RELIABILITY AND VALIDITY OF THE HOME ENVIRONMENTAL

ASSESSMENT PROTOCOL-REVISED

A DISSERTATION

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DEDICATION

This work is dedicated to the glory of God and to the caregivers of persons with dementia.

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ABSTRACT

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This dissertation examined the initial content validity, concurrent validity, inter-rater

reliability, and test-retest reliability of the Home Environment Assessment Protocol – Revised.

The Home Environment Assessment Protocol –Revised (HEAP-R) is a home assessment for

persons with dementia and their caregivers. The domains assessed included hazards, adaptations,

visual cues, clutter, and comfort. Content validity was established by seven experts through a

content validity index (CVI). The result was an overall CVI of .98. A few minor changes were

made to the HEAP-R form and a quick start guide with definitions was developed. Concurrent

validity was established through the administration of both the HEAP and the HEAP-R with 21

caregiver/person with dementia dyads at homes in Florida and Texas. This resulted in strong

correlations for the domains of hazards ($r =.792$) and adaptations ($r = .742$). Correlations were

strong for the domains of clutter ($r = .843$), and comfort ($r = .958$). The two tools did not

correlate for the domain of visual cues.

Reliability was examined by 24 occupational therapists who scored the HEAP-R by

viewing videos of 10 home environments. Inter-rater reliability was poor across all domains,

hazards ($\alpha = .300$), adaptations ($\alpha = .234$), visual cues ($\alpha = .201$), and clutter ($\alpha = .252$). Test-

retest reliability showed strong agreement for the domains of hazards ($r = .820$), adaptations

($r = .887$), and clutter ($r = .696$). The domain of visual cues showed moderate ($r = .487$) test-

retest reliability.

To address theoretical relevance, follow-up phone calls resulted in 19 caregiver responses. This provided guidance for future research using the HEAP-R as a clinical tool in the homes of persons with dementia and their caregivers. Relative mastery scores showed that caregivers viewed the assessment process as efficient and effective, and were satisfied with the process. Caregivers did want more education and resources for home modifications and caregiving.

Rater training and reliability needs to be further explored. These studies demonstrate that the HEAP-R is a valid tool and has strong potential for use in clinical practice and research.

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CHAPTER I

STATEMENT OF THE PROBLEM AND SPECIFIC AIMS

Statement of the Problem

The Alzheimer's Association reports that 14% of older Americans have some form of dementia. Alzheimer's disease (AD) is the most common form of dementia and accounts for 60-80% of dementia cases. It estimates that the current number of 5.3 million Americans over age 65 with AD will increase to 13.8 million by 2050 (Alzheimer's Association, 2015). The American Association of Retired Persons (2014) reports that more than 87% of adults over age 65 want to stay in their home as they age. Persons with dementia are more likely to require caregiving assistance at home than older adults without dementia, yet caregivers of persons with AD identify the desire to keep the person with AD at home as the number one reason for deciding to provide in-home care (Alzheimer's Association, 2015). However, caregivers often lack the information and knowledge to manage the complexity of care required by a person with AD (Alzheimer's Association, 2015; Horvath et al., 2005; Lach, Reed, Smith, & Carr, 1995). As the incidence of dementia increases so will the need for occupational therapy services that promote aging in place, such as home modifications. Home modifications can increase independence, safety, and self-esteem while reducing health care costs for older adults with chronic health conditions (Sanford, Pynoos, Tejral, & Browne, 2001). Home modifications are inclusive of environmental / structural changes, assistive devices, and caregiver supports. Use of assistive devices in the home can reduce in home personnel costs for frail elders (Mann, Ottenbacker, Fraas, Tomita & Granger, 1999). To make the best recommendations for home modifications occupational therapists need reliable and valid assessment tools.

Interventions that result from the home assessment process can influence quality of life, patient independence, and number of falls (Barras, 2005). An enhanced quality of life, improved independence, and a reduction of fall hazards may also promote aging in place for persons with dementia and their caregivers. Caregivers of persons with dementia reported they need knowledge, training, and resources about home modifications (Chee, Gitlin, Dennis, & Hauck, 2007; Horvath et al., 2005) A home modifications assessment specific to the unique needs of persons with dementia can guide the occupational therapist in addressing caregiver and client needs related to environmental barriers and supports.

Three home assessments specific to persons with dementia were identified in the literature: The Home Safety Inventory, The Home Safety Checklist, and the Home Environmental Assessment Protocol (HEAP). The Home Safety Inventory consists of 13 items including activities, hazardous behaviors, and precautions. These items are designed to explore safety and caregiving issues in the home (Lach et al., 1995). The Home Safety Checklist (HSC) includes 64 items that address home safety and was developed to measure outcomes for an intervention study (Horvath et al., 2013). Neither the Home Safety Inventory nor the Home Safety Checklist address supports in the environment such as adaptations, visual cues, or comfort. Both assessments were developed to measure outcomes of specific research studies focused on home safety modifications. The Home Environmental Assessment Protocol (HEAP) is 192 items which address the domains of safety hazards, adaptations, visual cues, clutter, and comfort through observation and probing questions (Gitlin et al., 2002). Advantages of the HEAP are that it is a comprehensive, reliable, and valid tool for assessing the home environment of persons with dementia and their caregivers. The HEAP is considered to have sound psychometrics (Gitlin et al., 2002). Administration of the HEAP takes 45-60 minutes. Where a valid and reliable tool

exists, shorter versions that have fewer questions and take less time may have advantages for clinical utility (Jogi, Spaulding, Zecevic, Overend, & Kramer, 2011). The HEAP was revised into the HEAP-R by this researcher for potential use by occupational therapists in home based practice.

The Home Environmental Assessment Protocol-Revised (HEAP-R) was designed in hopes of meeting the need for a clinically useful, reliable, and valid home assessment specific to the person with dementia and their caregiver. The HEAP-R has fewer items than the HEAP and does not include probing questions. This researcher estimated administration of the HEAP-R to take approximately 20 minutes. The same domains of safety hazards, adaptations, visual cues, clutter, and comfort from the HEAP were maintained. Revision included a section for collaboration with the client with dementia (if able) and the caregiver to further identify and prioritize barriers and supports in the home environment. This research was the first step in examining if the HEAP-R is a reliable and valid tool.

Research Focus

The area of my research focus was the assessment of the home environment for individuals with dementia and their caregivers. A scoping review (Struckmeyer & Pickens, 2016) identified that home modifications for persons with dementia considers the physical environment, the caregiver, and is client-centered. Most of the occupational therapy home modification literature was not specific to persons with dementia, rather was focused on general fall prevention and the physical environment (Chiu & Oliver, 2006; Siebert, Smallfield, & Stark, 2014; Stark, Somerville, Keglovits, Smason, & Bigham, 2015). There is a need for an occupational therapy assessment specific to home modification assessment for individuals with dementia that will translate into use with clients and caregivers in their homes. This research focused on

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examination of a revision of the HEAP for use by occupational therapists. The reliability and

validity of the Home Environmental Assessment Protocol – Revised was examined (see

Appendix A for a copy of the assessment tool). This dissertation study was a series of

psychometric studies with the purpose to investigate the reliability and validity of the Home

Environmental Assessment Protocol- Revised (HEAP-R).

Specific Aims

The purpose of this research was to examine the reliability and validity of the HEAP-R for

use in practice when assessing the homes of persons with dementia and their caregivers.

Specific primary aims were:

1. To examine the content validity of the HEAP-R.

2. To examine the inter-rater reliability of the HEAP-R.

3. To examine the test-retest reliability of the HEAP-R.

4. To examine the concurrent validity of the HEAP-R as it compares to the HEAP.

5. To examine the theoretical relevance of the HEAP-R assessment process.

Content validity was established through reexamination of the theoretical underpinnings

of the HEAP-R, literature review, and expert review. Inter-rater reliability and test-retest

reliability were examined through the ratings of home environment video recordings. For inter-

rater reliability, occupational therapists, as participants, were asked to view 10 videos and score

the HEAP-R. The same participants were asked score the same 10 videos 2 weeks later for the

test-retest reliability analysis. Concurrent validity was examined by comparing the HEAP-R to

the HEAP. Both assessments were administered by this researcher to 21 caregiver/person with

dementia dyads in their homes. Theoretical relevance was examined through follow up telephone

interviews that explored the application of Occupational Adaptation (OA) theory as measured by

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the caregiver's relative mastery. These interviews were conducted by a member of the research team other than the primary researcher.

Definitions

Dementia is a progressive neurological disease that results in a decline in memory, language, problem-solving skills, and other cognitive skills. Alzheimer's disease is the most common form of dementia (Alzheimer's Association, 2015).

In this line of research, the term *home modification* refers to strategies to compensate for impairments and maintain performance of daily activities (Siebert et al., 2014). These strategies involve both the physical and the social environment.

Occupational adaptation (OA) is a normative process that exists in persons to allow adaptive responses and mastery when faced with occupational challenges (Schkade & Schultz 1992; Schultz & Schkade, 1992). As the person expresses a desire for mastery and the environment demands mastery there is an interactional press for mastery. The theoretical perspective of Occupational Adaptation was designed based on occupational therapy principles that can influence practice and research (Schkade & Schultz, 1992). Occupational adaptation is determined by a person's sense of relative mastery.

Relative mastery is an indicator that changes when the person's occupational adaptation process is occurring (Schkade & Schultz, 1992). Relative mastery is a phenomenological indicator of the person's perception of the process and not an indicator of the level of skill (Schkade & McClung, 2001) and is measured by rating the effectiveness, efficiency, and satisfaction to self and others (Schkade & Schultz, 1992; Schultz & Schkade, 1992).

CHAPTER II

BACKGROUND AND SIGNIFICANCE

This research examined the reliability and validity of the Home Environmental

Assessment Protocol - Revised (HEAP-R), an assessment tool for systematic observation of

potential hazards and supports in the homes of persons with dementia and their caregivers. The

HEAP-R is intended to provide information to the occupational therapist and caregiver for home

modifications. This chapter provides background on dementia, Alzheimer's disease, and aging in

place. Also covered is the literature on home modifications, the influence of the environment on

performance, and the role of the caregiver in home modifications. Assessments for home

modification and the development of the HEAP-R is discussed. Lastly, the potential significance

of this research and assessment tool development for occupational therapy is offered.

Dementia and Alzheimer's Disease

Dementia is a neurocognitive disease characterized by decline in cognitive skills and

function that interferes with everyday activities. Types of dementia include, but are not limited to,

Alzheimer's disease, Frontal-temporal lobe dementia, Lewy body dementia, Parkinson's

dementia, vascular dementia, and mixed dementia. Alzheimer's disease (AD) is the most

common form of dementia. The Alzheimer's Association (2015) estimated that 5.1 million

Americans age 65 and older have AD with an estimated increase to 13.8 million Americans by

2050. Alzheimer's disease is a neurodegenerative disease characterized by plaques and

neurofibrillary tangles in the brain that lead to cognitive decline and decreased functional status

(Budson & Solomon, 2012; Nowrangi, Rao, & Lyketsos, 2011). A new criterion for diagnosis of

AD has resulted in identifying preclinical AD though biomarkers in cerebrospinal fluid (Budson

& Solomon, 2012). The three stages of Alzheimer's disease are preclinical Alzheimer's disease, mild cognitive impairment (MCI) due to Alzheimer's disease, and dementia due to Alzheimer's disease (Alzheimer's Association, 2015).

Treatments for dementia fall in two basic approaches, pharmacological and nonpharmacological, which can be further categorized into four treatment categories: treating the disease, treating the symptoms, supporting the patient, and supporting the caregiver. Pharmacological interventions to treat the disease are sometimes guided by tests for identifying biomarkers specific to Alzheimer's type dementia (Budson & Solomon, 2012). Biomarkers include the ability to identify the increase of the beta-amyloid and tau proteins in cerebral spinal fluid and groups of proteins in the blood (Budson & Solomon, 2012; Nowrangi et al., 2011). Pharmacological interventions to treat the symptoms vary depending on the symptoms presented by the person with dementia.

Nonpharmacological treatments to treat the symptoms include development of cognitive reserve (Liberati, Raffone, & Olivetti-Belardinelli, 2012) and tailored activities (Gitlin, Jacobs, & Earland, 2010). Cognitive reserve refers to two concepts: first the brain has capacity based on educational status and occupation, and second the brain has the ability to form new neuronal networks (Liberati et al., 2012). Development of cognitive reserve as an intervention comes from the second perspective that cognition is not fixed. Examples of cognitive reserve interventions could be participation in educational courses or training in new tasks. Building of cognitive reserve in the early stages of dementia through the use of mental cognitive stimulation can improve ADL performance and build neuronal networks (Liberati et al., 2012). Tailored activities as an intervention is the use of meaningful activities tailored to the person's interests and cognitive level. Tailored activities have been shown to decrease neuropsychiatric symptoms

associated with dementia (Gitlin, Hodgson, Jutkowitz, & Pizzi, 2010). Nonpharmacological

treatments to support the patient and the caregiver include caregiver education and home

modifications. (Lach et al., 1995; Nowrangi et al., 2011; Olsen, Ehrenkrantz, & Hutchings, 1996;

van Hoof, Blom, Post, & Bastein, 2013). Caregiver education and home modifications as

interventions are discussed in more detail later in this chapter.

Aging in Place in with Dementia

Aging in place refers to the ability to live in one's home in the community regardless of

health, income, or ability level (AARP, 2014). A recent study by the American Association of

Retired Persons (2014) found that more than 87% of adults over age 65 want to stay in their home

as they age. Even though persons with dementia want to age in place, homecare can be expensive.

The cost of dementia care in 2010 was estimated to be between $159 billion and $215 billion

(Vaughn, 2013). The cost of caregiving for persons with AD is one reason for the development of

efficient home modification assessment tools that translate into positive outcomes for care

recipients and caregivers. Home modifications can increase independence, improve safety, and

quality of life, while reducing health care costs to promote aging in place (Barras, 2005; Mann,

Hurren, Charvat, & Tomita, 1996; Sanford et al., 2002).

Home Modifications

Home modifications are adaptations to environments that are intended to increase usage,

safety, security, and independence (Seibert et al., 2014). Home usage might be increased by

adding a ramp or stair lift to steps. Safety may be improved by adding a grab bar or removal of

dangerous items. Security for persons with dementia can be improved by adding key locks to the

inside of doors. Independence can be improved through the use of visual cues for wayfinding or

handwashing. Home modifications may be made to the physical environment, as in those listed

above; to the social environment, as in increased supervision and monitoring (Gitlin, Hauck, Dennis, & Winter, 2005); and to the task, as in visual or auditory cueing (Chee & Gitlin, 2006; Giovannetti et al., 2007).

The home modification process includes assessment, identification, and implementation of solutions, training, and outcomes evaluation. The home modification evaluation is part of a comprehensive occupational therapy assessment. Identification of environmental supports, barriers, and solutions is a client-centered, collaborative process with the caregiver. This collaborative process often includes caregiver training and education (Struckmeyer & Pickens, 2016). Home modification is an ongoing process that requires adaptive skills due to the progressive nature of dementia and the resulting needs of the client and the caregiver (Olsen et al., 1996).

Stark, Somerville, Keglovits, Smason, and Bigham (2015) developed a clinical reasoning guideline for home modification interventions. The authors identified 16 factors that occupational therapists routinely assess and integrate into practice. One of the factors identified was the clinical course and progressive nature of the disease. This factor along with other factors such as caregiver readiness for change, social supports, and compliance may have relevance for the dementia population. Stark et al. (2015) recognized that standardized assessment is often used to measure client capacity. However, the use of a specific standardized tool to assess the environment was not suggested in the findings or included in the guidelines.

Caregiver involvement is a theme identified in the occupational therapy literature on dementia (Struckmeyer & Pickens, 2016). Home modifications reduced caregiver stress and improved coping ability (Gitlin, Corcoran, Winter, Boyce, & Hauck, 2001; Sheldon & Teaford, 2002). Another theme is the importance of client-centered intervention as part of the home

modification process for individuals with dementia (Gitlin et al., 2010; Sheldon & Teaford, 2002; Struckmeyer & Pickens, 2016). Along with involvement of the caregiver and a need for a client-centered approach, there was a range of environmental modifications to consider. These included physical, cognitive, and social modifications to improve safety and function for the person with dementia (Struckmeyer & Pickens, 2016). Literature suggests in the later stages of AD home modifications were designed to restrict behaviors such as wandering, access to food, and rummaging (Mann et al., 1996). To a much lesser degree a few modifications were made to enhance participation, for example, placement of a sign or picture on the bathroom door to aid in room location.

