4) where injurious falls are directly linked to social isolation. The mechanism through which this link occurs is unknown (see table2)., wchiffhasdfkfkfkfkfk

Family appears to be a stronger social support system after an injurious fall occurs. Analysis of the friend subscales demonstrates increased social isolation (lower LSNS) after an injurious fall as compared to the effect of family social support measured by the family subscale. Family social support appears more stable after an injurious fall than social support from friends.

Descriptives

When examining this sample, for each fall an injury occurred 68% of the time. Having an ABC confidence score of about 70% can be considered relatively confident (Okada, Hirakawa, Takada, & Kinoshita, 2001). ABC is a more effective measure when measured over several time points; this allows researchers to view how certain variables affect balance confidence such as injurious falls (Hotchkiss et al., 2004). This thesis measured the ABC at one collection point only. Additionally, a mean LSNS score of

35.17 was found in the sample, which is in the range of moderate risk for social isolation. In order to see the true effects of social isolation, it may be necessary to study a group that would be categorized as highly socially isolated. It has been shown that a CES-D score of 12-15 may predict some level of minor depression or may place older adults at risk for depression (Hybels, Blazer, & Pieper, 2001).

H1

There was no significant relationship found between injurious falls and fear of falling. With a Pearson's correlation coefficient of $-.06$ this number supports the direction posited, but it is so low that even with a larger sample, it is unlikely to be significant.

When collecting the data certain details were not collected that may be helpful in explaining the results of H1. For example, collection of the length of time between when the injurious fall occurred and when the interview took place. During the interview, participants were asked how many falls they had experienced during the past 12 months. For every fall the participant reported they were asked if they were injured during that fall. It can be speculated that the greater the length of time between injurious fall and interview, the more likely the participant will have a reduced fear of falling. It has been shown in the literature that recall of injury decreased over time (Cummings, Rivara, Thompson, & Reid, 2005). If a fall occurred 11 months ago it may not be fresh in the participant's mind whereas if the fall occurred 1 month ago it may very well be. It also can be speculated that the participant who had the less recent fall may have "put it out of their mind" or forgot about the fall thus having a lower level of fear of falling.

Another missing detail which could be very helpful in explaining the results would be the recording the type and severity of the various injurious falls. The type and severity of an injurious fall event could play a significant role in triggering the fear of falling response (S. L. Murphy, Dubin, & Gill, 2003). It can be speculated that a serious injurious fall causing a hip fracture is likely to cause significantly more fear of falling than a simple bruise on the leg. The sample could have had less severe injurious falls such as scrapes and bruises as opposed to fractures, which may have led this sample to have more fear of falling.

Although not statistically significant, males as a group had a positive association between injurious falls and fear of falling. This positive relationship demonstrates that as the number of injurious falls increases, the participants' level of confidence decreases. As a result, this increases their fear of falling. With an increase in sample size it is likely that this relationship could become statistically significant. Perhaps injurious falls lead to fear of falling among males more so than among females.

Females as a group did not show any relationship between injurious falls and fear of falling. It is likely that females have some type of buffer against the fear of falling post injurious fall that was not examined in this thesis. This buffer prevents fear of falling from taking control. Buffers were not examined in this thesis.

Young older adults as a group did not show any relationship between injurious falls and fear of falling. Additionally old older adults as a group did not show any relationship between injurious falls and fear of falling either.

With essentially no relationship found with either group relating to H1 it is unlikely that age is a significant factor when examining associations between injurious

falls and fear of falling. A potential explanation for this is the grouping of young older adults and old older adults. The cut off point of eighty years old to separate groups may not be adequate. This point was chosen to create equal number of participants in each group. If the sample size was increased, the distribution of the participants would likely change; therefore changing the cut off point between young older adults and old older adults.

Among older adults who lived alone demonstrated a trend toward a relationship between number of injurious falls and fear of falling ($r = -.22$) Older adults living alone may not have others to confide in regarding their fear of falling post injurious fall. By confiding in another person this may reduce the fear and anxiety associated with the event. An older adult who is injured during a fall may lose confidence to carry on with their daily walking activities due to a fear of falling. This individual does not have a constant companion with them to elevate their confidence and decrease their fear of falling. In addition, a companion might guide and support the person both physically and emotionally while providing assistance post injurious fall (Chappell, 1991). It is possible that with an increased sample size, this relationship could become significant.

