THE ROLE OF PRAGMATIC LANGUAGE IN

AGING AND ITS RELATIONSHIP WITH QUALITY OF

LIFE

By

RACHEL HELEN MESSER

Bachelor of Science in Psychology and French
Morehead State University
Morehead, KY
2009

Master of Science in Psychology
Oklahoma State University
Stillwater, OK
2012

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
May, 2014

THE ROLE OF PRAGMATIC LANGUAGE IN AGING

AND ITS RELATIONSHIP WITH QUALITY OF LIFE

Dissertation Approved:

Shelia Kennison, Ph.D.

Dissertation Adviser

Jennifer Byrd-Craven, Ph.D.

David Schrader, Ph.D.

Cheryl Giddens, Ph.D.

ACKNOWLEDGEMENTS

I would like to sincerely thank my family for their continued support of my educational journey. I would also like to thank my graduate adviser, Dr. Shelia Kennison, for always encouraging me to do and be my best. I would like to express my very great appreciation to my committee members and other professors who have impacted me greatly as an academic and person: Dr. Jennifer Byrd-Craven, Dr. David Schrader, Dr. Cheryl Giddens, and Dr. Lucy Bailey. I also wish to acknowledge the help given by Lisa Conley, B.S., and Erika Hyatt, B.S., who assisted with my dissertation data collection and analysis and always kept a positive attitude. I would like to offer special thanks to Dr. Karen Taylor, Dr. John Secor, Dr. Lynn Haller, and Dr. Shari Kidwell, who mentored me continuously as an undergraduate. I am particularly grateful for the early guidance provided to me in adolescence by two outstanding English teachers, Carrie Roberts and Brandy Hyatt Feagan, who helped mold my early interests in critical thinking, writing, and feminism.

Name: RACHEL HELEN MESSER

Date of Degree: MAY, 2014

Title of Study: THE ROLE OF PRAGMATIC LANGUAGE IN AGING AND ITS
               RELATIONSHIP WITH QUALITY OF LIFE

Major Field: LIFESPAN DEVELOPMENTAL PSYCHOLOGY

Abstract: The study examined the relationship between pragmatic language decline and older adults' quality of life, as well as social factors that could affect health. Quality of life is a term used to describe an individual's life satisfaction as it relates to physical, mental, and social needs. Quality of life for older adults can be affected by many factors, such as changes in physical or psychological health, cognitive aging, social isolation, and other factors. Pragmatic language is one area that has not yet been investigated as to how its decline may affect specific aspects of older adults' quality of life. Pragmatic language aspects are verbal and nonverbal language aspects that dictate social use of language, and have been shown to decline with age. There was support for the hypothesis that in older adults, the decreased ability to produce and comprehend several aspects of pragmatic language (e.g., use of gestures, emphatic stress, and ability to make inferences) are related to lower quality of life, namely in the realm of physical and mental health. Additionally, frequency of social contact was related to quality of life and language ability for some aspects of pragmatic language ability. Future directions for pragmatic language and health research with older adults are discussed.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

According to the U.S. Administration on Aging (2011), the number of adults 65 years and older will double between 2000 and 2030. With the growing number of older adults in the U.S., concerns have been raised about how to accommodate this growing population in terms of health care and social implications. We know that as our brain ages, changes in thoughts, attitudes, behavior, and language ability can occur. The purpose of the current study was to establish the relationship between pragmatic language ability and its relationship with quality of life in older adults.

For people of all ages, the term *quality of life* (QOL) refers to an individual's perception of the status of their well-being, including physical and psychological health (Baernholdt, Hinton, Yan, Rose, &Mattos, 2012). An individual's quality of life is dependent upon cultural standards and their own expectations about goals and concerns in life. The idea of quality of life, although now popularized in use, has existed for hundreds of years (Jordan, 2009). Interestingly, one of the most criticized areas of current QOL research is the definition of quality of life itself. Researchers have argued over which aspects of living should be included in the QOL definition, and whether health-related quality of life (HRQOL) aspects should be included in the general conceptualization of QOL (Barofsky, 2012). Researchers who include questions of

quality of life in their studies may define QOL in different ways that suit their needs for the

particular research questions in which they are interested. In fact, Halvorsrud and Kalfoss

(2007) reported that there are over 100 definitions of QOL and over 1000 assessments of

QOL in the current literature.