Theoretical Background of Home Modifications

Lawton's Ecological Model of Aging interfaces well with Occupational Adaptation Theory. Both models focus on adaptation as a key concept. Lawton and Nehemow's (1973) model suggests that environmental press promotes positive or negative behaviors. It further suggests that functional decline in persons must be matched with environmental supports to prevent unnecessary functional loss. Environments that promote competence are considered high in functional quality (Lawton & Nehemow, 1973). This model outlines the need for a balance between competence and the environment. Applied to home modifications for persons with dementia, environmental press suggests that as cognition declines, the person may have difficulty interpreting environmental cues.

Occupational Adaptation (OA) Theory integrates the concepts of occupation and adaptation as a normative process that every person experiences throughout the lifespan (Schkade & Schultz, 1992). The basic assumption is that as a person becomes more adaptive they become more functional. A person's adaptive ability can become overwhelmed due to illness such as

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dementia. Three basic elements of OA are the person, the occupational environment, and the interaction as the person and the environment meet in an occupational activity. OA describes the person as desiring mastery and the environment as demanding mastery. A press for mastery comes from interaction of the environment and the person (Schkade & Schultz, 1992). OA considers the adaptive repertoire of the person as they strive to meet the occupational challenge and demands of the environment for aging in place. Competence is viewed as the relative influence of the person-environment interaction (Schkade & McClung, 2001). The individual assesses their adaptive repertoire by evaluating their relative mastery of the occupational experience. Relative mastery is measured by efficiency, effectiveness, satisfaction to self, and satisfaction to others (Schultz & Schkade, 1992). Applied to home modifications for persons with dementia the environment can influence the demand for mastery through removal of barriers or addition of supports to facilitate performance. For example, a high tub side can be a barrier to bathing while a walk in shower can facilitate bathing. The environmental demand for mastery influences the performance of the person with dementia.

Influence of the Environment on Performance

Identification of barriers and facilitators to performance in the environment is part of the home modifications process (Siebert et al., 2014). Removal of hazards, implementation of adaptations, presentation of visual cues, reduction of clutter, and provision of comfort can facilitate safety and participation in the home environment. Functions for persons with dementia supported by home environmental modifications include self-care, safety, security (including wandering), perception, orientation, and memory (van Hoff, Kort, Waarde, & Bloom, 2010).

Hazards. Hazards in the environment can be related to physical aspects of the home or cognitive factors of the person with dementia. Environmental hazards are common in homes of

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older people (Clemson, 1997; Gitlin et al., 2002; Horvath et al., 2013; Lach et al., 1995). Poor flooring (slippery, loose boards, loose carpet) and poor lighting are two of the most commonly identified hazards in the homes of elderly people (Clemson, 1997). In persons with cognitive impairments, such as dementia, potential hazards include access to sharp objects, access to dangerous substances, access to medications, and access to stoves (Gitlin & Chee, 2006; Gitlin, Corcoran, Winter, Boyce, & Marcus, 1999; Horvath et al., 2005; Mann et al., 1996; Olsen et al., 1996). Sharp objects in view may be misused and result in injury to self or others (Sheldon & Teaford, 2002). Dangerous substances could be mistaken for other liquids and ingested. Medications can be incorrectly self-administered and can result in overdose. Items left on a stove and forgotten can result in smoke or burn injuries. Fire is a hazard that is another safety concern for persons with dementia and the presence or absence of smoke alarms should be identified as part of the home modifications assessment (Gitlin & Corcoran, 2005; Horvath et al., 2005).

Adaptations. Adaptations are changes made to the environment to improve safety or enhance performance. The person with dementia may have difficulty adapting to their declining cognitive and functional status and therefore the environment must be adapted (van Hoff et al., 2010). Many adaptations are not visible when doing a home assessment and can only be ascertained by asking the caregiver such as prior removal of throw rugs or dangerous objects, and rearrangement of furniture (Gitlin et al., 2002). Environmental adaptations such as task monitoring and use of a call bell can improve everyday task performance in persons with Alzheimer's disease (Giovannetti et al., 2007). Adaptations become more restrictive in nature as dementia progresses, such as: adding key locks on doors, disconnecting stoves or removing knobs, lowering water temperature, using baby monitors, and removing sharp objects (Mann et al., 1996).

Visual cues. Visual cues are a specific type of adaptation for persons with cognitive decline. In early stages of dementia performance can be improved. Visual cues include signs, color contrast, and reflective tape (van Hoff et al., 2010). Signs can provide instruction of steps to independently complete a task such as handwashing. Signs can also identify rooms behind closed doors (such as bathroom or laundry room). Color contrast may assist in locating or using items. An example of this could be keeping the dark colored phone on a light colored surface. Reflective tape can improve safety on stairs or provide way finding to the bathroom at night. Visual cues for time orientation may include simple clocks and calendars. A small study examined the use of cognitive assist technology where a video guides the person with dementia through the steps of a task. This type of visual cueing required less caregiver assistance and facilitated completing more steps of handwashing (Mihailidis, Boger, Craig, & Hoey, 2008).

Clutter. Clutter is sensory input in excess to the task. The surroundings of a person with dementia should be simple in order to offer information about orientation and navigation, as even a moderate amount of clutter can be problematic (Corcoran & Gitlin, 1991). Removal of clutter from walkways or counters is a commonly identified intervention (Clemson, 1997; Gitlin et al., 1999; Horvath et al., 2005; Lach & Chang, 2007; Lach et al., 1995; Mann et al., 1996; Sheldon & Teaford, 2002). Persons with dementia may experience sensitivity to environmental influences such as having excess items in their immediate environment. Removal of clutter may be one intervention to cope with this sensitivity (Corcoran & Gitlin, 1991) and may prevent the occurrence of accidents (van Hoff et al., 2010).

Comfort. The comfort of a physical environment includes sensory attributes such as temperature and acoustics. Comfort also includes attributes that address emotion and connectedness to place such as visual appeal, privacy, and access to frequently used items

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(Corcoran & Gitlin, 1991; van Hoff et al., 2010). Areas of comfort in the home of the person with dementia may decrease agitation, enhance sustained positive engagement, and enhance sense of control (Gitlin & Corcoran, 2005). The incorporation of favorite objects and aesthetically pleasing items (flowers, family pictures) in the immediate space provides familiarity and a sense of comfort for persons with dementia (Sheldon & Teaford, 2002). In the Environmental Skill Building Program strategies used to improve comfort included the set-up of familiar photos; the set-up of a control center with objects such as remote control, phone, manipulatives, magazine, and water; and placement of meaningful objects to touch and look at (Gitlin & Corcoran, 2005).

Assistive devices. Assistive devices are often used in the course of normal aging such as hearing aids, eyeglasses, night lights, canes, walkers, tub grab bars, and medication boxes (Mann et al., 1996; van Hoff et al., 2010). Assistive devices that restrict performance in the general aging population but are used for safety with people with dementia are keyed deadbolt locks and gates blocking off part of the home. Persons with dementia may also use other items to assist and promote performance such sticky notes for memory reminders; signs in the home to provide directions; and labels to identify contents of drawers and cabinets.

Caregiver Role in Home Modifications

In dementia care the client, or unit of care (dyad), includes both the person with dementia and the caregiver(s). Home-based care for persons with dementia relies heavily on informal caregivers (Struckmeyer & Pickens, 2016; van Hoff et al., 2010). Environmental press affects the caregiver as well as the person with dementia as they collaboratively participate in the co-occupation of caregiving/care receiving. Showering is an example of an activity that often requires the caregiver and person with dementia to collaborate. The environmental press may

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come from the temperature of the room, the amount of space in the room, or the abilities of either person to access supplies and complete the task.

Occupational Adaptation Theory views the caregiver as part of the environment. The press and demand for mastery from the environment may come from the caregiver's desire to successfully complete the caregiving tasks. In the home modifications process the caregiver is both part of the caregiver/client dyad as well as part of the client's environment. This dual role of the caregiver in the home modifications process requires an adaptive response to lead to function and mastery in the caregiving role.

Caregiver stress and depression are barriers to the implementation of home modifications (Chee et al., 2007: Lach et al., 1995). Caregiver stress may increase as dementia progresses. As the person with dementia's adaptive capacity declines the caregiver's adaptive capacity also needs to reciprocate and can easily be overwhelmed by the burden of caregiving. Impaired function of persons with dementia is a significant predictor of caregiver stress and burden (Kim, Chang, Rose, & Kim, 2012). Caregiver stress often leads to nursing home placement for persons with AD and other forms of dementia (Alzheimer's Association, 2015).

Caregivers report they want more training in home modifications (Gitlin et al., 2005; Horvath et al., 2005; Lach et al., 1995), including ideas for specific problems and where to obtain equipment and services (Horvath et al., 2005; Lach et al., 1995; Lach & Chang, 2007; Sheldon & Teaford, 2002). Caregivers prefer collaborative, client-centered decision making (Gitlin & Chee, 2006; Smith, Lauret, Peery, & Mueller, 2001; Struckmeyer & Pickens, 2016). Training and home modifications interventions may reduce caregiver burden and maintain the person with dementia at home. Decisions on whether or not to implement home modifications are often made by the caregiver (Gitlin & Chee, 2006; van Hoff et al., 2010). As dementia progresses the modifications

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may be aimed at supporting caregivers (Mann et al., 1996; van Hoff et al., 2010). This is especially true in the later stages when modifications may include assistive devices such as Hoyer lifts and wheelchairs (Mann et al., 1996).

Home Modification Assessments

The home modification process, guided by the use of a systematic home assessment, may influence quality of life, patient independence, and number of falls (Barras, 2005), promoting aging in place for persons with dementia. A home modification assessment tool specific to the unique needs of persons with dementia and their caregivers is needed to address aging in place for this growing population.

Several home safety assessments frequently used in practice and research in the occupational therapy literature include the Westmead Home Safety Assessment, In-Home Occupational Performance Evaluation (I-HOPE), Safety Assessment of Function and the Environment for Rehabilitation-Health Outcome Measure and Evaluation (SAFER-HOME), and Home Environmental Assessment Protocol (HEAP). Of these, the HEAP (Gitlin & Corcoran, 2005) is the only tool specific to caregivers of persons with dementia. Two other home assessments, less frequently found in the literature specific to persons with dementia, include the Home Safety Inventory and Home Safety Checklist. Many home assessment checklists that are agency or locally developed are easily found in the public domain but do not have published psychometrics.

The Westmead Home Safety Assessment (WeHSA) is designed to assess environmental hazards specific to fall prevention (Clemson, Fitzgerald, & Heard, 1999). The WeSHA has 72 fall hazard categories that are broken down into more specific items. Items include walkways in and out of the home, seating, footwear, and medications. Items are first identified as "relevant" or

"not relevant." Relevant items are then rated as a "hazard" or "not a hazard." Hazards are categorized and summarized to form an intervention action plan (Clemson, 1997). This tool is designed to be used with other assessment tools as the physical environmental piece of a comprehensive occupational therapy evaluation. The WeSHA has a manual that is part of the *Home Fall Hazards* book (Clemson, 1997). This assessment has published validity and reported good inter-rater reliability. Inter-rater reliability is reported to have a Kappa of > 0.40 for all items (Clemson, Fitzgerald, Heard, & Cumming, 1999). Content validity was established through literature review and expert opinion. Expert opinion was calculated using the content validity index (CVI) and was 0.78 (Clemson, Fitzgerald, & Heard, 1999).

The In- Home Occupational Performance Evaluation (I-HOPE) is a measure of activity performance in the home. The I-HOPE is a card sort task where clients look at 42 pictures of daily activities then rate their personal level of performance, level of self-satisfaction with task performance, and identify the severity of barriers in their home (Stark, Sommerville, & Morris, 2010). Pictures include daily activities such as doing the laundry, taking a shower, and reaching into an overhead cabinet. The I-HOPE requires the participant to sort picture cards to identify daily activities in the home that are difficult now and daily activities the client anticipates will be difficult in the future. Tasks identified as difficult are prioritized by the client and physically assessed at the time of evaluation. The I-HOPE is manualized and has published reliability and validity. Inter-rater reliability has an ICC range of .94 to 1.0. Content validity is based on a review of 250 cases and a review of the literature. Internal consistency of the subscales ranged from .76 to .96 (Cronbach's Alpha). Convergent validity positively correlated with the motor items of the Functional Independence Measure at $r = .54$ ($p < .000$) (Stark et al., 2010).

The SAFER-HOME v.3 is a home safety assessment outcome measure which involves the therapist walking through and observing performance in each room of the home with the client and caregiver (if there is one) (Chiu & Oliver, 2006). The SAFER-HOME v.3 is designed for adult and geriatric persons who have physical, mental, or problems and is not limited to a specific diagnosis, functional problem, or environmental issue. The SAFER-HOME v.3 consists of 74 items rated on a zero to three scale, ranging from "no problem" to "severe problem." Categories assessed include (a) living situation; (b) mobility; (c) environmental hazards; (d) kitchen hazards; (e) household tasks; (f) eating; (g) personal care; (h) bathroom and toilet; (i) medication, addiction, and abuse; (j) leisure; (k) communication and scheduling; and (l) wandering. An advantage of the SAFER-HOME for people with dementia is that it does consider cognitive function in regards to safety with items such as medications and access to hazardous materials. The SAFER-HOME v.3 is manualized. Published reliability and validity is for previous versions. A factor analysis was done on the first version and it was then revised. Version two had an internal consistency coefficient alpha of 0.86. Divergent validity had a low correlations between the 93 item SAFER-HOME v.2 and the Functional Autonomy Measuring System with $r = -0.206$ ($p = .018$). This supported that as a home assessment the SAFER-HOME v.2 was not related to function (Chiu & Oliver, 2006).

Home modification assessments specific to dementia. Three home assessments specific to dementia were identified in the literature: the Home Safety Inventory, Home Safety Checklist, and Home Environmental Assessment Protocol. The Home Safety Inventory has a list of thirteen activities and hazardous behaviors (Lach et al., 1995). Examples of the activities assessed were cooking, eating, and smoking. The Home Safety Inventory was developed for a phone interview study with caregivers of persons with AD. Caregivers were asked to identify if the activity or

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behavior was an accident/problem area and if they had taken precautions during that activity. Content validity was based on literature review and caregiver interviews. No other psychometrics were reported.

The Home Safety Checklist (HSC) includes 64 items and was developed to measure overall home safety. Each item was scored on a 1 to 4 scale ranging from no safety issue to safety modification needed. Scores were summed with totals ranging from 5 to 256 (lower scores indicate better home safety). The items on the assessment were designed to reflect the research intervention that it was developed to measure. The intervention was to provide persons with AD a home safety toolkit that included educational materials and assistive devices such as smoke alarms, colored duct tape, and grab bars. Examples of items on the HSC were not available as this tool has not been published. The HSC was reported to have good preliminary psychometrics. Inter-rater reliability was $r = 0.80 - 0.85$ and internal consistency reliability was $\alpha = 0.84$ (Horvath et al., 2013).

The Home Safety Inventory and the Home Safety Checklist, while specific to dementia, narrowly focus on home safety. The HEAP has a theoretical foundation and considers home safety and enhancement of occupational performance. In addition to assessing safety hazards, the HEAP offers the additional domains of adaptations, visual cues, clutter, and comfort which support the person with dementia at home.

The Home Environmental Assessment Protocol (HEAP) was used as part of The Home Environmental Skill-Building Program (Gitlin & Corcoran, 2005). The Home Environmental Skill-Building Program (ESP) is a program for individuals with dementia and their families. ESP was designed as an occupational therapy intervention to address the role of the physical and social environment in managing activities and care at home (Gitlin et al., 2002). The HEAP (see

Appendix B) has 192 items in domains that address safety hazards, adaptations, visual cues, clutter, and comfort. Removal of safety hazards and clutter and the additions of adaptations and visual cues have been shown to support persons with dementia (Gitlin et al., 2002). Administration of the tool involves the therapist and the caregiver walking through eight areas of the home to access the domains. Comfort is only assessed in the living area and bedroom.