H2

There was no significant relationship found between fear of falling and social isolation. With a Pearson's correlation coefficient of 0.14 this number supports the direction posited. Perhaps with a larger sample size this would become a significant finding.

As part of the inclusion criteria the participants had to be able to bathe, dress, and toilet themselves. In addition, the participants could not be regularly using a walker or wheelchair. By design of the larger study, this study had criteria that comprised a sample of independent participants.

Certain individuals may be able to socialize regularly despite having a fear of falling. Having a fear of falling does not necessarily mean that one cannot leave the house or have others visit or call them. This sample may have unmeasured characteristics that allow them to interact socially, whereas others in the sample may be forced into social isolation by an intense level of fear of falling.

When examining the sub-analyses for the relationships between fear of falling and social isolation there were no significant results. In this sample there is no relationship between fear of falling and social isolation. This holds true for males, females, young older adults, old older adults, those who live alone, and those who live with someone. According to the results of this study, it appears that despite breaking down the sample into various sub-groups to analyze correlations, there does not appear to be any significant relationships. The results of this thesis suggest that there is a relationship between injurious falls and social isolation, but perhaps the mechanism is not through fear of falling. Despite not being a finding of significance, this knowledge could be important in developing future studies of this nature.

The length of time that the participant has been living alone or how long they have been living with someone was not measured. Older adults prefer to solve their everyday problems with a partner or spouse who they have known for some time (Strough, Patrick, Swenson, Cheng, & Barnes, 2003). The length of time that the

participant has lived alone or has lived with someone is a valuable variable that might explain why there was no statistically significant relationship found when looking at H2. People living alone for a period of time were at higher risk for mortality in Australian city (Siahpush & Singh, 1999).

H3

There was no significant relationship found between social isolation and depression. With a Pearson's correlation coefficient of -0.17 this number supports the direction posited, perhaps if there were a larger sample size this may become a significant finding.

As with all variables, social isolation data was collected at one point in time. It is likely that one has to be socially isolated for a period of time before they become depressed. Therefore, it is reasonable to speculate that as the length of time one is socially isolated increases so will their depression. By collecting data at one time it is unknown how long the participant has been socially isolated.

Without the neighbor subscale the LSNS may not portray a true picture of the level of social isolation in a given sample. Social isolation is a difficult phenomenon to measure and should be approached with as many different angles as possible. Without the neighbor subscale data, the results may not provide the full picture of the level of social isolation in the sample. Social isolation is something that encompasses many aspects of one's life.

When examining the sub-analyses for the relationships between social isolation and depression there were no significant results for males, females, young older adults,

and old older adults. In this sample there is no relationship between the above mentioned groups when testing H3.

Older adults who lived alone showed a significant relationship between social isolation and depression. Lower scores of the LSNS are associated with higher scores of the CES-D, which means that as social isolation increases, depression increases as well. The very nature of living alone may increase the likelihood of being socially isolated. It may become difficult as people age to socialize regularly and effectively. Transportation, pain, and money may be constraints for older adults restricting their ability to socialize. It may be even more difficult to socialize when one lives alone due to the increased effort that is required of these individuals to see others. A long term companion who knows the participant well may be able to decrease feelings of depression.

Older adults who live with someone showed no significant relationship between social isolation and depression. The direction of the relationship found was different than for those living alone.

H4

There was a significant relationship found between injurious falls and social isolation. With a Pearson's correlation coefficient of -0.40 this number supports the direction hypothesized in the conceptual model.

Results from this sample suggest that there is an association between lower scores of the LSNS and higher number of injurious falls, which means that increased injurious falls are related to increased social isolation. In the findings for this sample it appears that there may be some direct link between injurious falls and social isolation. It is likely

that increasing number of injurious falls causes something other than fear of falling to occur, which in turn leads to social isolation. Having an injurious fall may cause one to decrease contact with friends and family thus causing them to become socially isolated.