CHAPTER II

HISTORY AND DEFINITIONS OF QUALITY OF LIFE

In spite of difficulties in specific definitions of QOL, most researchers agree that three main aspects of QOL are most relevant and important: physical health, mental/psychological health, and social support/activity (Berg, Hallauer, & Berk, 1976; Wilson & Cleary, 1995). In short, physical, psychological, and social aspects of quality of life are intertwined, and interact with one another to form an individual's overall impression of his/her quality of life. Some fields focus solely on the way health-related quality of life (HRQOL) is impacted by physical and mental health (Crosby, Kolotkin, & Williams, 2003; Guyatt, Feeny, & Patrick, 1993). However, focusing solely on HRQOL does not paint a complete picture of how individuals may be affected by their daily experiences. Physical health does play a role in individuals' quality of life; being injured, having a chronic illness, or having a disability can certainly affect overall functioning. However, psychological and social aspects can be just as influential on overall QOL. For example, individuals with disabilities are often perceived to have lowered overall QOL due to physical difficulties associated with their disability. However, researchers have found that these individuals often have important factors of other areas of QOL (i.e., psychological and social functioning) that enable their overall QOL to remain high (Albrecht & Devlieger, 1999).

In prior research, QOL has been assessed in multiple ways. The World Health Organization's levels of assessment of quality of life encompass three main categories of questioning about an individual's subjective judgments of QOL: functioning, global functioning evaluations, and personalized evaluations (The WHOQOL Group, 1985). The three categories are layered within one another. General functioning could be a question such as, "How many hours did you sleep last night?" Global functioning evaluation is a prompting for evaluation of the information initially provided, such as, "How well do you sleep?" Personalized evaluations involve a deeper evaluation, such as, "How satisfied are you with your sleep?" (p. 1405). Factors affecting quality of life can be teased apart through the use of different types of information that can provide more detail into subjective experience.

The Centers for Disease Control (2000) defined HRQOL as "an individual's or group's perceived physical and mental health over time" (p. 8). The CDC identified that the difference between HRQOL and general QOL is that HRQOL specifically addresses the physical and mental aspects that contribute to overall quality of life. Like other QOL factors, factors contributing to HRQOL are factors affecting both the individual and community levels of functioning. Individual-level HRQOL factors include mental and physical health perceptions and social support. Community-level HRQOL factors include suicide, divorce, and alcoholism. Overall QOL includes other factors such as careers, housing location, and culture, as well as health factors. The CDC HRQOL-14 is a 14-question measure that addresses issues such as activity limitations and symptoms of health-related problems, as well as subjective perceptions of health status in the last 30 days.

Quality of life can be affected by factors such as successful aging. Although successful aging is another abstract concept that has had difficulty in study (Depp &Jeste, 2006), it can affect QOL if one considers that aging can happen normally, abnormally, or somewhere in between. Successful aging has been defined as "healthy aging" (p. 7; Depp &Jeste, 2006). That is, avoiding physical disability or illness is a way to age successfully. However, other factors can affect whether aging occurs successfully, such as social and psychological factors and high cognitive functioning into older age. It is assumed that the more successfully one ages, the more they will endorse items relevant to aging as positive on QOL assessments.

Many studies on QOL have focused on older adults. Quality of life can change throughout the lifespan, with QOL sometimes declining in older age due to factors related to physical and mental aging (Baernholdt, Hinton, Yan, Rose, &Mattos, 2012). Although several factors determine when biological aging is in full swing, most researchers agree that starting at age 65, the label "older adult" is applied (Halvorsrud & Kalfoss, 2007). In older adulthood is when QOL can begin to decline due to age-related changes. Older adults often experience unique life characteristics compared to other age groups. For example, Halvorsrud and Kalfoss (2007) pointed out that degenerative health problems and chronic disorders may affect quality of life for older adults especially. Older adults may have different social experiences than other age groups, such as ageism, or decreased social support due to dying relatives or friends. The decline in social networks can decrease quality of life. In the United States, the aging population is increasing. With the growing numbers of older adults and the difficulties that older adults face affecting

QOL, research on quality of life in older adults can continue to be beneficial to the health of the country.

For older adults' quality of life in particular, research has focused on physical, psychological, and social aspects that are specific to aging and contribute to overall QOL. One area of functioning that requires integration of these three aspects is language and communication. Language requires specific brain functions, articulatory processes, and gestures. It requires specific thought processes associated with retrieval of words and concepts from memory. It also requires the contribution of social aspects of language, called pragmatic language. These aspects help an individual successfully communicate with another person through eye contact, posture, processing of indirect meaning, and other processes. We know that as the brain and body ages, all of these areas of functioning may be affected.