The HEAP is lengthy, lacks a client-centered approach (does not include the person with dementia, only the caregiver), and is not used in clinical practice. This tool does consider caregiver input, visual cues, and comfort, all of which are important concepts in home modifications for persons with dementia. The HEAP has preliminary psychometrics for inter-rater reliability and validity. Content validity ($n = 8$) was established by a panel of experts. Revisions were made and agreement was obtained, noting that any one condition of the environment may overlap into more than one dimension (Gitlin et al., 2002). Inter-rater reliability ($n = 4$, in 22 homes) for hazards ranged from $r = 0.36$ to 0.66 across rooms. ICC's for adaptations, clutter, and comfort ranged from $r = 0.51$ to 0.90. Convergent validity examined the relationship to the HEAP to the Mini Mental Status Exam and ADL dependence. Fewer hazards, more adaptations, and less clutter were associated with lower Mini Mental Status Examination scores. ADL dependence was associated with more adaptations in the dining room ($r = -0.080$, $p = 0.001$), kitchen ($r = -0.052$, $p = 0.02$), and bedroom ($r = -0.76$, $p = 0.001$).

The focus of the HEAP on both quality of life and occupational performance, as part of the ESP, is developed from multi-theory approach (Gitlin & Corcoran, 2005). Theories and models used in the development of the ESP and HEAP are a stress-health process model, a triadic model, a theory of personal control, a disablement model, and environmental models. The Stress-Health Process model as cited in Gitlin and Corcoran (2005) identifies that primary stressors in

dementia caregiving are external. These external stressors include events in the social and physical environments as well as occupational performance and behaviors of the person with dementia (Gitlin & Corcoran, 2005). The triadic model illustrates the interaction of the person with dementia, their caregiver, and their physical and social environments. Personal control theory addresses the caregiver's desire for mastery. Caregiver concerns are included in the HEAP so that caregivers can gain control through activities such as modification the environment. The disablement model of dementia-related behaviors is used to explain the progressive nature of dementia (Gitlin & Corcoran, 2005). Environmental models were also used to establish the theoretical tenets of the HEAP. Lawton's work on competence–environmental press supports understanding the interactions between the person with dementia and the external environmental demands (Gitlin & Corcoran, 2005). The external environment is viewed as shaping behavior, a match (or mismatch) of the individual with the environment can support or inhibit competence (Lawton, 1982).

Revision of HEAP to HEAP-R

The *Occupational Therapy Practice Guidelines for Home Modifications* identify that the foundational skills of occupational therapy in home modifications assessment and intervention should include application of theoretical perspectives (Siebert et al., 2014). The incorporation of Occupational Adaptation Theory into the design of the HEAP-R seeks to meet the need of an occupational therapy based theoretical perspective in this instrument. The theories incorporated from the HEAP include a stress-health process model, a triadic model, a theory of personal control, a disablement model, and environmental models (Corcoran & Gitlin, 2005). The HEAP-R seeks to be a systemic tool for evaluation of the environment as the caregiver and person with dementia work together to adapt to the progressive nature of cognitive decline in dementia.

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Assumptions of the theories used in revision of HEAP-R include that persons (the caregiver and the person with dementia) desire mastery in the caregiving relationship.

To improve clinical utility, the HEAP-R length was reduced from 34 pages to 2 pages and probing questions were removed. The assessment form was reformatted for ease in use. An unpublished pilot study ($n = 6$ occupational therapists) on the first revision (Struckmeyer, 2014) provided preliminary data that the HEAP-R1 had clinical utility for assessing the home modification needs of persons with dementia. Participants reviewed the assessment tool and responded to an internet survey of six questions rated on a four point Likert scale and four open-ended questions. Participants agreed the HEAP-R1 was well laid out, was thorough, was a comprehensive assessment of the physical environment and appeared easy to use in the home setting. Participants also agreed the tool promoted collaboration between the therapist and caregiver.

The original HEAP was intended for use by both occupational therapists and non-experts (Gitlin et al., 2002) whereas the HEAP-R is intended to provide a standardized assessment for use by occupational therapists. Occupational therapists are trained and qualified to conduct home assessments (Siebert et al., 2014). The systematic organization of the HEAP-R may assist both the novice home care occupational therapist and the experienced home care occupational therapist in administration. The removal of HEAP probing questions allows for a more client-centered approach in which questions can be customized for each dyad and each home.

The format of the HEAP-R modifies columns so therapists can easily score each domain in the column matched to each area of the home. In the original HEAP, pages are flipped as first hazards are scored, followed by adaptations, visual cues, clutter, and lastly comfort where applicable. The HEAP-R maintains an additional area under the room heading where the

evaluating therapist can identify client/home specific items and maintains columns for comments related to each area of the home assessed. In addition to the eight areas of the home assessed in the HEAP, the HEAP-R adds a section for another area (other) since time may be spent in a basement, an office area, or a sunporch/lanai.

The HEAP-R differs from the HEAP in the inclusion of the person with dementia in the home walk through if he or she is physically able to participate with the intention to identify potential hazards that would not have otherwise been noted for example, when a person with dementia used a broom that was next to doorway as a "grab bar" when walking up a step into the home. A broom resting along the wall may not have been identified as a hazard if the person with dementia had not been observed using it. The inclusion of the person with dementia in the home walk through also addresses participation, a key concept of occupational therapy and a goal of the home modifications process.

The complementary theories used in the development of the original tool HEAP add strength to the revised tool. The HEAP-R further incorporates Occupational Adaptation theory in that it provides opportunity for the dyad to identify environmental barriers of concern, environmental supports, and unmet needs. Occupational Adaptation Theory suggests that increased function results from adaptation. Opportunities for the caregiver and client to identify barriers, supports, and unmet needs could be expected to promote adaptation. The HEAP-R has a section for the occupational therapist, caregiver, and person with dementia to collaboratively identify other environmental supports and unmet needs that were not observed or discussed in the walk through. The final section of the HEAP-R is for recommendations prioritized by the caregiver/care recipient dyad.

Significance of Study for Occupational Therapy

As the number of persons with dementia continues to rise so will the need for occupational therapy services that promote aging in place, such as home modifications. There is a need for interventions related to the home environment and aging in place (van Hoff et al., 2010). Gitlin (2003) identified the need for development of measures that evaluate adaptive responses and the specific person and environmental characteristics that contribute to aging in place. This research seeks to add to this needed base of knowledge.

The American Occupational Therapy Association has identified home assessment as a critical area for research (AOTA, 2014b). Evidence-based practice in occupational therapy requires the use of assessment tools that have good clinical utility as well as sound psychometric properties and the ability to show outcomes. This dissertation examined the psychometric properties of the HEAP-R and proposes future research opportunities to examine the clinical utility and use of the tool as an outcomes measure. The original HEAP is a reliable and valid tool that has been used in research to study the home environment of persons with dementia; however it has not been adopted into use by occupational therapy practitioners. There is minimal occupational therapy literature specific to home modifications for individuals with dementia and their caregivers (Struckmeyer & Pickens, 2016). Assessment tools are needed to evaluate and support the need for occupational therapy services in home modifications specific to the dementia population. Where a valid and reliable tool exists, shorter versions that have fewer questions and take less time may have advantages for clinical and research use (Jogi et al., 2011). The revision of the HEAP into the HEAP-R seeks to meet these needs. When asked permission by this author to revise the HEAP the author stated the tool was "cumbersome" and provided permission to revise it (L. Gitlin, personal communication, February, 25, 2014). The revision was initiated in

spring 2014 during coursework related to instrumentation and has been continually developed and examined to develop a more clinically useful tool.

Research Questions

The research questions and hypotheses for this proposed study on the Home Environmental Assessment Protocol – Revised (HEAP-R) were:

1. Is the content of the HEAP-R valid?

    The hypothesis stated that the HEAP-R would have a content validity index of 1.00 if N = 5 or fewer raters, at a significance level of .05.

2. Does the HEAP-R have significant inter-rater reliability?

    The hypothesis stated that the HEAP-R would have an inter-rater reliability of .70 or greater ($\alpha \geq .70$) set at a significance level of .05

3. Does the HEAP-R have significant test-retest reliability?

    The hypothesis stated that the HEAP-R would have a test-retest reliability correlation coefficient of .80 or greater ($r \geq .80$) set at a significance level of .05.

4. Does the HEAP-R have a significant association with the previously validated HEAP?

    The hypothesis stated that the HEAP-R would have a positive correlation to the HEAP at .07 ($r > .70$) set at a significance level of .05.

The context validity index was set at 1.00 based on Lynn's (1986) recommendation that for five or less experts all must agree on the content validity for their rating to be considered reliable. Scores of three or four on a four point Likert score of relevance are considered agreement. If $N = 6$ the recommendation changes to a CVI of .83 for validity and if $N = 7$ the recommendation changes to .78 (Lynn, 1986).

When considering rater agreement Krippendorff's Alpha a minimum of .67 is considered acceptable with .80 considered the norm for good reliability (DeSwert, 2012). Inter-rater reliability was set at $\alpha \geq .70$. When considering test-retest reliability, the instrument should have correlation coefficient of $r \geq .90$ if it will be used for decision making (McDowell, 2006) and .70 is acceptable if the instrument is to measure progress (Kielhofner, 2006; McDowell, 2006). The correlation coefficient for test-retest was set at .80 to aim for the ability of the HEAP-R to be used to measure progress and potentially for use in clinical decision making. When considering concurrent validity, a correlation coefficient of .31- .59 is considered adequate and a correlation coefficient of $r > .60$ is considered excellent (www.rehabmeasures.org/rehabweb/rhstats.aspx). Considering this is a modified version of the same test the concurrent validity correlation coefficient was expected to be slightly higher than adequate so was set at 0.70 or greater.

CHAPTER III

METHODS

To study the psychometric properties of the Home Environmental Assessment Protocol - Revised (HEAP-R) the content validity, inter-rater reliability, test-retest reliability, and concurrent validity were examined. Content validity was examined by a review of theoretical underpinnings, literature review, and expert review of the HEAP-R. Inter-rater reliability was examined by occupational therapists scoring the assessment through video recordings and comparison of scores across raters. Test-retest reliability was examined by the same therapists scoring the video recordings approximately two weeks after first scoring. Concurrent validity was examined through administration of the HEAP- R followed by administration of the HEAP. Theoretical relevance was addressed through follow up phone interviews with the caregiver participants, asking about their relative mastery related to the HEAP-R assessment process.

Content Validity

Most validity studies begin with content validity. Content validity measures the adequacy of an instrument to capture the domains it seeks to measure (McDowell, 2006). For example in the HEAP-R the domain of hazards includes content in several living areas of the home and items such as flooring and lighting. An important part of content validity is to identify if all relevant content is included (McDowell, 2006).

Participants

The authors of the original HEAP were consulted during the initial revision process and were invited to be expert reviewers during this research phase. Inclusion criteria for additional experts were presentations and publications on the topic of home modifications and dementia

care. These experts in home modifications or dementia were identified through literature review and previous professional presentations attended by the researcher. Recruitment was by email to nine potential participants.

Instrumentation

For content validity, a web-based survey was used for data collection. Expert reviewers were provided with a link to a 10 question content validity survey (See Appendix D) located in PsychData.com. PsychData is a secure online platform for conducing survey research. This web based survey instrument was developed specifically for this study based on the scale described by Lynn (1986) for establishing content validity. The survey questionnaire asked about each domain of the HEAP-R. A content validity index (CVI) was derived from the responses by using a 4-point ordinal rating scale to rate each domain. Choices were: 1= Not Relevant, 2= Unable to assess relevance without item revision (or item in need of such revision that it would no longer be relevant, 3= Relevant but needs minor revisions, and 4= Very relevant. In addition to the seven scale questions the survey included three related open-ended questions to ensure all areas of content validity had been addressed.

Procedures

The methods to address content validity were a review of literature related to the original HEAP, current literature published since its development, and expert ratings of content validity. The literature was searched to identify new literature on home modification for persons with dementia and the specific domains of the HEAP-R. A scoping review of home modifications for people with Alzheimer's disease was completed in summer 2014 (Struckmeyer & Pickens, 2016). Chapter 2 includes further updates in the literature that explored hazards, adaptations, visual cues,

clutter, and comfort and how these domains relate to home modifications for people with dementia.

Institutional review board approvals (See Appendix C) were obtained from Texas Woman's University (TWU) and the University of Florida (UF), where the researcher is a full time faculty member. Following both approvals, potential expert participants were emailed and asked to participate. The email included a copy of the HEAP-R and a link to the content validity survey questions. Participants were asked to respond within two weeks. A reminder email was sent at the two-week time period. This research used a web-based survey as described in the above instrumentation section. Based on the results of research findings, the decision to revise and any revisions were made by this researcher and research mentor.

Data Analysis

Data analysis of the literature review was done with a matrix analysis as described by Garrard (2013). A review matrix is a table with rows that list articles down the left side and columns that summarize the main topics (Garrard, 2013). The review matrix was used to organize the literature for synthesis.

Data analysis of the survey responses was a computation of the index of content validity as described by Lynn (1986) and qualitative analysis of open ended questions. From the survey results a content validity index was determined for each domain and the overall HEAP-R tool. The proportion of items that received a rating of three or four made up the actual content validity index (Lynn, 1986) of each domain and the overall HEAP-R relevance score. The total CVI was arrived at using the method described by Polit and Beck (2006) in which item CVI scores are summed and averaged. Quantitative data were organized into an Excel spreadsheet for analysis. Qualitative data from the open-ended questions were included on the same spreadsheet and

examined with deductive analysis, as described by Patton (2002), to verify the fit or misfit of items on the HEAP-R. Results were discussed with the research mentor for confirmation of themes.

Reliability

The reliability of an assessment tool refers to the consistency of the instrument to yield the same results when repeated by different raters and when it is administered on different occasions. The two types of reliability examined as part of this dissertation were inter-rater reliability and test-retest reliability (also referred to as stability). Inter-rater reliability was used to assess the degree to which different raters give consistent scores on administration of the same tool (Agresti & Finley, 2013). Test-retest reliability was used to assess the stability of the test from one time to another. It assumes that no conditions have changed. In a home evaluation, conditions are expected to change from one time to another. To account for this potential change the same videos of the home environments were used to assess stability.

The same participants and the same videos were used to examine inter-rater reliability and test-retest reliability. Sample sizes of 20 participants and 10 homes video records were established by the researcher and committee chair after consultation with a statistician and committee members. Institutional review board approvals were obtained by TWU and UF (See Appendix C). Informed consent was received on the first page of the online response system, PsychData. An addendum to both TWU and UF's IRB's was later approved (see Appendix C) to add additional recruitment methods and an online training.

Participants

The goal was to recruit 20 participants. This was a convenience sample with regional differences. Inclusion criteria were English literacy, experience in working with dementia patients

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in the home, and licensed occupational therapists. Expert reviewers from the content validity study were excluded from participation in the inter-rater reliability study. The demographic data collected from participants was number of years' experience in occupational therapy, number of years working with dementia patients in home, state of licensure, and level of occupational therapy education. Demographic data was analyzed using descriptive statistics.

Participants were recruited through four methods. The first group was recruited from participants in attendance at the Vanderkooi workshops (TWU Dallas campus, February 8, 2016). The second group was attendees at the North Central Florida Occupational Therapy Forum on February 16, 2016. The third group was comprised of Gainesville, Florida area occupational therapists who expressed interest in this research but where not part of the Forum. This training was held at the University of Florida on March 10, 2016. A fourth method, online training, was approved and implemented. The online participants were recruited through the TWU doctoral network, through a home modifications group this researcher participates in, and through snowballing.