Gender appeared to play a role when examining H4. Males as a group did not show a significant relationship between number of injurious falls and social isolation. The relationship for females as a group was positive and significant. This female sample showed a high Pearson's correlation coefficient (see Table 4). This suggests that injurious falls may trigger some direct link to social isolation in females. Females may feel that they must limit their social activities in order to prevent future injurious falls. Women are typically the primary caretaker's for their family (Guberman, Maheu, & Maille, 1992). In addition, perhaps they feel that if they have another injurious fall, they will be unable to take care of their husband or other family members. They focus on preventing this from occurring at the expense of their social networks. For men that may not be such a concern because older adult men are typically the bread winners, and despite potentially being incapacitated by an injurious fall, they would still receive their pension, social security or other income to support the family.

When examining the sub-analyses for the relationships between injurious falls and social isolation there were no significant results for young older adults, and old older adults. In this sample it appears that there may not be a relationship between the above mentioned groups when testing H4. Young older adults and old older adults as groups have not yielded any significant relationships when testing any of the main hypotheses including H4. The grouping of young older adults and old older adults may explain the

lack of significant relationships found in this thesis. In order to effectively test age it may be necessary to have a wider variation.

The group of older adults living alone showed a statistically significant relationship between injurious falls and social isolation. The group of older adults who live with someone also showed a statistically significant relationship between injurious falls and social isolation. Both groups had a strong correlation, however the live alone group showed a stronger correlation suggesting that perhaps living situation is a factor in becoming socially isolated post fall.

H4a

When examining the family subscale of the LSNS, there was no correlation between injurious falls and social isolation (see Table 3). It is possible that as the participant continues to have injurious falls and becomes less likely to leave the house due to a fear of future injurious falls, he/she will eventually become socially isolated. This is not necessarily the case when families are involved. They often include younger members, particularly by a generation or two, who could increase their visits to the participant who is relegated to his or her home. This increase in visits would likely keep family members in frequent contact thus decreasing the family sub score for social isolation.