Homes

Ten home environments were video recorded. The five areas of the homes recorded were the main entrance, the living room, the kitchen including the eating area, the primary bedroom, and the primary bathroom. This was a convenience sample with regional differences. Home videos were from California (1), Florida (4), Illinois (2), Missouri (1), Oklahoma (1), and Wisconsin (1). No persons were in the recording and no physical address or city was attached to the recordings. Each home owner signed a consent form agreeing to have the home video recorded. The geographic state of each recording was not made known to participants in the study. Each home video was given an identification number for tracking and data collection

purposes. A video recording checklist (See Appendix E) for what to include in the recording was used to ensure consistency in recordings.

Instrumentation

For the reliability studies, data were collected on the hazards, adaptations, visual cues, and clutter domains. Participants watched 10 videos of home environments, through unlisted YouTube™ links, and scored the assessment. Scoring was completed through PscyhData. Items from the HEAP-R were embedded as survey questions to score each home video.

Procedures

Inter-rater reliability. To address inter-rater reliability, the participants attended a training session, either in person or online. Both trainings included a PowerPoint and an 11-minute training video. Participants then completed a competency quiz until reaching a 90% or better score (Appendix F), and practiced scoring three HEAP-R assessments. Online only participants read through the same training PowerPoint and scored the same three practice home assessments and completed the same competency exam. Questions were answered in person and through email and phone calls. The only difference was that in person training participants had the benefit of hearing all the questions posed and participating in a discussion on the scoring of the practice videos. After successful completion of the training and competency exam participants were provided with links to the videos of home environments and PsychData survey. Participants were then able to log into PsychData and score the HEAP-R domains as they viewed video recordings of ten homes. Participants were able to log out and return to complete the study.

After the training presentations, the 11-minute training video was made available on demand through a YouTube™ link. Participants were able to review the training video as many

times as they wanted. The scoring of the videos was completed in a setting of the participants'

choice and at the participants' discretion.

Participants were asked to score the hazards, adaptations, visual cues, and clutter for each

home. The domain of comfort was not scored as part of the study as it includes a verbal opinion

and hearing the noise level of that room which was not audible in the video.

Test-retest reliability. Two weeks after initial ratings of the HEAP-R had been

completed the same participants were sent an email with the links to PsychData and the

YouTube™ unlisted playlist of home videos. Participants were asked to watch each video and

score it again. Participants had the opportunity to watch the training video again if needed. They

were given three weeks to complete this second viewing. A $50 gift card was provided to each

participant after completion of both parts of the reliability study.

Data Analysis

Inter-rater reliability. Demographic data were analyzed using descriptive statistics.

Analysis of inter-rater reliability was completed with Krippendorff's Alpha. This form of analysis

is used to measure the level of agreement between two or more raters. Krippendorff's Alpha can

be used with any number of observers, any number of participants, any levels of measurement,

and regardless of if there is missing data or not (Hayes & Krippendorff, 2007). Alpha = 1.00

indicates perfect reliability and no correlation when $\alpha < 0$. Data was nominal and ordinal.

Hazards, adaptations, and visual cues were scored with Yes or No (Yes = 1, No = 0). Clutter was

scored on an ordinal 0 - 2 scale (not cluttered = 0, somewhat cluttered = 1, very cluttered = 2) in

each room. Data were downloaded from PsychData into an Excel spreadsheet on a secure

computer, and then transposed for analysis. A log of the process for data matching among

participants and transposing was kept and checked by the statistician. Data analysis was

conducted using ReCal3 (http://dfreelon.org/utils/recalfront/recal3/). A TWU statistician was

consulted to ensure accuracy of data input and set up prior to running the analysis and again after

the analysis to verify accuracy of results. A second analysis of intra-class correlation coefficient

(ICC) was run on summed scores of each domain. ICC is not sample dependent and can reflect

the extent of agreement between raters (Kielhofner, 2006). ICC correlations range from .0 to 1.0.

For the summed scores clutter was collapsed into somewhat cluttered and very cluttered = 1 and

no clutter =0. The same TWU statistician was consulted throughout the second analysis.

Test-retest reliability. Analysis of test-retest reliability was done with Pearson's

correlation statistics. Pearson correlations form of analysis is typically used for test-retest

reliability studies (Agresti & Finley, 2013). Data were exported from PsychData into an Excel

spreadsheet. Data analysis was conducted using SPSS. The significance level was set at .05.

Guidelines used for interpreting correlation results were r .40 - .60 as moderate correlation, .60 -

.80 as strong correlation and .80 – 1.0 as very strong (Kielhofner, 2006). The analysis was run on

the summed scores of each domain. For the summed scores clutter was collapsed into somewhat

cluttered and very cluttered = 1 and no clutter =0. A TWU statistician was consulted to ensure

accuracy of data input and set up prior to running the analysis. A TWU statistician reviewed the

analysis to verify accuracy of results.

Concurrent Validity

Concurrent validity sought to examine the evidence that the HEAP-R concurs with the

HEAP. This was crucial since the HEAP-R is a revision of an existing tool, but is a shorter

version since the original instrument was considered too lengthy for use in home health practice.

Concurrent validity is generally assessed by administering both instruments at the same time

(McDowell, 2006). The HEAP-R and HEAP were administered in succession (refer to procedures for details).

Participants

Participants were 21caregiver/person with dementia dyads. They were recruited through flyers distributed at local Alzheimer's day centers, caregiver support groups, and dementia care professionals. Approximately half the participants were from Gainesville, Florida and surrounding areas and half were from Denton, Texas and surrounding areas. Inclusion criteria were that participants needed to be the primary caregiver of person with diagnosis of dementia; both caregiver and person with dementia were English speaking; both caregiver and person with dementia lived in home being assessed; and person with dementia was ambulatory (device allowed). Participants needed to be ambulatory so they could enter and participate in each of the rooms being evaluated in the home. Sample sizes for number of participants were provided to this researcher after consultation with a TWU statistician. Given that they were versions of the same tool, the statistician estimated a somewhat large effect size ($r = .500$), so with power set at .80, 21 dyads/homes were needed (G*Power 3.1.9.2).

Instrumentation

For the concurrent validity study the Home Environmental Assessment Protocol (HEAP) and the Home Environmental Assessment Protocol –Revised (HEAP-R) were used for data collection. Both instruments were described in detail in the previous chapter and are included in the appendices (See Appendices A & B).

Procedures

After IRB approval by TWU (See Appendix C), caregivers were informed of procedures and asked to sign the consent form. This study was exempted from UF approval by the UF IRB

01 office (See Appendix C). Participants consented to both the home visit and the follow-up phone call. Caregivers were provided with a $25 gift card at the completion of the home visit.

Two assessments were administered by the primary researcher. The HEAP-R was administered first. The reason it was first was twofold; first, as a shorter version it did not have embedded many of the probing questions of the HEAP. Thus using the HEAP first would invalidate the results of the HEAP-R. The administration protocol was followed for each assessment.

Administration of the HEAP-R was 20-30 minutes and the HEAP was 45 minutes. Total visit lengths for administration of both tools took approximately one hour to one and a half hours including rest breaks as needed. The HEAP-R required participation from the caregiver and when willing the person with dementia. Only the caregiver was asked to participate in the HEAP walk through, although the person with dementia was allowed to walk through if interested in doing so.

Data Analysis

Analysis of concurrent validity was completed with Pearson correlations (r) across total domain scores. Pearson correlations were used as both variables were measured using interval scales. Yes equaled 1, No equaled 0 for hazards, adaptations, visual cues, and comfort. Clutter was scored on a 0 - 2 scale (not cluttered = 0, somewhat cluttered = 1, very cluttered = 2) for level of clutter in each rooms. Total scores from the HEAP-R domains of hazards, adaptations, visual cues, clutter, and comfort were scored and compared to the respective domains of the HEAP for analysis. Data analysis was conducted using SPSS with significance level set at .05. A TWU statistician was consulted to ensure accuracy of data input and set up prior and after running the analysis and again after the analysis to verify accuracy of results.

Theoretical Relevance

A follow-up phone questionnaire sought to assess if the HEAP-R has potential to result in caregiver adaptation as measured by relative mastery. Relative mastery is an Occupational Adaptation theory concept that refers to an individual's perceptions of their effectiveness, efficiency, and satisfaction regarding their responses to an occupational challenge (George, Schkade, & Ishee, 2004). The occupational challenge was participation by the caregiver in the assessment process and use of knowledge and recommendations to make changes to their homes.

Instrumentation

Data collection for the follow-up phone interviews was completed on the Follow up Phone Call Questionnaire (see Appendix G). This instrument was developed for this study. It was based on the Relative Mastery Measurement Scale (George et. al., 2004). The questionnaire consisted of four Likert scale questions and one open-ended question that were administered over the phone.

Procedure

Two weeks after the administration of the HEAP-R and the HEAP the caregiver received a follow-up phone call from a research team member (not the PI). The caregiver was asked six guided interview questions (see Appendix G) about his or her relative mastery following the time period since the administration of the assessments.

Data Analysis

For the follow-up phone calls, descriptive statistics were used for analysis of the first four questions. Nineteen of the possible 21 participants responded in the phone interviews. Open-ended responses from participants were transcribed and organized into coded into themes as described by Patton (2002). This was completed by identification of key words into categories.

Once completed a second research team member reviewed the data, key words, and themes to

ensure the credibility of the coding procedure.

CHAPTER IV

RESULTS

This chapter will include the results to answer the four research questions examined in this dissertation. The four main questions were related to the content validity, inter-rater reliability, test-retest reliability, and concurrent validity of the HEAP-R. Also included in this section are the results of theoretical relevance follow up phone calls with concurrent validity participants.

Content Validity

Seven of the nine experts recruited responded to a survey that included review of the HEAP-R. This resulted in a response rate of 78 %. Participants had varying degrees of experience as shown in Table 1. The educational level of the experts varied. Four experts held doctorates; two held master's degrees, and one held a bachelor's degree.

Table 1

Demographics of Content Validity Experts

	<5	6-10	11-15	>15
Years of experience with home modifications	2	-	-	5
Years of experience in dementia care	1	1	2	3

Note. N = 7.

Research Question One: Is the Content of the HEAP-R Valid?

To answer this question the literature was reviewed and a content validity index (CVI) was developed. The literature review is included in Chapter 2. The hypothesis stated the HEAP-R would have a content validity index of 1.00 if $N = 5$, at a significance level of .05. The CVI was 1.0 for hazards, adaptations, visual cues, and clutter; and 0.86 for comfort. The experts were asked to rate the overall relevance of the HEAP-R tool. Overall relevance CVI score was 0.86.

The total CVI for the HEAP-R tool based on the item scores is 0.98 as shown in Table 2. Ratings of both three (relevant) and four (very relevant) are considered relevant in calculating the CVI and count as a value of one for calculating the CVI. For this reason ratings of three and four were collapsed and both are identified as X in the table.

Table 2

Content Validity Index Relevancy Results

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Number in Agreement	Item CVI
1. Hazards	X	X	X	X	X	X	X	7	1.00
2. Adapt.	X	X	X		X	X	X	6	.86
3. Visual Cues	X	X	X	X	X	X	X	7	1.00
4. Clutter	X	X	X	X	X	X	X	7	1.00
5. Comfort	X	X	X	X	X	X	X	7	1.00
6. AD & fire safety	X	X	X	X	X	X	X	7	1.00
Entire HEAP-R	X	X	X		X	X	X	6	.86

Notes. N = 7. CVI = Content Validity Index. A rating of 4 is very relevant; a rating of 3 is relevant. Both are identified as X in the table. The sum of the item CVI divided by the number of items (6) results in an overall CVI of 0.98.

Experts also had the opportunity to add comments in the survey. Comments were coded into themes. Three themes emerged: the need for definition of domain terms, the need for clarity in filling out sections of the form, and the need for more space for comments. Appendix H illustrates the specific responses from experts, the themes identified, and the action taken. For example, to respond to the theme of a need for definitions of domain terms a quick start guide (See Appendix I) with definitions was developed as the first page of the HEAP-R.

These findings support the hypothesis that the HEAP-R would have a content validity index of 1.00 if $N = 5$, at a significance level of .05. A CVI of .78 or higher is considered to be content valid with a response from seven participants (Lynn, 1986). With $N = 7$ a content validity

index of .98 exceeds expectations. Based on these findings of the content validity study, the

research question is affirmed.

Reliability

Twenty-four therapists participated in scoring the home environment videos: 22

completed all 10 homes, one completed only 4 homes, and 1 completed only 3 homes.

(Additionally six people started the survey and consented, but did not complete one home. None

of their data were included.) Nineteen of the 22 participants completed the test-retest scoring.

Table 3

Demographics of Reliability Participants

Variable	n
State of residence	
Florida	12
Texas	6
Other	6
Highest level of education	
Bachelor's degree	3
Master's degree	17
Doctoral degree	4
Years of OT experience	
<5	2
5-9	4
10-14	6
15+	12
Years of dementia care experience	
<5	3
5-9	8
10-14	5
15+	8
Years of home care experience	
<5	14
5-9	9
10-14	0
15+	1

Note: N = 24.

This was a convenience sample with regional differences. Inclusion criteria were English literacy, experience in working with patients with dementia in the home, and licensed occupational therapists. The demographic data collected from participants were number of years' experience in occupational therapy, number of years working with patients with dementia in home, state of licensure, and level of occupational therapy education, as shown in Table 3.

Research Question Two: Does the HEAP-R Have Significant Inter-rater Reliability?

To answer this question occupational therapists viewed 10 home environment videos and scored the HEAP-R tool for each home. Data were then analyzed with both Krippendorff's Alpha and secondly with an intra-class correlation coefficient. The hypothesis stated the HEAP-R would have an inter-rater reliability of .70 or greater set at significance level of .05. Inter-rater reliability of individual homes included the domains of hazards, adaptations, and visual cues. The levels of agreement ranged from $\alpha = .178$ to $\alpha = .382$. Overall level of agreement for all 10 homes combined was $\alpha = .313$. The domain of clutter was analyzed separately as it was ordinal. The results of this analysis are displayed in Table 4.

Table 4

Krippendorff's α *Inter-rater Reliability*

	α	*n*
Home 1	.282	24
Home 2	.178	24
Home 3	.192	24
Home 4	.327	23
Home 5	.306	23
Home 6	.24	22
Home 7	.377	22
Home 8	.373	22
Home 9	.382	22
Home 10	.334	22
Homes 1-10	.313	22
Homes 1-10 clutter	.252	22

Notes. n varies as one participant competed only 3 homes and a second participant completed 5 homes. $p > 0.05$

Due to the low level of agreements between raters the home domains were analyzed to

determine if one domain was a problem area for rating. Levels of agreement for inter-rater

reliability for hazards ranged from α = .168 to α = .383. Agreement for adaptations ranged from α

= .019 to α = .516. Agreement for visual cues ranged from α = -.001 to α = .218. The results of

this analysis are displayed in Table 5. Domain totals for hazards and adaptations were consistent

with findings from combined domain results. However, the negative alpha results seen in some of

the visual cues domain indicate more disagreement than would be due to chance. Further

exploration of this result ruled out a recoding error.

Table 5

Krippendorff's α *Inter-rater Reliability by Domain*

	Hazards	Adaptations	Visual Cues	*n*
Home 1	0.32	0.233	0.218	24
Home 2	0.168	0.051	0.037	24
Home 3	0.22	0.034	-0.015	23
Home 4	0.235	0.335	0.233	22
Home 5	0.274	0.019	-0.001	22
Home 6	0.336	0.101	0.052	22
Home 7	0.245	0.516	0.018	22
Home 8	0.305	0.429	-0.009	22
Home 9	0.383	0.06	-0.019	22
Home 10	0.361	0.144	-0.02	22
Home 1-10	0.3	0.234	0.201	

Note. Clutter was analyzed separately in the first set of results.

After consultation with a TWU statistician and the dissertation committee chair a

decision was made to use an intra class correlation coefficient to analyze the inter-rater reliability.

For this analysis two participants (#15 and # 21) were removed due to a high number on N/A

responses as compared to other participants. All missing data were coded to be ignored for this

analysis. ICC scores ranged from .114 for home nine to .488 for home two. Based on these results

only home two had fair inter-rater agreement; all the other homes had poor agreement. Results of

this second analysis are displayed in Table 6.