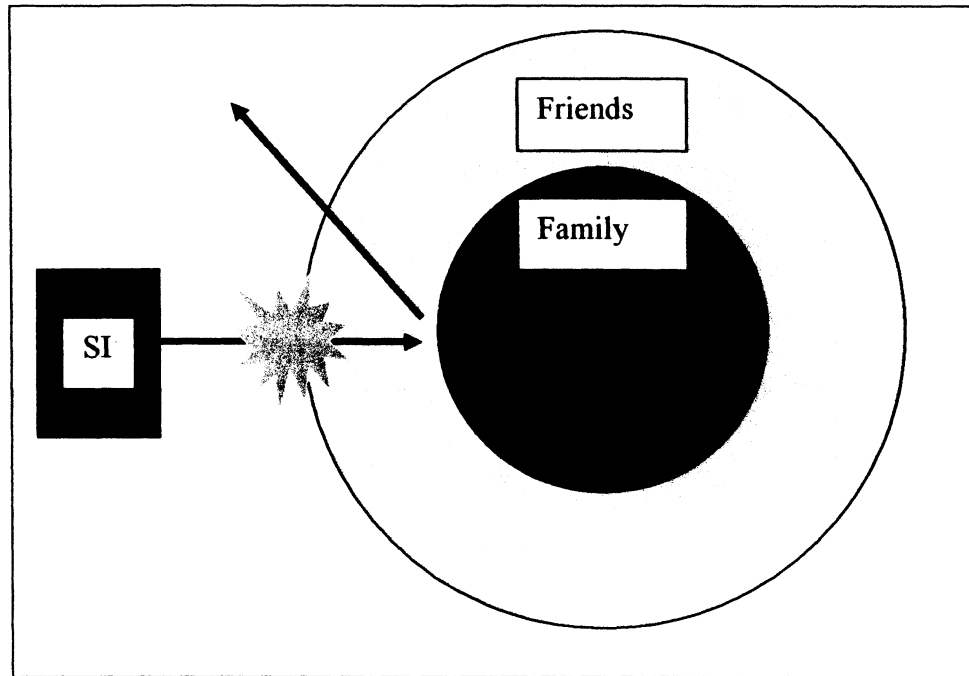
H4b

On the other hand, in the case of the friends subscale, there was a strong correlation between injurious falls and social isolation, such that a greater number of injurious falls was associated with a greater degree of social isolation (see Table 3). A possible explanation for this may be the opposite of the phenomenon with family and social isolation. The participant who has increasing injurious falls may become more likely to stay in the house thus losing contact with friends. Friends of the participants tend to be around the same age as the participant and are less likely to increase the amount of visits to the participant to make up for the lack of contact the participant suffers as a result of being homebound. Another possible explanation is that the friends of the participants may be homebound due to an injurious fall themselves.

Friend/Family Social Isolation Buffer model

This model was constructed to form a visual representation of what may be occurring in hypotheses H4a and H4b. The box on the left represents social isolation while the core of the circular figure represents the patient. Surrounding the core is a thick circular ring which represents the strong protective effect of family support. Surrounding the family ring is another ring which represents support obtained from friends. Although the support from friends may offer some type of buffer effect against social isolation, it may not be strong enough once the patient begins to experience social isolation. However, the powerful nature of family support is able to mediate the effects of social isolation, maintaining the integrity of the family support ring which ultimately can help to protect the core (see Figure 2).

Figure 2. Friend/Family Social Isolation Buffer Model



Strengths

The researchers were trained and interviews were done in a consistent manner.

Trained research assistants were blinded to the condition of the participants. The order of the interview was such that the question about injurious falls was at the end of the initial interview.

Limitations

Limitations of this study include the small sample size of 58. With a small sample size this study may lack the power to actually find results that support the hypotheses put forth in this paper. As indicated in the discussion section perhaps with a larger sample size more statistically significant results may have been found.

Additionally self report data could be unreliable and subject to recall bias. In this study participants were asked to recall information from up to one year prior to the study.

If the participants were found not to have a minimum level of independence they were not eligible for this study. In the larger parent study, participants were asked if they bathe, toilet and dress themselves. Those who could not bathe, dress, or toilet themselves are more likely to be socially isolated. If they cannot take care of basic ADL's it is unlikely that they are regularly leaving the house for social purposes. Due to this exclusion criterion, the group on the whole is less likely to be socially isolated.

However there are a large number of other factors that could have a profound effect of social isolation that were not covered in this study. One example is a participant's access to transportation. Although the question "How do you get around" was asked, the topic was not investigated in any depth. Race and education level data were not collected in this study. The entire sample consisted of those who were English speaking only. These are all factors that could have a significant effect on social isolation as well as depression. The instrument used to assess and record falls and injurious falls was not adequate for research.

The definition of both falls and injurious falls were subjective and whether to count an incident as a fall/injurious fall was ultimately left to the discretion of each subject. The subjects received no definition of either prior to being asked these questions during the interview. Due to the subjective nature of both the fall and injurious fall definition, the consistency of this variable is decreased.

Conclusions

This thesis investigated the relationships between injurious falls, fear of falling, social isolation and depression. A conceptual design was developed and followed throughout hypothesis testing.

The sample size may not have been large enough to detect significant results. Many of the correlations showed the direction that was hypothesized, but due to small sample size were not significant.

Analysis of this sample demonstrates that older adults living alone have relationships with the hypotheses, which follows the conceptual model more closely than the entire sample. It appears that older adults living alone may be more at risk for negative post fall outcomes.

This sample suggests some direct link between social isolation and injurious falls which skips fear of falling as the mechanism.

This sample shows that the sub scales of social isolation give some insight into social networks. Family sub scale remains relatively unaffected (no significant relationship) post injurious fall whereas friend sub scale is (relationship with being socially isolated) affected.

Public Health Implications

In terms of creating interventions to prevent falls and reduce negative post fall outcomes, this thesis has uncovered useful knowledge. From this sample it appears that those who are living alone may be a more vulnerable population when constructing fall prevention and negative post fall reduction programs. Public health officials must

examine these aggregates closely and design specific programs aimed at this segment of the older adult population. Older adults living alone in this sample closely fit in the conceptual model presented. Public health interventions aimed at stopping the cascade of events would be extremely beneficial for this group of individuals. Again, due to the correlational nature of this thesis no causation can be determined, only inferences toward the relationships.

Public health officials must continue to utilize new techniques for examining falls as a public health problem thus putting substantial efforts towards stopping the epidemic of injurious falls. As injurious falls cannot always be prevented, we must also strive to limit the damage associated with possible associations of negative post fall outcomes as outlined in this thesis.

Recommendations for future study


A larger sample size will be very important in future studies of this nature. Another key aspect to constructing future studies might be considering the length of time between the occurrence of the injurious fall and the date of the interview. This will allow the researcher to determine if time is a significant variable in determining a relationship between injurious falls and fear of falling.

Future studies should retest the same participants over time looking at the same variables. One would be able to test the effect of time on the relationships between injurious falls, fear of falling, social isolation and depression. Additionally, this would allow one to study the causal sequence between the major variables. This will be very important in confirming the direction of the proposed conceptual model. Another

important aspect of examining the causal sequence will be strictly defining injurious falls. This strict definition prior to the commencement of a prospective design study, would allow the researcher to define a fall and injurious fall ahead of time; thus allowing the participant to have instruction on how to keep track of both. This will improve the accuracy as well as decrease recall bias.

Appendix A

Activities-Specific Balance Confidence (ABC Scale)



9884

**THE CLAUDE PEPPER
OLDER AMERICANS INDEPENDENCE CENTER**
Of the University of Connecticut Health Center
Successful Aging through Research

Form 28
ABC Scale
Page 1 of 2

Study:

Acrostic:

Volunteer ID:

Exam Date:

Interviewer:

Volunteer Time Point

☐ screening ☐ 15 month

☐ baseline ☐ 18 month

☐ 3 month ☐ 21 month

☐ 6 month ☐ 24 month

☐ 9 month ☐ 30 month

☐ 12 month ☐ 36 month

☐ other

Please fill in one appropriate box for each question. The box should be filled as such: ☐ or ☒

Answer the following questions according to the following percentage scale:

	No Confidence										Completely Confident											
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
... walk around the house?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... walk up and down stairs inside your home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... bend over and pick up a slipper from the front of a closet door?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... reach for a small can off a shelf at eye level?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... stand on a chair and reach for something?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... stand on your tip toes and reach for something above your head?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... sweep the floor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... walk outside the house to a car parked in the driveway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... get into or out of a car?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... walk across a parking lot to the mall?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Form 28
ABC Scale
Page 2 of 2

Volunteer ID:

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	No Confidence					Completely Confident					
	0	10	20	30	40	50	60	70	80	90	100
... walk up or down a ramp?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... walk in a crowded mall where people rapidly walk towards you and pass by?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... when people bump into you as you walk through the mall?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... step onto or off of an escalator while holding onto a railing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... step onto or off an escalator while holding onto parcels such that you cannot hold onto railing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... walk outside on icy sidewalks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix B

LUBBEN SOCIAL NETWORK SCALE

FAMILY *Considering the people to whom you are related either by birth or marriage...*

1. How many relatives do you see or hear from at least once a month?

0 = <i>none</i>	1 = <i>one</i>	2 = <i>two</i>
3 = <i>three or four</i>	4 = <i>five thru eight</i>	5 = <i>nine or more</i>

2. How often do you see or hear from relative with whom you have the most contact?

0 = <i>never</i>	1 = <i>seldom</i>	2 = <i>sometimes</i>
3 = <i>often</i>	4 = <i>very often</i>	5 = <i>always</i>

3. How many relatives do you feel at ease with that you can talk about private matters?

0 = <i>none</i>	1 = <i>one</i>	2 = <i>two</i>
3 = <i>three or four</i>	4 = <i>five thru eight</i>	5 = <i>nine or more</i>

4. How many relatives do you feel close to such that you could call on them for help?

0 = <i>none</i>	1 = <i>one</i>	2 = <i>two</i>
3 = <i>three or four</i>	4 = <i>five thru eight</i>	5 = <i>nine or more</i>