Table 6

Intraclass Correlation Coefficient (ICC) Reliability

	ICC	*n*
Home 1	.363	22
Home 2	.488	22
Home 3	.345	21
Home 4	.336	21
Home 5	.178	20
Home 6	.265	20
Home 7	.178	20
Home 8	.283	20
Home 9	.114	20
Home 10	.157	20

Note. Significance set at the $p > 0.05$ level.

These findings do not support the expectations of the hypothesis. Based on these findings

of this inter-rater reliability study, the research question is not affirmed. The HEAP-R did not

show significant inter-rater reliability in this study.

Research Question Three: Does the HEAP-R Have Significant Test-retest Reliability?

To answer this question occupational therapist participants from the inter-rater reliability

study viewed the same ten home environment videos again and scored the HEAP-R again. The

hypothesis stated the HEAP-R would have a test-retest reliability correlation coefficient of 0.80

or greater ($r \geq 0.8$) set at a significance level of .05. The number of participants was fewer than

the inter-rater reliability analysis as three participants (#10, #18, and #21) did not complete the

test-retest portion and two participants' (#15 and # 21) data were removed due to a high number

on N/A responses compared to other participants. The total number of participants in this study

was 17.

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The Pearson correlation coefficient for overall test-retest reliability of hazards was very strong ($r = .820$, $p = .01$). Although significant overall, some home environment videos were not significant such as homes three, four, and six. The Pearson correlation coefficient for overall test-retest reliability of adaptations was very strong ($r = .887$, $p = .01$). Homes one and ten were not significant when examined individually. The Pearson correlation coefficient for overall test-retest reliability of visual cues was moderate ($r = .487$, $p = .05$), although homes two and five were higher when examined individually. The Pearson correlation coefficient for overall test-retest reliability of clutter was strong ($r = .696$, $p = .01$). Although significant overall, some home environment videos were weaker such as homes one, two, six, and ten. The results of this analysis are displayed in Table 7.

Table 7

Test-Retest Reliability Results Pearson r

	Hazards	Adaptations	Visual Cues	Clutter
	r	r	r	r
Home 1	.796**	.391	.407	-.117
Home 2	.512*	.723**	.627**	.133
Home 3	.405	.901**	.012	.684**
Home 4	.405	.818**	.350	.603*
Home 5	.716**	.876**	.234	.512*
Home 6	.374	.726**	.408	.020
Home 7	.630**	.727**	.592*	.410
Home 8	.651**	.612**	.168	531*
Home 9	.554*	.715**	.452	.797
Home 10	.867**	.403	-.062	.200
Homes 1-10	.820**	.887**	.487*	.696**

Note. $n = 17$. **Significance at 0.01. *Significance at .05.

These findings support the hypothesis for that the HEAP-R has significant test-retest reliability for the domains of hazards and adaptations. These findings are moderately significant for clutter but do not meet the expectations of the hypothesis that the relationship would be at a level of $r > 0.8$. The domain of visual cues did not meet the expectations of the hypothesis. Based

on the findings of this study the research question is affirmed for the domains of hazards and adaptations; the research question is not affirmed for the domains of verbal cues and clutter. However, the domain of clutter showed moderate significance, but it did not meet the level of expectation for this study.

Concurrent Validity

Concurrent validity was examined with 21 caregiver/person with dementia dyads from Florida ($n = 9$) and Texas ($n = 12$). Participants were recruited through two dementia caregiver support groups in the Denton, Texas area, and one in the Gainesville, Florida area. Additional participants in Florida were recruited through the researcher's personal contacts. Participant demographics are detailed in Table 8.

Table 8

Demographics of Concurrent Validity Participant Dyads

Variable	Caregiver n	Care Recipient n
Age		
< 50	1	0
51-60	2	0
61-70	8	2
71-80	4	5
81-90	4	11
>90	2	3
Gender		
Female	18	9
Male	3	12
Relationship caregiver to care recipient		
Spouse	14	
Adult child	6	
Grandchild	1	
Care recipient diagnosis*		
Alzheimer's disease		12
Lewy Body Dementia		3
Vascular Dementia		2
Frontal Lobe Dementia		1
Dementia (unspecified)		3

Note: $N = 21$. *Diagnosis as reported by caregiver.

Research Question Four: Does the HEAP-R Have a Significant Association With the Previously Validated HEAP?

To answer this question both the HEAP and the HEAP-R were administered in participants' private homes. The hypothesis stated that the HEAP-R would have a positive correlation to the HEAP at .70 or greater set at significance level of .05. Total scores for each domain were summed and total domain scores were analyzed using a Pearson correlation coefficient. The Pearson correlation coefficients for the HEAP and HEAP-R domains of hazards ($r = .792$, $p = .000$) and adaptions ($r = .742$, $p \leq .0005$) were strong. The Pearson correlation coefficient for visual cues was not significant ($r = .000$, $p = 1.00$). A result of 0 means there is no correlation. The Pearson correlation coefficients for clutter ($r = .843$, $p \leq .0005$) and comfort ($r = .958$, $p = .000$) were very strong.

These findings support the hypothesis that the HEAP-R has significant relationship to the HEAP for the domains of hazards, adaptations, clutter, and comfort. The domain of visual cues did not meet the expectations of the hypothesis. Based on the findings of this study the research question is answered affirmatively that the HEAP-R had a significant association with the previously validated HEAP, but the results did not affirm the question for the domain of visual cues which showed no correlation.

<div align="center">Theoretical Relevance</div>

Participants included 19 of the 21 caregiver/person with dementia dyads from Florida ($n=7$) and Texas ($n=12$). One set of participants did not answer repeated (four) phone attempts to contact them; for the other dyad, the caregiver did not recall the visit having been made. Results of responses from caregivers on the Relative Mastery Measurement Scale questions reported overall efficiency, effectiveness, and satisfaction with the assessment process as rated on the scale

of relative mastery. Effectiveness was consistently defined to participants as "that being, how effective was it in helping you think about changes to your home?" Caregivers had more difficulty responding to the question on how satisfied the person with dementia (care recipient) was with the process. For example, three caregivers stated they were unable to answer this question. One caregiver noted her husband was fully engaged in the process while another stated her mother had no idea what was going on. Ten of the 19 caregivers were able to provide a rating on care recipient satisfaction. With an n of 19, on a scale of 1-4, the mean was efficiency 3.89, effectiveness 3.63, and satisfaction of caregiver 3.79. With an n of 10 perceived satisfaction of the care recipient was 3.70.

From the question "What changes to the home environment have you made since the evaluation?" five respondents reported they had not made any changes. Six participants reported they had plans to make some changes. Examples of anticipated changes were doing something with the rug and adding signage (visual cues). Another caregiver planned to add a door alarm and to eventually hide the knives. One caregiver had made some changes and had plans for adding a handrail/post or ramp to the entrance. Nine participants reported they had removed or secured rugs. Other changes included moving cleaning supplies out of sight, adding foam tape to edge of the fireplace, and putting florescent tape on steps. All the modifications made were easily completed without cost or purchased at a local department store. One caregiver purchased a grab bar and then took it back. Two participants replied that that needed information on special anchors to install grab bars. The research team member who called had experience with home modifications so was able to provide this information to the caregiver during the call.

In response to the question "Are there any other comments you would like to share about the home assessment process you participated in?" eight participants affirmed the assessment

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process was helpful. Three participants stated they would have liked more information. Examples of information requested were provision of resources for obtaining equipment recommended, help with the next steps in caregiving, and a copy of the report. One participant wished she had had this assessment sooner in the Alzheimer's disease process. Another caregiver stated she would have liked a follow-up visit after she had time to think about the questions asked in the assessment. Other relevant comments included that the questions asked were "interesting, they made me think" and non-intrusive. Participants also stated the process was straightforward and the method was enjoyable.

CHAPTER V

DISCUSSION AND IMPLICATIONS

This dissertation examined the reliability and validity of the Home Environmental

Assessment Protocol-Revised (HEAP-R). Content validity of the HEAP- R was determined to be

excellent with an overall CVI of .98. Inter-rater reliability was weak for all domains. Test-retest

reliably was very strong for the domains of hazards and adaptations, strong for the domain of

clutter, and moderate for the domain of visual cues. Concurrent validity of the HEAP-R with the

HEAP was strong for the domains of hazards and adaptations, and very strong for the domains of

clutter and comfort. No correlation was seen for the domain of visual cues. Theoretical relevance

was examined for relative mastery. This chapter will discuss the interpretation and implications

of the results, the limitations of the studies, the implications for occupational therapy, and the

suggestions for future research.

Content Validity

Content validity was examined through literature review and establishing a content

validity index. The literature supported the importance of a client-center approach which included

collaboration and the caregiver (Struckmeyer & Pickens, 2016), in the HEAP-R both the

caregiver and care recipient (as able and willing) participate. The five domains of hazards,

adaptations, visual cues, clutter, and comfort were also supported in the literature. Compared with

the original tool, the HEAP-R had seven experts as participants to establish a CVI, the HEAP had

a panel of eight occupational therapists review items to establish its content validity through a

(Gitlin et al., 2002). The Westmead Home Safety Assessment was the only other home

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assessment that used a CVI to examine content validity and it had a CVI of .78 with nine raters. Content validity response rate was excellent and results confirm that the HEAP-R has excellent content validity.

Themes that emerged for participant comments were the need for definition of domain terms, the need for clarity in filling out sections of the form, and the need for more space for comment. Appendix H illustrated the specific responses from experts, the themes identified, and the action taken. From these themes the HEAP-R was slightly revised and will be manualized in the future. In response to the themes identified a one page quick start guide was developed and minor changes were made to the HEAP-R. The minor changes included reformatting the fire safety section to specifically identify the presence or absence of smoke alarms and adding a larger comment section.

Action taken to improve the content validity included the addition of the "quick start guide" to administration of the HEAP-R as a first page (See Appendix I). A recorded training video PowerPoint was developed to further improve understanding of terms and how to complete the HEAP-R. This addressed the first two themes of definitions and clarity. A comments section was added to the end of each section of the form to address the need for more space to write comments. In addition there are plans to make the HEAP-R into a fillable form for electronic use that allows for expansion of each area in the comments section and domains to automatically sum. The assistive device and fire safety sections were separated and a box to note if there are smoke detectors was added to fire safety.

Reliability

Reliability studies included inter-rater reliability and test-retest reliability. The five areas of the homes used in this study were the main entrance, the living room, the kitchen including the

eating area, the primary bedroom, and the primary bathroom. The domains assessed were hazards, adaptations, visual cues, and clutter. Any one condition of the environment may reflect multiple dimensions (Gitlin et al., 2002) and this can complicate decision making when scoring an evaluation tool. Examples of these are florescent color tape on the edge of a step or a bathroom nightlight, both are adaptations and visual cues. Clutter is sensory input in excess to the task (Gitlin & Corcoran, 2005). This is an interesting domain to score as it is very personal. Items in the home have symbolic meanings and may not be perceived as excessive to the people in the home but are considered clutter to an outside evaluator (Gitlin, 2003). Some therapists may consider items left out on a counter as enhancing performance by serving as a visual cue. Other therapists may consider any items left in view as distracting and, therefore, clutter. An example of this is grooming items left out on a bathroom counter. Clutter can also be a hazard when it results in over-stimulation or interferes with ability to navigate a pathway in the home (Corcoran & Gitlin, 1991).

Inter-rater Reliability

When interrupting Krippendorff's Alpha a correlation coefficient of 0.80 is considered good reliability test with a minimum of 0.67 still being acceptable (DeSwert, 2012). The inter-rater reliability results did not meet this minimum; the overall alpha was .313 for homes 1-10 and .252 for clutter. In the domain of visual cues five negative correlations resulted. A negative alpha means that the coders did worse than chance and may indicate some structural error exists (DeSwert, 2012). The most common structural error for a negative correlation is related to coding labels. Coding labels were rechecked and deemed to be accurate. The coding error can also be due to a misunderstanding between coders on how to score. For example, in one home a visual cue in the eating area was a sign on a closed door that said "Laundry" some coders identified this

as a visual cue in the eating area and others did not. It was not possible to re-contact and retrain coders to repeat this study. A second analysis was then completed using ICC. Again the results were poor, with the exception of one home that had fair agreement. The ICC scores confirmed the alpha scores for overall poor reliability of the HEAP-R when scored by watching home environmental videos.

Participant information is interesting in that while the majority of participants had over 10 years of experience in occupational therapy and in dementia care, the majority of participants had less than 10 years' experience in home care with 14 having less than 5 years of home care experience. Level of experience in home modifications was not identified. During the first five years of work in home modifications therapists may still be in the novice or advanced beginner stages of skill acquisition (DuBroc & Pickens, 2015).

Several participants mentioned the poor quality of the videos. They noted that the videos were "jumpy." Another potential concern was that although the videos and the scoring surveys were numbered, there was no mechanism built in to assure that the participant matched the correct video to the correct survey. This may have affected the ability to see hazards, adaptations, visual cues, or clutter. The reality of scoring hazards in a home is that everything has the potential to be a hazard if used incorrectly. Making the distinction of an actual hazard, potential hazard, or perceived hazard is even more difficult without the client present to observe performance. Scores may have been influenced by rater biases such as level of experience, training, or when a rater has shared characteristics with the client (or home) and may judge too harshly or too leniently (Kielhofner, 2006). Another potential area of concern when comparing therapist's ratings of the home environment is the personal meaning of home to the therapist as well as to the clients.

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The results of this study were compared with the inter-rater reliability of the HEAP which varied from slight correlation (-.019 for entrance transitions) to almost perfect correlation on individual items (Gitlin et al., 2002). It is interesting to note that the domain of visual cues was not reported on in the HEAP study. The HEAP was designed as an evaluative tool with ratings made independent of the individual (Gitlin et al., 2002) in contrast to an assessment approach that takes the individual into consideration. That said, in the HEAP study, done in the actual home, a researcher in the home had the opportunity to ask probing and clarifying questions, while in the HEAP-R study no persons were in the home environmental videos scored. The HEAP reliability study also relied on caregiver self-report to identify adaptations (Gitlin et al., 2002). Similar assessments of home safety reported higher inter-rater reliability than the HEAP-R. The I-HOPE had an ICC range of .94 to 1.0 (Stark et al., 2010), the WeSHA had a kappa $> .40$ (Clemson et al., 1999) and the Home Safety Checklist (HSC) had a correlation range of $r = 0.80 - 0.85$ (Horvath et al., 2013). All four (HEAP, I-HOPE, WeSHA, HSC) of these home safety assessment reliability studies were done in the home and with the client/participant present, unlike this HEAP-R study which was completed by viewing home environment videos. Occupational therapists are trained to consider the individual in context. Not being able to do so in this study may not have been a challenge to therapists when scoring from a video and without a client.

Test-Retest Reliability

When interpreting test-retest reliability Pearson's r should have a correlation coefficient of $r \geq 0.90$ if the assessment tool will be used for decision making (McDowell, 2006) and $r \geq 0.70$ is considered acceptable if the instrument is to measure progress (Kielhofner, 2006; McDowell, 2006). Based on the results of this study the HEAP-R shows potential to measure progress in the domains of hazards, adaptations, and comfort which all had very strong test-retest

reliability ($r > .80$) and met the hypothesis set in this dissertation. The domain of clutter had strong test-retest reliability ($r = .689$) but did not meet the expectation set in the hypothesis of this dissertation ($r \geq .80$). The domain of visual cues, with a moderate coefficient ($r = .487$) did not meet the expectations set in the hypothesis of this dissertation. Due to the progressive nature of dementia and the resulting needs of the client and the caregiver home modification is an ongoing process (Olsen et al., 1996), so may require re-assessment. The HEAP-R may have value for reassessment when re-assessed by the same occupational therapist, but the HEAP-R would need further development for reliability among different therapists.

Recommendations

Further training that includes a manual and case study examples may strengthen future inter-rater reliability. Based on the findings of the reliability studies it is recommendation that if the HEAP-R is to be readministered in the same home that it is done by the same occupational therapist. The use of video recordings for identifying hazards, adaptations, visual cues, and clutter in the home needs to be further examined and is not recommended at this time. The caregiver's presence and comments to clarify what is observed might improve the reliability. Results might be improved when the HEAP-R is manualized, scored by an occupational therapist trained in administration of the tool, scored in the home, and scored with the client and the caregiver both present.