5. When one of your relatives has an important decision to make, how often do they talk to you about it?

0 = <i>never</i>	1 = <i>seldom</i>	2 = <i>sometimes</i>
3 = <i>often</i>	4 = <i>very often</i>	5 = <i>always</i>

6. How often is one of your relatives available for you to talk to when you have an important decision to make?

0 = <i>never</i>	1 = <i>seldom</i>	2 = <i>sometimes</i>
3 = <i>often</i>	4 = <i>very often</i>	5 = <i>always</i>

FRIENDSHIPS: *Considering your friends who do not live in your neighborhood....*

7. How many of your friends do you see or hear from at least once a month?

0 = <i>none</i>	1 = <i>one</i>	2 = <i>two</i>
3 = <i>three or four</i>	4 = <i>five thru eight</i>	5 = <i>nine or more</i>

8. How often do you see or hear from the friend with whom you have the most contact?

0 = <i>never</i>	1 = <i>seldom</i>	2 = <i>sometimes</i>
3 = <i>often</i>	4 = <i>very often</i>	5 = <i>always</i>

9. How many friends do you feel at ease with that you can talk about private matters?

0 = <i>none</i>	1 = <i>one</i>	2 = <i>two</i>
3 = <i>three or four</i>	4 = <i>five thru eight</i>	5 = <i>nine or more</i>

10. How many friends do you feel close to such that you could call on them for help?

0 = <i>none</i>	1 = <i>one</i>	2 = <i>two</i>
3 = <i>three or four</i>	4 = <i>five thru eight</i>	5 = <i>nine or more</i>

11. *When one of your friends has an important decision to make, how often do they talk to you about it?*

0 = <i>never</i>	1 = <i>seldom</i>	2 = <i>sometimes</i>
3 = <i>often</i>	4 = <i>very often</i>	5 = <i>always</i>

12. How often is one of your friends available for you to talk to when you have an important decision to make?

0 = <i>never</i>	1 = <i>seldom</i>	2 = <i>sometimes</i>
3 = <i>often</i>	4 = <i>very often</i>	5 = <i>always</i>

Appendix C

CES-D

Please answer these questions by checking only one box for each question:

How often during the past week were you bothered by things that usually don't bother you?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you not feel like eating (your appetite was poor)?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel that you couldn't shake off the blues even with help from your family or friends?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel that you were just as good as other people?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you have trouble keeping your mind on what you were doing?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel depressed?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel that everything you did was as effort?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel hopeful about the future?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you think that your life had been a failure?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel fearful?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week was your sleep restless?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week were you happy?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you talk less than usual?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel lonely?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week were people unfriendly?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you enjoy life?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you have crying spells?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel sad?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel that people disliked you?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

How often during the past week did you feel that you could not "get going"?

- | | |
|---|---|
| <input type="checkbox"/> Rarely or None of the time (less than 1 day) | <input type="checkbox"/> Little or Some of the time (1 or 2 days) |
| <input type="checkbox"/> Sometimes or Moderate (3 or 4 days) | <input type="checkbox"/> All or Most of the time (5 to 7 days) |

Would you rate this past week as a typical week?

- ☐ Yes ☐ No

Appendix D

MINI-COG

MINI COG

ASSESSMENT INSTRUMENT FOR DEMENTIA

The Mini-Cog assessment instrument combines an uncued 3-item recall test with a clock-drawing test (CDT). The Mini-Cog can be administered in about 3 minutes, requires no special equipment, and is relatively uninfluenced by level of education or language variations.

Administration

The test is administered as follows:

1. Instruct the patient to listen carefully to and remember 3 unrelated words and then to repeat the words.
2. Instruct the patient to draw the face of a clock, either on a blank sheet of paper, or on a sheet with the clock circle already drawn on the page. After the patient puts the numbers on the clock face, ask him or her to draw the hands of the clock to read a specific time, such as 11:20. These instructions can be repeated, but no additional instructions should be given. Give the patient as much time as needed to complete the task. The CDT serves as the recall distractor.
3. Ask the patient to repeat the 3 previously presented words.

Scoring

Give 1 point for each recalled word after the CDT distractor. Score 1–3.

- A score of 0 indicates positive screen for dementia.
- A score of 1 or 2 with an abnormal CDT indicates positive screen for dementia.
- A score of 1 or 2 with a normal CDT indicates negative screen for dementia.
- A score of 3 indicates negative screen for dementia.

The CDT is considered normal if all numbers are present in the correct sequence and position, and the hands readably display the requested time.

Source: Adapted in part from Ellison S, Scarpone J, Borch M, Vichansri P, Delmonico A. The mini-cog: a cognitive "fast screen" instrument for dementia screening in multi-lingual elderly. *Int J Geriatr Psychiatry* 2000; 15:117–1127.

Mini-Cog: Copyright 2000 and 2004 by Sanjit Basra and James Scarpone. All rights reserved. Reproduced here under license from the University of Washington. Further use as a clinical tool is prohibited. To obtain information on the Mini-Cog, contact Sanjit Basra at sb@u.washington.edu.

Table 1. Subject Characteristics

	N	Mean	Percentage	Standard Deviation	Minimum	Maximum
Age	58	78.5	_____	6.30	63	89
Male	23	_____	39.6	_____	_____	_____
Female	35	_____	60.4	_____	_____	_____
Live Alone	31	_____	53.4	_____	_____	_____
Live With Someone	27	_____	46.6	_____	_____	_____
Number of Falls in last 12 months	58	2.2	_____	1.15	0	4
Injurious Falls*	58	1.5	_____	1.33	0	4
Fear of Falling (ABC)	58	69.7	_____	19.49	19.38	98.13
Social Isolation (Family)	58	18.20	_____	7.34	0	29
Social Isolation (Friend)	58	16.98	_____	7.04	0	28
Social Isolation (Total LSNS)	58	35.17	_____	11.30	9	56
Depression (CES-D)	58	12.36	_____	7.96	0	43

*During the past twelve months

Table 2. Pearson's Correlation Coefficients for
Study Hypotheses 1-4*

Variable	1	2	3	4
Older Adults (n = 58)				
1. Number of Injurious Falls	—			
2. Fear of Falling (ABC)	-.06 (.68)	—		
3. Social Isolation (LSNS)	-.40 ($< .05$)	.14 (.30)	—	
4. Depression (CES-D)	—	—	-.17 (.19)	—

* This table shows the Pearson value and the (p value) below.

**Table 3. Pearson's Correlation Coefficients for
Hypotheses 4a, 4b***

Variable	1	2	3
Older Adults (n = 58)			
1. Number of Injurious Falls	—		
2. Family Sub Scale of Social Isolation	-.20 (.12)	—	
3. Friend Sub Scale of Social Isolation	-.43 (< .05)	—	—

* This table shows the Pearson value and the (p value) below.

**Table 4. Pearson's Correlation Coefficients
for Sub-Analyses**

	Number of Injurious Falls & Fear of Falling (ABC)	Fear of Falling (ABC) & Social Isolation (LSNS)	Social Isolation (LSNS) & Depression (CES-D)	Number of Injurious Falls & Social Isolation (LSNS)
Male (n=23) Pearson's Correlation Coefficient (p value)	-.23 (.29)	.08 (.72)	-.06 (.77)	-.21 (.35)
Female (n=35) Pearson's Correlation Coefficient (p value)	.06 (.79)	.13 (.45)	-.20 (.26)	-.53 (.001)
*Young Older Adults (n=29) Pearson's Correlation Coefficient (p value)	-.07 (.71)	.18 (.36)	-.19 (.33)	-.22 (.19)
*Old Older Adults (n=29) Pearson's Correlation Coefficient (p value)	-.04 (.86)	.01 (.96)	-.10 (.61)	-.30 (.12)
Live Alone (n=31) Pearson's Correlation Coefficient (p value)	-.22 (.24)	.18 (.32)	-.35 (.05)	-.46 (.02)
Live with Someone (n=27) Pearson's Correlation Coefficient (p value)	.18 (.41)	.01 (.97)	.27 (.18)	-.37 (.05)

*Young older adult were aged 79 or less, whereas old older adults were aged 80 or greater.

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