<div align="center">

Concurrent Validity

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When considering concurrent validity, a correlation coefficient of $r > 0.60$ is considered excellent (http://www.rehabmeasures.org/rehabweb/rhstats.aspx). Concurrent validity of the HEAP-R to the HEAP was excellent ($r = .742 - .958$) for the domains of hazards, adaptations, clutter, and comfort. The domain of visual cues had no correlation. This demonstrates that for

these domains the relationship between this shorter revised version and the original HEAP is strong.

Kielhofner (2006) lists several reasons shorter versions of the same assessment are developed: the existing instrument may be too lengthy or costly to administer or not practical for use in the situation it was intended. All of these reasons apply to the HEAP-R. In home health care occupational therapists have multiple client factors, performance skills and patterns, and occupations to assess along with assessment of the context and environment (AOTA, 2014a). Typical evaluation sessions in the home last and are reimbursed at one hour. In addition, in home health care the patient (in this case the person with dementia) should be actively participating in the entire assessment process including the home assessment walk through. If a home assessment in too lengthy the patient may fatigue prior to completion of the evaluation.

The definition for scoring visual cues was compared for both tools and was very similar. The HEAP-R quick start guide stated "***Visual Cues*** *include pictures, labels, schedules, signs or arrows to a room, and placement of items in view for use. These would all be observable as you look around the room. If any visual cues are observed check the Yes box.*" The HEAP manual definition included more examples such as color contrast, short instruction lists, and mirrors. Further examination of visual cues' items on the HEAP included identification of mirror in bathroom and own chair or name at table, items this researcher did not identify as visual cues on the HEAP-R, in that they are standard in most homes and were in all of the 21 homes in this study. Visual cues are a specific type of adaptation for persons with cognitive decline dementia (van Hoff et al., 2010) therefore therapists might not be as familiar considering them in the home modification assessment.

The results of this HEAP-R study were compared with other concurrent validity studies evaluating shorter versions of the same form. In a study comparing the Berg Balance Scale (BBS) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) to shorter versions of the respective forms correlations were good to excellent ($r \geq .80$) (Jogi et al., 2011). The method used for comparing the longer form to the shorter form was to pull the results from the longer version versus administration of both as in the HEAP/HEAP-R study. In another study Bringhurst and Miller (2006) compared the shorter Outcome Rating Scale (ORS) to its counterpart, the Outcome Questionnaire - 45.2. Both tools are outcome measures for clients to track progress in intervention sessions. Items were reduced from 45 to four. Concurrent validity ranged from $r = .54$ to .69. Unlike the hypothesis of the HEAP/HEAP-R comparison that predicted high correlation, this study predicted that it was not reasonable to expect a very high coefficient between the two measures due to the shorter nature of the ORS. The comparison studies on the BBS, WOMAC, and ORS all concluded that shorter versions with good concurrent validity may be an advantage for clinical practice or research. This HEAP/HEAP-R study resulted in the same conclusion, that the shorter HEAP-R may be an advantage for clinical practice and research.

Theoretical Relevance

Research guides theory to be refined so that it can provide useful explanations in practice (Kielhofner, 2006). The theoretical relevance portion of this study sought to look at the theory of Occupational Adaptation in the home modification assessment process. A main assumption of Occupational Adaptation theory is that adaptation promotes function and interventions aim at promoting adaptiveness. Adaptive skills are required in the home modification process for persons with dementia due to the progressive nature of the disease (Olsen et al., 1996). The

Relative Mastery Measurement Scale (George et al., 2004) is the measure currently available to assess occupational adaptation and when used in this study showed that caregivers experienced a sense of relative mastery following the home modification assessment.

In addition to completion of the four item scale caregivers responded to a question about changes they had made following the assessment and had an opportunity to add any comments they had about the process. The changes caregivers made were all things they could easily do without leaving the home (pick up throw rugs) or items they could purchase relatively inexpensively (sticky tape, tub grab bars) at a local department store. Many caregivers noted the assessment was helpful and informative, and several requested more information, some of which was provided in the follow up calls. The importance of caregiver education was supported in the literature which notes that caregivers often lack the knowledge to manage the complexity of caring for someone with AD (Alzheimer's Association, 2015; Horvath et al., 2005; Lach et al., 1995).

Implications for Occupational Therapy

The American Occupation Therapy Association (2014b) identified home assessment/modification as a critical area for research. This dissertation provides a tool that can promote further research for home assessment of persons with dementia and their caregivers. Problems related to the home environment and aging in place have not been adequately addressed (van Hoff et al., 2010). The HEAP-R, a shorter version of the HEAP, can easily be administered in 20 minutes and provides the home health care occupational therapist a standardized assessment tool that would be reimbursable as part of the occupational therapy home health care evaluation.

Home modifications can increase independence, improve safety, and quality of life, while reducing health care costs to promote aging in place (Barras, 2005; Mann et al., 1996; Sanford et

al., 2002). The HEAP-R is a tool for occupational therapists that has potential to guide the home modifications recommendations that promote aging in place for persons with dementia. Caregiver stress has been identified as a barrier to implementation of home modifications (Chee et al., 2007; Lack et al., 1995). As the person with dementia's adaptive capacities decline the caregivers adaptive capacities need to increase. Caregivers identify the desire to keep the person with AD at home as the number one reason for deciding to provide in-home care (Alzheimer's Association, 2015). Caregivers of persons with dementia further identify the need for more information and knowledge to obtain and implement home modifications (Chee et al., 2007; Horvath et al., 2005; Lach et al., 1995). This study and the literature on caregiving support the need for caregiver education and follow up to support home modifications. Occupational therapists performing home assessments should schedule time for caregiver education and follow up.

Limitations

The use of videos in the reliability testing limited the client centered/collaborative approach. The home environment videos were not professionally recorded and the lighting was poor in some. The quality of videos may not have shown an area in the home that a physical presence in the home may have revealed. For example, this researcher saw a lock on a wine refrigerator in a kitchen island part that did not show up in a video. Another limitation of the reliability studies was the survey tool. If a participant signed out of the survey and later signed back in the survey restarted on the next survey page, not on the next item. This resulted in some missing data. A third limitation of the reliability studies was the variation in training. Participants who attended trainings in person had the benefit of group discussions, questions, and answers. Online participants only had access to this researcher for discussions, questions, and answers. A limitation of the concurrent validity study was that the same researcher did each assessment;

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findings from the HEAP-R administration may have influenced the results of the HEAP. As the researcher became increasing familiar with the HEAP some of the HEAP probing questions may have been inadvertently incorporated into the HEAP-R.

Future Directions for the HEAP-R

Many opportunities exist for incorporating the HEAP-R into practice and research. There are a number of steps to further develop the HEAP-R: First, the development of a HEAP-R training manual would further add to the training for administration of the HEAP-R. Second, additional inter-rater reliability studies are warranted including completing the ratings in the homes of persons with dementia. This could include the collaborative identification of barriers and supports for performance. Third, a study is indicated to examine if the HEAP-R can be used as an outcomes measure.

As part of implementing use of the HEAP-R into practice the form and a training module could be made available as on online resource for occupational therapists. Development of the form into a fillable form that can be completed on a tablet or laptop is in progress. The Fitness-To-Drive Screening Measure (http://ftds.phhp.ufl.edu/) is an example of how an assessment tool and training can be made available through free online access. A second part of implementing the HEAP-R into practice will be publications and presentations on the results of the validity and reliability studies completed for this dissertation.

Conclusion

In conclusion, this dissertation examined the psychometric validity and reliability of the Home Environmental Assessment Protocol–Revised. Four research questions were answered in this dissertation study:

- The HEAP-R was found to be a content valid tool.

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- Inter-rater reliability was poor for all domains. Further examination is needed to establish inter-rater reliability, preferably in the actual homes of persons with dementia versus by video as done in this study.

- Test-retest reliability was moderate for the domain of visual cues, strong for the domain of clutter, and very strong for the domains of hazards, adaptations, and comfort.

- Concurrent validity of the HEAP-R to the HEAP was excellent for the domains of hazards, adaptations, clutter, and comfort. The domain of visual cues had no correlation.

The domain of visual cues was consistently low except for content validity, showing that experts deemed this domain important to assess for people with dementia. However, clinicians had difficulty identifying the presence or absence of visual cues. This domain needs further exploration in future HEAP-R studies. Theoretical relevance follow up questions showed high levels of relative mastery as reported by caregivers. Caregivers reported the home assessment process was efficient, effective, and resulted in satisfaction to themselves and in most cases to the care recipient. Low cost, easy to implement changes to the environment were made as a result of the assessment process. As with any assessment tool it is up to the occupational therapist to synthesize the results and use clinical reasoning in interrupting them. The HEAP-R is intended to be only one piece of a full occupational therapy evaluation.

Future directions for incorporating the HEAP-R into research and practice abound. Aging in place with dementia is a priority research area and a desire of the majority of seniors caring for those with dementia. Further development of the HEAP-R can add to the knowledge needed in caring for persons with dementia at home. As the incidence of dementia continues to rise and as older adults desire to age in place occupational therapists will need standardized tools like the HEAP-R to assess homes, to guide interventions, and measure outcomes.

REFERENCES

Agresti, A., & Finley, B. (2013). *Statistical methods for the social sciences* (4th ed.). London,

England: Pearson Education Limited.

Alzheimer's Association. (2015). 2015 Alzheimer's Disease Facts and Figures. Retrieved June 8,

2015 from www.alz.org/facts/downloads/facts_figures_2015.pdf

American Association of Retired Persons. (2014). What is livable? Community preferences of

older adults. Retrieved July 14, 2014, from

http://www.aarp.org/content/dam/aarp/research/public_policy_institute/liv_com/2014/wh

at-is-livable-report-AARP-ppi-liv-com.pdf

American Occupational Therapy Association. (2014a). Occupational Therapy Practice

Framework: Domain and Process, 3rd ed. *American Journal of Occupational Therapy*, *68,*

S1-S48. doi:10.5014/ajot.2014.682006

American Occupational Therapy Association. (2014b). Research opportunities in the area of

productive aging. *American Journal of Occupational Therapy, 68,* 111-114.

doi:10.5014/ajot.2014.681003

Barras, S. (2005). A systematic and critical review of the literature: The effectiveness of

occupational therapy home assessment on a range of outcome measures. *Australian*

Occupational Therapy Journal, 52, 326-336. doi: 10.1111/j.1440-1630.2005.00496

Bringhurst, M. D. L., & Miller, S. D. (2006). The Reliability and Validity of the Outcome Rating

Scale: A Replication Study of a Brief Clinical Measure. *Journal of Brief Therapy*, 5, 23-

30.

Budson, A., & Solomon, P. (2012). New criteria for Alzheimer disease and mild cognitive

    impairment: implications for the practicing clinician. *The Neurologist, 18*, 356-63. doi:

    10.1097/NRL.0b013e31826a998d

Chee, Y., Gitlin, L., Dennis, M., & Hauck, W. (2007). Predictors of adherence to a skill-building

    intervention in dementia caregivers. *The Journals of Gerontology, Series A, Biological*

    Sciences and Medical Sciences, 62, 673-678. doi:10.1093/gerona/62.6.673

Chiu, T., & Oliver, R. (2006). Factor analysis and construct validity of the SAFER-

    HOME. *OTJR: Occupation, Participation and Health*, *26*, 132.

    doi: 10.1177/153944920602600403

Clemson, L. (1997). *Home Fall Hazards.* West Brunswick, Victoria: Co-ordinates Publications.

Clemson, L., Fitzgerald, M., & Heard, R. (1999). Content validity of an assessment tool to

    identify home fall hazards: The Westmead Home Safety Assessment. British Journal of

    Occupational Therapy, *62*, 171 – 179. doi: 10.1177/030802269906200407

Clemson, L., Fitzgerald, M., Heard, R., & Cumming, R. (1999). Inter-rater reliability of a home

    fall hazards assessment tool. *The Occupational Therapy Journal of Research, 19*, 83-100.

    doi: 10.1177/153944929901900201

Corcoran, M., & Gitlin, L. (1991). Environmental influences on behavior of the elderly with

    dementia: Principles for intervention in the home. *Physical and Occupational Therapy in*

    Geriatrics, 9, 5-22. doi:10.1080/J148V09N03_02

DeSwert, K. (2012). Calculating inter-coder reliability in media content analysis using

    Krippendorff's Alpha. Retrieved from http://www.polcomm.org/wp-

    content/uploads/ICR01022012.pdf

DuBroc, W., & Pickens, N. (2015). Becoming "at home" in home modifications: Professional

    reasoning across the expertise continuum. *Occupational Therapy In Health Care*.

    Advance online publication. doi:10.3109/073880577.2015.1010129

Garrard, J. (2013). *Health sciences literature review made easy: The matrix method*. Burlington,

    MA: Jones & Bartlett Learning, LLC.

George, L., Schkade, J., Ishee, J. (2004). Content validity of the relative mastery measurement

    scale: A measure of occupational adaptation. *OTJR: Occupation, Participation and*

    Health, 92-102. doi: 10.1177/153944920402400303

Giovannetti, T., Bettcher, B., Libon, D., Brennan, L., Sestito, N., & Kessler, R. (2007).

    Environmental adaptations improve everyday action performance in Alzheimer's disease:

    Empirical support from performance-based assessment. *Neuropsychology, 21*, 448-457.

    doi: 10.1037/0894-4105.21.4.448

Gitlin, L. (2003). Conducting research on home environments: Lessons learned and new

    directions. *The Gerontologist*, *43*, 628-637. doi: 10.1093/geront/43.5.628

Gitlin, L., & Chee, Y. (2006). Use of adaptive equipment in caring for persons with dementia at

    home. *Alzheimer's Care Today, 7,* 32-40.

Gitlin, L. & Corcoran, M. (2005). *Occupational Therapy and Dementia Care.* Bethesda, MD:

    AOTA Press.

Gitlin, L., Hodgson, N., Jutkowitz, E., Pizzi, L. (2010). The Cost-Effectiveness of a

    Nonpharmacologic Intervention for Individuals with Dementia and Family Caregivers:

    The Tailored Activity Program. *The American Journal of Geriatric Psychiatry*, *18*, 510-

    519. doi:10.1097/JGP.0b013e3181c37d13

Gitlin, L., Jacobs, M., & Earland, T. (2010). Translation of a dementia caregiver intervention for

delivery in homecare as a reimbursable Medicare service: Outcomes and lessons learned.

The Gerontologist. doi: 10.1093/geront/gnq057

Gitlin, L., Corcoran, M., Winter, L., Boyce, A., & Hauck, W. (2001). A randomized, controlled

trial of a home environmental intervention: Effect on efficacy and upset in caregivers and

on daily function of persons with dementia. *The Gerontologist, 41*, 4-14.

doi: 10.1093/geront/41.1.4

Gitlin, L., Corcoran, M., Winter, L., Boyce, A., & Marcus, S. (1999). Predicting participation and

adherence to a home environmental intervention among family caregivers of persons with

dementia. *Family Relations, 48*, 363-372. doi:1. Retrieved from

http://www.jstor.org/stable/585243 doi:1

Gitlin, L., Hauck, W., Dennis, M., & Winter, L. (2005). Maintenance of effects of the home

environmental skill-building program for family caregivers and individuals with

Alzheimer's disease and related disorders. *The Journals of Gerontology, Series A,*

Biological Sciences and Medical Sciences, 60, 368-374.

Gitlin, L., Schinfeld, S., Winter, L., Corcoran, M., Boyce, A., Hauch, W. (2002). Evaluating

home environments of persons with dementia: Inter-rater reliability and validity of the

Home Environmental Assessment Protocol (HEAP). *Disability and Rehabilitation,*

24, 59-71.

Hayes, A., & Krippendorff, K. (2007). Answering the call for a standard reliability measure of

coding data. *Communication Methods and Measures, 1,* 77-89. doi:

10.1080/19312450709336664

Horvath, K., Hurley, A., Duffy, M., Gauthier, M., Harvey, R., Trudeau, S., Cipolloi, P., & Smith, S. (2005). Caregiver competence to prevent home injury to the care recipient with dementia. *Rehabilitation Nursing, 30*, 189-196. doi: 10.1002/j.2048-7940.2005.tb00109

Horvath, K., Trudeau, S., Rudolph, J., Trudeau, P., Duffy, M., & Berlowitz, D. (2013). Clinical trial of a home safety toolkit for Alzheimer's disease. *International Journal of Alzheimer's Disease*, Article ID 913606, 11 pages. doi:10.1155/2013/913606

Jogi, P., Spaulding, S. J., Zecevic, A. A., Overend, T. J., & Kramer, J. F. (2011). Comparison of the Original and Reduced Versions of the Berg Balance Scale and the Western Ontario and McMaster Universities Osteoarthritis Index in Patients Following Hip or Knee Arthroplasty. *Physiotherapy Canada*, 63, 107–114. doi:10.3138%2Fptc.2009-26

Kielhofner, G. (2006). *Research in occupational therapy: Methods of inquiry for enhancing practice*. Philadelphia: F.A. Davis**.**

Kim, H., Chang, M., Rose, K., & Kim, S. (2012). Predictors of caregiver burden in caregivers of individuals with dementia. *Journal of Advance Nursing, 68*, 846-855. doi: 10.1111/j.1365-2648.2011.05787

Lach, H. W., & Chang, Y. (2007). Caregiver perspectives on safety in home dementia care. *Western Journal of Nursing Research, 29*, 993-1014. doi: 10.1177/0193945907303098

Lach, H., Reed, A., Smith, L., & Carr, D. (1995). Alzheimer's disease: Assessing safety problems in the home. *Geriatric Nursing, 16,* 160-164. doi: 10.1016/S0197-4572(05)80022-9

Lawton, M. (1982). Competence, environmental press, and the adaptation of older people. In M. Lawton, P. Windley, & T. Byerts (Eds.), *Aging and the environment: Theoretical approaches* (pp.33-59). New York: Springer.

Lawton. M., & Nahemow, L. (1973). Ecology and the aging process. In Eisderfer & Lawton, M. (Eds.), *The psychology of adult development and aging* (pp. 619-674). Washington, DC: American Psychological Association.

Liberati, A., Raffone, A. & Olivetti-Belardinelli, M. (2012). Cognitive reserve and its implications for rehabilitation and Alzheimer's disease. *International Quarterly of Cognitive Science. 13*, 1-12. doi:10.1007/s10339-011-0410-3

Lynn, M**.** R. (1986). Determination and quantification of content validity. *Nursing Research, 35,* 382-386. doi: 10.1097/00006199-198611000-00017

Mann, W., Hurren, M., Charvat, B., & Tomita, M.. (1996). Changes over one year in assistive device use and home modifications by home-based older persons with Alzheimer's disease. *Topics in Geriatric Rehabilitation, 12*, 9-16. doi:10.1097/00013614-199612000-00004

Mann, W., Ottenbacher, K., Fraas, L., Tomita, M., & Granger, C. (1999). Effectiveness of assistive technology and environmental interventions in maintaining independence and reducing home care costs for the frail elderly. *Archives of Family Medicine, 8,* 210-217. doi:10.1001/archfami.8.3.210

McDowell, I. (2006). *Measuring Health.* New York, NY: Oxford Press.

Mihailidis, A., Boger, J., Craig, T., & Hoey, J. (2008). The COACH prompting system to assist older adults with dementia through handwashing: An efficacy study. *BMC Geriatrics,* 828. doi: 10.1186/1471-2318-8-28

Nowrangi, M. A., Rao, V., & Lyketsos, C. G. (2011). Epidemiology, Assessment and Treatment of Dementia. *Psychiatric Clinics of North America. 34*, 275-294. doi:10.1016/j.psc.2011.02.004

Olsen, R. V., Ehrenkrantz, E., & Hutchings, B. L. (1996). Creating the movement-access continuum in home environments for dementia care. *Topics in Geriatric Rehabilitation, 12*, 1-8. doi:10.1097/00013614-199612000-00003

Patton, M. Q. (2002). *Qualitative Research & Evaluation Methods* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Polit, D.F., & Beck, C.T. (2006). The Content Validity Index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health, 29, 489-497.* doi: 10.1002/nur.20147

Sanford, J. A., Pynoos, J., Tejral, A., & Browne, A. (2001). Development of a comprehensive assessment for delivery of home modifications. *Physical & Occupational Therapy in Geriatrics, 20*, 43-55. doi: 10.1300/J148v20n02_03

Schkade, J., & McClung, M. (2001). *Occupational adaptation in practice*. Thorofare, NJ: Slack, Inc.

Schkade, J., & Schultz, S. (1992). Occupational adaptation part 1. *American Journal of Occupational Therapy, 46,* 829-837. doi:10.5014/ajot.46.9.829

Schultz, S., & Schkade, J. (1992). Occupational adaptation part 2. *American Journal of Occupational Therapy, 46,* 917-925. doi:10.5014/ajot.46.10.917

Sheldon, M. M., & Teaford, M. H. (2002). Caregivers of people with Alzheimer's dementia: An analysis of their compliance with recommended home modifications. *Alzheimer's Care Quarterly, 3*, 78-81.

Siebert, C., Smallfield, S. & Stark, S. (2014). *Occupational therapy practice guidelines for home modifications.* Bethesda, MD: AOTA Press.

Smith, A. L., Lauret, R., Peery, A., & Mueller, T. (2001). Caregiver needs: A qualitative

    exploration. *Clinical Gerontologist, 24*, 3-26. doi: 10.1300/J018v24n01_02

Stark, S., Somerville, E., Keglovits, M., Smason, A., & Bigham, K. (2015). Clinical reasoning

    guideline for home modification interventions. *American Journal of Occupational*

    Therapy, *69,* 6902290030p1-p8. doi: 10.5014/ajot.2015.014266

Stark, S. Sommerville, E., Morris, J. (2010). In Home Occupational Performance Evaluation (I-

    HOPE). *American Journal of Occupational Therapy, 64*, 580-589.

    doi:10.5014/ajot.2010.08065

Struckmeyer, L. R., & Pickens, N. P. (2016). Home modifications for people with Alzheimer's

    disease: A scoping review. *American Journal of Occupational Therapy*, *70*,

    7001270020p1-p11. doi:10.5014/ajot.2015.016089

Struckmeyer, L. "Pilot Study: Use of Survey Design to Establish Clinical Utility

    of the HEAP-R1." Course paper, Texas Woman's University, 2014.

van Hoof, J., Blom, M., Post, H., & Bastein, W. (2013). Designing a "Think-along dwelling" for

    people with dementia: A co-creation project between health care and the building

    services sector. *Journal of Housing for the Elderly, 27*, 299-332. doi:

    10.1080/02763893.2013.813424

van Hoof, J., Kort, H. S., van Waarde, H., & Blom, M. (2010). Environmental interventions and

    the design of homes for older adults with dementia: An overview. *American Journal of*

    Alzheimer's Disease and Other Dementias, 25, 202-232. doi:

    10.1177/1533317509358885

Vaughn, P. (2013). Formal and unpaid dementia costs are tallied. Retrieved from

https://www.nia.nih.gov/newsroom/2013/04/nih-supported-study-finds-u-s-dementia-

care-costs-high-215-billion-2010

APPENDIX A

Home Environmental Assessment Protocol-Revised

Name of Client: _____ Date: _____

Address: _____ Housing Type: _____

		HAZARDS			ADAPTATIONS			VISUAL CUES			CLUTTER
		Y	N	N/A	Y	N	N/A	Y	N	N/A	
ENTRANCE	steps	☐	☐	☐	☐	☐	☐	☐	☐	☐	# of entrances used _____
	locks	☐	☐	☐	☐	☐	☐				☐ Not cluttered (0)
	flooring & transitions	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	lighting	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
	Other:	☐	☐	☐	☐	☐	☐				Comments:
LIVING ROOM	flooring & transitions	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ Not cluttered (0)
	lightning	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	furniture	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
	Other:	☐	☐	☐	☐	☐	☐				Comments:
KITCHEN	flooring & transitions	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ **Floor:** Not cluttered (0)
	lighting	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	appliances	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
	Other:	☐	☐	☐	☐	☐	☐				☐ **Counters:** Not cluttered
											☐ Somewhat cluttered (1)
											☐ Very Cluttered (2)
EATING AREA	flooring & transition	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ Not cluttered (0)
	lighting	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	furniture	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
	Other:	☐	☐	☐	☐	☐	☐				Comments:
STAIRS	flooring & transitions	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ Not cluttered (0)
	lighting	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	Other:	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
											Comments:
HALLWAY	flooring & transitions	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ Not cluttered (0)
	lighting	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	Other:	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
											Comments:

		Hazards			Adaptations			Visual Cues			Clutter
		Y	N	N/A	Y	N	N/A	Y	N	N/A	
BEDROOM	flooring & transitions	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ Not cluttered (0)
	lighting	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	Other:	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
											Comments:
BATHROOM	flooring & transitions	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ **Counters: Not cluttered**
	lighting	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	commode	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
	sink	☐	☐	☐	☐	☐	☐				☐ **Floor: Not cluttered (0)**
	Shower/tub	☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
	Other:	☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
											Comments:
OTHER ROOM		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐ Not cluttered (0)
		☐	☐	☐	☐	☐	☐				☐ Somewhat cluttered (1)
		☐	☐	☐	☐	☐	☐				☐ Very Cluttered (2)
Total Yes											**Clutter Score:**

Assistive Devices	
Fire Safety	
COMFORT: Bedroom	Items: Y N Quiet: Y N Privacy: Y N
COMFORT: Living area	Items: Y N Quiet: Y N Privacy: Y N

Other environmental barriers of concern (include caregiver and care recipient perspective):

Other environmental supports identified:

Unmet needs as identified in collaboration with caregiver/care recipient:

Prioritized Recommendations (made in coordination with caregiver):

Therapist: _____ Contact Information: _____

APPENDIX B

Home Environmental Assessment Protocol: Sample Pages

Home Environmental Assessment Protocol (HEAP)
For Dementia Patients Living at Home

Key

CR= Care Recipient
CG= Caregiver
Only rate rooms used
N/A= Not Applicable

Reference: Gitlin, L. N., Schinfeld, S., Winter, L., Corcoran, M., Boyce, A. A., & Hauck, W. (2002). Evaluating home environments of persons with dementia: interrater reliability and validity of the Home Environmental Assessment Protocol (HEAP). *Disability and Rehabilitation*, 24(1-3), 59-71.

0

ENTRANCE TO HOME
T1 Date
Time of Day

・ 1 morning to noon ・ 2 12:01 pm-3 pm ・ 3 3:01-sunset ・ 4 Dark

1a. Number of entrances to home: / / 1c. Can main entrance used CR be evaluated?
(verify with CG) ☐1 ☐ Yes
☐2 ☐ No
1b. Number of entrances used by CR: / / 1d. If no, why?
☐1 ☐Refused
☐2 ☐Other (specify) / / **I. POTENTIAL HAZARDS**

A. Exterior	YES	NO	N/A	COMMENTS
1. Are external steps uneven, steep, loose, cracked, sloping or slippery?	1	0		
2. Is there a securely attached banister or handrail that covers all steps?	0		1	
3. Is lighting to entrance adequate?	0		1	
Probe: Is lighting to entrance in working order?				
B. Interior	0		1	
4. Is a lock or dead bolt present on interior of door?				
5. Is door threshold >1 inch?	1		0	
ADAPTATIONS	1		0	
A. Exterior				
1. Is there a ramp, stair glide, or elevator to entrance?				
B. Exterior or Interior	1		0	
1. Any other visual cues or adaptations?	1		0	

Probe: Have you changed anything in the entrance to make it easier
for yourself or CR? (specify)
/ / /
/ / / 2. Any other safety hazards? (specify)

II. ADAPTATIONS   Living Room   Den

	Living Room			Den			
	YES	NO	N/A	YES	NO	N/A	COMMENTS
1. Are there any structural renovations? *PROBE: Have you made any major alterations or renovations in this room to make things easier for yourself or CR? This includes any change, floors (including removal of wall-to-wall rugs), walls, ceiling, wiring, and/or plumbing. Specify: /// ///*	1	0					
2. Has any door leading to or in living room been modified? If no doors, code = -2 *PROBE: Have you done anything to doors in living room? a) Has door been removed? b) Have locks or chains been installed, removed or placed in unusual manner? c) Was doorway made wider? d) Is there a pressure gate or other barrier to room? e) Other*		1			0		
3. *PROBE: Have you removed any objects in response to CR's* problems? (e.g. throw rugs, plants, fireplace equipment, *framed pictures, magazine holders, matches, etc.) Specify: /// ///*		1			0		
4. *PROBE: Are there devices or special equipment in this room that CR uses or you use to help CR for:*		1			0		
		1			0		
a) leisure activities? Specify_____		1			0		
b) seating Specify_____		1			0		
c) monitoring or communicating? Specify_____		1			0		
d) toileting Specify_____							

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APPENDIX C

Institutional Review Board Letters

September 22, 2015

TO: Linda Struckmeyer
PO Box 100164
Campus

FROM: Ira S. Fischler, PhD; Chair
University of Florida
Institutional Review Board 02

SUBJECT: **Exemption of Protocol #2015-U-1046**
Examination of Content Validity of Home Environmental Assessment Protocol-Revised (HEAP-R)

SPONSOR: None

Your protocol submission was reviewed by the IRB. The Board determined that your protocol is exempt based on the following category:

> *45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior*

Should the nature of your study change or if you need to revise this protocol in any manner, please contact this office before implementing the changes.

IF:dl

DATE: October 9, 2015

TO: Ms. Linda R. Struckmeyer
             Occupational Therapy - Dallas

FROM: Institutional Review Board - Dallas

Re: *Exemption for Examination of the Content Validity of Home Environmental Assessment
       Protocol-revised (HEAP-R) (Protocol #: 18617)*

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and was
determined to be exempt from further review.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data
collection at that agency. Because a signed consent form is not required for exempt studies, the filing
of signatures of participants with the TWU IRB is not necessary.

Although your protocol has been exempted from further IRB review and your protocol file has been
closed, any modifications to this study must be submitted for review to the IRB using the Modification
Request Form. Additionally, the IRB must be notified immediately of any adverse events or
unanticipated problems. All forms are located on the IRB website. If you have any questions, please
contact the TWU IRB.

cc.   Dr. Noralyn Davel Pickens, Occupational Therapy - Dallas
      Graduate School

UF |**Institutional Review Board**
|**UNIVERSITY** *of* **FLORIDA**

PO Box 112250
Gainesville, FL 32611-2250
352-392-0433 (Phone)
352-392-9234 (Fax)
irb2@ufl.edu

DATE: November 18, 2015

TO: Linda Struckmeyer
             PO Box 100164
             Campus

FROM: Ira S. Fischler, PhD, Chair
             University of Florida
             Institutional Review Board 02

SUBJECT: Approval of Protocol #2015-U-1313
             *Examination of Inter-rater Reliability and Test-Retest Reliability of Home
             Environmental Assessment Protocol-Revised (HEAP-R)*

SPONSOR: None

I am pleased to advise you that the University of Florida Institutional Review Board has recommended approval of this protocol. Based on its review, the UFIRB determined that this research presents no more than minimal risk to participants, and based on 45 CFR 46.117(c), An IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either: *(1) That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or (2) That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.*

The IRB authorizes you to administer the informed consent process as specified in the protocol. If you wish to make any changes to this protocol, *including the need to increase the number of participants authorized*, you must disclose your plans before you implement them so that the Board can assess their impact on your protocol. In addition, you must report to the Board any unexpected complications that affect your participants.

This approval is valid through <u>October 26, 2016</u>. If you have not completed the study prior to this date, please telephone our office (392-0433), and we will discuss the renewal process with you. Additionally, should you complete the study on or before the expiration date, please submit the study closure report to our office. The form can be located at http://irb.ufl.edu/irb02/irb-02-forms.html

It is important that you keep your Department Chair informed about the status of this research protocol.

ISF:dl

TWU

EXAS WOMAN'S UNIVERSITY

DENTON DALLAS HOUSTON

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P.O. Box 425619, Denton, TX 76204-5619
940-898-3378
email: IRB@twu.edu
http://www.twu.edu/irb.html

DATE: December 10, 2015

TO: Ms. Linda R. Struckmeyer
           Occupational Therapy - Dallas

FROM: Institutional Review Board (IRB) - Dallas

Re: *Approval for Examination of Inter-Rater and Test-Retest Reliability of Home Environmental
        Assessment Protocol-revised (HEAP-R) (Protocol #: 18802)*

The above referenced study has been reviewed and approved by the Dallas IRB (operating under
FWA00000178) on 12/10/2015 using an expedited review procedure. This approval is valid for one
year and expires on 12/9/2016. The IRB will send an email notification 45 days prior to the expiration
date with instructions to extend or close the study. It is your responsibility to request an extension for
the study if it is not yet complete, to close the protocol file when the study is complete, and to make
certain that the study is not conducted beyond the expiration date.

If applicable, agency approval letters must be submitted to the IRB upon receipt prior to any data
collection at that agency. A request to close this study must be filed with the Institutional Review
Board at the completion of the study. Because you do not utilize a signed consent form for your
study, the filing of signatures of subjects with the IRB is not required.

Any modifications to this study must be submitted for review to the IRB using the Modification
Request Form. Additionally, the IRB must be notified immediately of any adverse events or
unanticipated problems. All forms are located on the IRB website. If you have any questions, please
contact the TWU IRB.

cc.   Dr. Noralyn Davel Pickens, Occupational Therapy - Dallas
      Graduate School

Struckmeyer, Linda R

From:	Mizrahy,Sherri L
Sent:	Wednesday, November 04, 2015 1:17 PM
To:	Struckmeyer,Linda R
Subject:	FW: confirmation that UF IRB not needed

Hello Linda,

My understanding based on your response below is that if all the following are true, you **will not need** to submit to UF IRB:

- Even though you are an UF employee, you will be doing all research on your own time and not using any UF resources
- You want to publish eventually but not sure where your affiliation will be

Please let me know if there is anything further TWU IRB needs,
Sherri

Sherri Mizrahy RN, MSN
Assistant Director
UF IRBs
Tel: (352) 273-9602
Fax: (352) 273-9614
smizrahy@ufl.edu

TWU
TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378
email: IRB@twu.edu
http://www.twu.edu/irb.html

DATE: December 9, 2015

TO: Ms. Linda R. Struckmeyer
             Occupational Therapy - Dallas

FROM: Institutional Review Board (IRB) - Dallas

Re: *Approval for Examination of Concurrent Validity of Home Environmental Assessment Protocol-*
       Revised (HEAP-R) (Protocol #: 18776)

The above referenced study was reviewed at a fully convened meeting of the Dallas IRB (operating under FWA00000178). The study was approved on 12/9/2015. This approval is valid for one year and expires on 12/8/2016. The IRB will send an email notification 45 days prior to the expiration date with instructions to extend or close the study. It is your responsibility to request an extension for the study if it is not yet complete, to close the protocol file when the study is complete, and to make certain that the study is not conducted beyond the expiration date.

If applicable, agency approval letters must be submitted to the IRB upon receipt prior to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp is enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. A copy of the signed consent forms must be submitted with the request to close the study file at the completion of the study.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

cc. Dr. Noralyn Davel Pickens, Occupational Therapy - Dallas
     Graduate School

DATE: March 24, 2016

TO: Linda Struckmeyer
             PO Box 100164
             Campus

FROM: Ira S. Fischler, PhD; Chair *ISF/MT*
             University of Florida
             Institutional Review Board 02

SUBJECT: Revision of Protocol #2015-U-1313

TITLE: *Examination of Inter-rater Reliability and Test-Retest Reliability of Home Environmental Assessment Protocol-revised (HEAP-R)*

SPONSOR: None

The request to revise the above referenced protocol has been reviewed and approved. Approval of this study is valid October 26, 2016.

The Board must review any further revisions to this protocol, including the need to increase the number of participants authorized prior to implementation.

IF:mt

- *Modified recruitment*
- *Added online training*

DATE: March 28, 2016

TO: Ms. Linda R. Struckmeyer
             Occupational Therapy - Dallas

FROM: Institutional Review Board - Dallas

Re: Notification of Approval for Modification for Examination of Inter-Rater and Test-Retest
      Reliability of Home Environmental Assessment Protocol-revised (HEAP-R) (Protocol #: 18802)

The following modification(s) have been approved by the IRB:

The purpose of this revision is to make the training available via email links to reach my
required number of participants.
The online training will consist of the same PowerPoint with the embedded 11 minute training
video. The same three home videos will be used to practice scoring the tool. After completion
of these sections, participants will take the same competency exam. They will return it to the PI
and have an opportunity for an online or phone call with PI to ask/answer any questions. After
this the participant will receive a link to the inter-rater reliability study and two weeks later to
the test- retest study.

cc. Dr. Noralyn Davel Pickens, Occupational Therapy - Dallas

APPENDIX D

Content Validity Survey Questions

Content Validity Survey Questions

The Home Environmental Assessment Protocol- Revised is a tool to evaluate the home environment of a person with dementia and their caregiver. It is designed as a walkthrough the home assessment to identify supports and barriers of safety and performance specific to the person with dementia. After reviewing the HEAP-R please answer the following questions:

1) In the 2nd column you see a place where an OT can indicate the presence or absence of hazards in various parts of the home. Do you think this column is:

☐ Not Relevant

☐ Relevant but needs minor revisions. Please share recommended revision

_____

☐ Very relevant

☐ Unable to assess relevance without item revision (or item in need of such revision that it would no longer be relevant)

2) In the 3rd column you see a place where an OT can indicate the presence or absence of adaptations in various parts of the home. Do you think this column is:

☐ Not Relevant

☐ Relevant but needs minor revisions. Please share recommended revision

_____

☐ Very relevant

☐ Unable to assess relevance without item revision (or item in need of such revision that it would no longer be relevant)

3) In the 4th column you see a place where an OT can indicate the presence or absence of visual cues in various parts of the home. Do you think this column is:

☐ Not Relevant

☐ Relevant but needs minor revisions. Please share recommended revision

_____

☐ Very relevant

☐ Unable to assess relevance without item revision (or item in need of such revision that it would no longer be relevant)

4) In the 5th column you see a place where an OT can indicate the presence or absence of clutter in various parts of the home. Do you think this column is:

☐ Not Relevant

☐ Relevant but needs minor revisions. Please share recommended revision

_____

☐ Very relevant

☐ Unable to assess relevance without item revision (or item in need of such revision that it would no longer be relevant)

5) At the bottom you see a place where an OT can indicate the presence or absence of comfort in the living area and bedroom. Do you think this section is:

☐ Not Relevant

☐ Relevant but needs minor revisions. Please share recommended revision

_____

☐ Very relevant

☐ Unable to assess relevance without item revision (or item in need of such revision that it would no longer be relevant

6) Considering the items of assistive devices and fire safety, do you consider these items to be:

89

    ☐   Not Relevant

    ☐   Relevant but needs minor revisions. Please share recommended revisions

    _____

    ☐   Very relevant

    ☐   Unable to assess relevance without item revision (or item in need of such revision that it would no longer be relevant)

7) Considering the entire HEAP-R, a tool to evaluate the home environment of a person with dementia and their caregiver, how would you rate the content validity of this tool?

    ☐   Not Relevant

    ☐   Relevant but needs minor revisions. Please share recommended revisions

    _____

    ☐   Very relevant

    ☐   Unable to assess relevance without item revision (or item in need of such revision that it would no longer be relevant)

8) Are there any items that are not included in the HEAP-R that are necessary for this tool?   YES   NO

    IF YES PLEASE COMMENT_____

9) Are there any items that are included in the HEAP-R that are **un**necessary for this tool?   YES   NO

    IF YES PLEASE COMMENT_____

10) Do you have any additional comments about this tool?

_____

All responses will be kept anonymous. **Thank you** for completing this survey.

APPENDIX E

Video Recording Checklist

Video Recording Checklist

Recording # _____ Geographic location of home _____

- ☐ **Main Entrance**
    - ☐ Scan area (to include ceiling lights)
    - ☐ Floor
    - ☐ Threshold into house
    - ☐ Door from both sides
- ☐ **Living Room**
    - ☐ Scan room
    - ☐ Floor
    - ☐ Threshold into and out of room
    - ☐ Tabletops
    - ☐ Furniture
    - ☐ Sitting area
- ☐ **Eating area**
    - ☐ Scan room
    - ☐ Floor
    - ☐ Threshold into and out of room
    - ☐ Tabletops
    - ☐ Furniture
    - ☐ Sitting area
- ☐ **Kitchen**
    - ☐ Scan room
    - ☐ Floor
    - ☐ Threshold into and out of room
    - ☐ Tabletops
    - ☐ Furniture
    - ☐ Counters
    - ☐ Appliances
- ☐ **Bedroom**
    - ☐ Scan room
    - ☐ Floor
    - ☐ Threshold into and out of room
    - ☐ Tabletops/dresser tops
    - ☐ Furniture
- ☐ **Bathroom**
    - ☐ Scan room
    - ☐ Floor
    - ☐ Threshold into and out of room
    - ☐ Shower/tub
    - ☐ Sink/counter
    - ☐ Commode

APPENDIX F

Inter-rater Reliability Competency Exam

Inter-rater Reliability Competency Exam Questions

Below are ten questions regarding the scoring of the HEAP-R Please watch the training video and complete the quiz. You must score 90% prior to scoring the home videos. You may take the quiz as many times as you want and view the training video as many times as you want. You may also have notes with you.

1. Potential hazards include sharp objects that are visible in the room.

    a) True

    b) False

2. A phone number posted by the phone or on the refrigerator is an example of which domain?

    a) Potential hazard

    b) Visual cues

    c) Clutter

    d) Comfort

3. Lighting, under hazards, includes which of the following:

    a) Glare

    b) Missing bulbs

    c) Missing lamp shades

    d) All of the above

4. A throw rug or loose flooring is

    a) Clutter

    b) A potential hazard

    c) Not relevant to this assessment

5. Electrical cords in the walkway should be marked under which domain?

a) Clutter

b) Visual Cues

c) Hazards

d) Adaptations

6. A comfort height toilet is

   a) An adaptation

   b) A visual cue

   c) A hazard

7. Steps without a handrail are considered a hazard.

   a) True

   b) False

8. A rating of "not cluttered" may include a few common items on the counter.

   a) True

   b) False

9. Crowded furniture with narrow walkways is considered:

   a) A hazard

   b) An adaptation

   c) A visual cue

   d) Clutter

10. The number of hazards should be counted and entered in each individual room.

    a) True

    b) False

APPENDIX G

Follow up Phone Interview Questionnaire

Follow up Phone Call Questionnaire

Participant ID # _____ Date: _____

  This is to be completed two weeks after the home assessment. A research team member will call participants. The team member calling will:

 ☐ Thank participant for participation in the home assessment that took place two weeks prior.

 ☐ Remind participant they signed consent form that they would receive this phone call.

 ☐ Ask participant if they will answer a few questions about the first part of the home assessment when the occupational therapist walked with them through their house with them and their family member with dementia.

 ☐ Read the statement below

 ☐ Ask questions 1-6.

"When answering these questions please consider the first evaluation administered when the researcher was at your home two weeks ago."

1. On a scale of 1-4 with one being poor and four being excellent please rate the efficiency of the home assessment process. 1 2 3 4

2. On a scale of 1-4 with one being poor and four being excellent please rate the effectiveness [note: effectiveness may need to be defined for participant] of the home assessment process.

 1 2 3 4

3. On a scale of 1-4 with one being poor and four being excellent, as the caregiver to a person with dementia please rate your satisfaction with the home assessment process.

 1 2 3 4

4. On a scale of 1-4 with one being poor and four being excellent, how satisfied do you think the person with dementia you are caring for was with the assessment process?

1   2   3   4

5. What changes to the home environment have you made since the evaluation?

_____

_____

_____

6. Are there any other comments you would like to share about the home assessment process

you participated in?

_____

_____

_____

All responses will be kept anonymous. Thank you for taking time to participate in this research.

APPENDIX H

Content Validity Responses

Content Validity Expert's Comments and Researcher's Response

Domain/item	Expert response	Researcher's response	Action
Hazards	More space needed to document/specify hazards Additional space for notes to capture info such as lack of or unstable railings? Define hazard: threat to physical safety or emotional stability	Space for comments needed Space for comments needed Definition needed	Fillable form to add flexibility Training PowerPoint and added "Quick Start" guide as first page to include definitions
Adaptations	Should there be a Comments section also? Define adaptation How do you note that the issue is presence or absence?	Space for comments needed Definition needed Clarity needed	Fillable form Training PowerPoint and added "Quick Start" guide as first page to include definitions and instructions
Visual Cues	It is unclear to me what visual cues means Define visual cues Not clear what is meant in this section. Are visual cues present or needed?	Definition needed Definition needed Clarity needed	Training PowerPoint and added "Quick Start" guide as first page to include definitions and instructions
Clutter	Might want to be able to specify which one is cluttered (like if there are multiple) Define clutter Seems as though this is the same as hazard - a tripping hazard. It is interesting that clutter is given such high priority since it is a hazard. Scores should sum.	More space needed (to specify) Definition needed For persons with dementia clutter can limit participation as well as be a hazard Scoring	Fillable form will increase flexibility "Quick Start" guide as first page to include definitions Training PowerPoint will address relationship of clutter to participation Set up fillable form to sum

APPENDIX I

Quick Start Guide to HEAP-R

```
HEAP-R
Home Environmental Assessment Protocol Revision
Linda R. Struckmeyer, MA, OTR/L (2016)
```

Definitions

Hazards include tripping & falling, electrical hazards and access to dangerous items. If any physical hazards exist check the Yes box in the row for that item. For example loose railings on the entrance steps would be a Yes for hazards. A section for comments is available for items not noted on the form that may be a hazard.

Any other types of hazards identified and not noted in a room section should be noted in the "other environmental barriers of concern" section at the end of the form.

Adaptations include assistive devices, technology, and home modifications. This also includes rearrangement of furniture or increased wattage in lights. Many of the adaptations may be visible through observation such as a grab bar in the shower. Ask the caregiver and person with dementia to identify adaptations that may have been made prior to the home it (such as picking up throw rugs) Ask caregiver probing questions such as "Have you changed anything to make it easier for either of you?" If any adaptations have been implemented check the Yes box.

Visual Cues include pictures, labels, schedules, signs or arrows to a room, and placement of items in view for use. These would all be observable as you look around the room. If any visual cues are observed check the Yes box.

Clutter includes items in walkways and on counters. Items covering less than 20% of the surface and determined to be irrelevant to safety or participation should be considered *no clutter*. Items that take up over 20% to 80 % of the area should be scored *somewhat cluttered*. Surfaces that are over 80% and will severely impact ability to function should be scored *very cluttered*.

Comfort includes the perspective of caregiver and person with dementia and if they perceive these areas to be "comfortable". Consider the noise level, privacy level, and access to items in the space the person with dementia spends the most time. For example, next to the recliner is there a place for the phone or a bell to contact caregiver, a water glass, and items for engagement or fiddling (magazine, stuffed animal).

Assistive devices include any assistive devices the person with dementia uses or the caregiver uses in the care of the person with dementia. **Examples are:** eyeglasses, hearing aids, walker, cane, shower spray hose, grab bars, stove timer, cabinet locks.

Fire Safety includes if there are working smoke detectors. There is additional space for comments related to fire safety.

Other room:
This is a place to note an additional room the person with dementia uses frequently. This might be a laundry room, den, or a sun porch.

Scoring Instructions
After completion of the assessment add the number of Yes boxes checked under hazards, adaptations, and visual cues. The total **clutter score** is derived by adding 1 for each box checked somewhat cluttered and 2 for each box checked very cluttered.

For additional training resources or a free PowerPoint on the administration of the HEAP-R contact Linde Struckmeyer, at OTlinde@twu.edu