The purpose of the present research was to investigate the possibility that aspects of language use can be an important predictor of QOL in older adults. Some research on language changes in older adults has focused on how older adults' figurative language ability changes over time. Figurative language is described as meaning that must be inferred from language; it can be a statement in which something that is said represents something else (Roberts & Kruz, 1994). Figurative language is often used to portray a message more easily than literal language, which is saying exactly what is meant (Ariel, 2002). Some examples of figurative language are metaphors, proverbs, idioms, and irony. As memory problems increase with aging, ability to process complex language can decrease in older adults (Kim, Bayles, & Beeson, 2008). Byrd (1991) pointed out that figurative language comprehension is unique in that, unlike literal language, it is not

simply retrieval or activation of stored information that enables comprehension. Instead, figurative language requires application of known meanings of words in a way that may be unusual and relies heavily on context to aid interpretation.

Metaphor is one common type of figurative language. Aging can affect figurative language processing in two ways, which correspond with the two aspects of metaphor. The first is through the actual linguistic material presented in the metaphor. The second is through the meaning that must be ascertained as figurative (vs. literal) when a metaphor is encountered. This corresponds with the interaction of the left (e.g., linguistic) and right (e.g., integration of meaning) hemispheres cooperating during figurative language comprehension.

Early research on the role of the brain in language abilities focused on the role of the left hemisphere in carrying out linguistic processes. However, as psycholinguistic research progressed and more information was provided through growing technologies and understanding of brain damaged patients, it was discovered that the right hemisphere of the brain plays a significant role in language production and processing. The left and right hemispheres employ complementary specialization, in which both work in conjunction to achieve full comprehension and production of language (Bryan, 1994). Generally, the LH is responsible for speech production, analytical processing, and sequential processing of language. It is responsible for the production and perception of syllables in speech. The right hemisphere is responsible for processing of meaning and the synthesis of verbal and nonverbal information (Beeman & Chiarello, 1998). It is responsible for making inferences and also for the perception of intonation of speech and other acoustic properties. The right hemisphere is also responsible for processing

pragmatic aspects of language. Emotion-related aspects of language are also processed by the right hemisphere. Two test batteries that can assess right hemisphere functioning are the Right Hemisphere Language Battery Bryan (1994) and the Right Hemisphere Communication Battery (Gardner & Brownell, 1986).

Besides figurative language, pragmatic language is also processed primarily by the right hemisphere (Bryan, 1994; Weed, 2011). Pragmatic language is the term used to refer to conveying meaning through linguistic information (Adams, 2002: Bryan, 1994). Within pragmatic language is the presence of tools used to socially navigate communication. Prutting and Kirschner (1987) identified some thirty pragmatic aspects of language, building on Grice's (1975) principles, in order to study people with communication disorders. The thirty aspects were grouped into three main categories: verbal aspects, paralinguistic aspects, and nonverbal aspects. Within verbal aspects are topic selection, turntaking initiation, and turntaking interruption. Within paralinguistic aspects are vocal intensity and quality and prosody. Included in nonverbal aspects are physical proximity, facial expression, and eye gaze. After viewing these pragmatic aspects, one can note that they are socially-based. After all, one would not be communicating by themselves. Arguably, meaning cannot be conveyed without some idea of what the person whom one is communicating with knows or does not know, or what he or she is capable of understanding. Therefore, as it relates to quality of life, deficits in the execution or comprehension of pragmatic aspects of language can be detrimental to communication between an individual and others, causing a disconnect in social relations.

Issues with pragmatic language often occur in normally aging adults. For example, older adults have more difficulty identifying facial emotion and vocal emotion (i.e., prosody) than younger adults (Lambrecht, Kreifelts, &Wildgruber, 2012; Mitchell, 2007). Older adults also have more difficulty understanding humorous situations than younger adults (Uekermann, Channon, &Daum, 2006), and humor has been labeled as a RH hemisphere processing function (Brownell, Michel, Powelson, & Gardner, 1983; Bryan, 1994). Older adults also ignore gesture in conversation more often than do younger adults (Cocks, Morgan, & Kita, 2011). Difficulties such as these can result in misunderstanding, confusion, and potential frustration in communication between older adults and other people. Keller-Cohen et al. (2006) assert that social interaction can be harmed by decreases in language ability due to aging, thus affecting overall quality of life. Being slower to pick up on pragmatic or non-literal aspects of language may cause a disconnect in communication between an older adult and another person (Westbury &Titone, 2011).

How can we assess for language changes in older age that may be meaningful to quality of life? Morris, Worsley, and Matthews (2000) pointed out that as of 2000, there were no test batteries specifically created to assess for language deficits due to abnormal aging in older adults. They stated that subtests of intelligence tests and other brief measures of naming or other language abilities can be used to assess for language deficits. However, Zanini, Bryan, de Luca, and Bava (2005) established that pragmatic language ability declines as a function of age. Thus, the potentially important aspect of pragmatic language decline during aging is not being regularly assessed during doctor and other visits related to cognitive aging. Some researchers have used the right-

hemisphere test batteries and other experimental tasks to examine age-related deficits in language abilities. Figurative language tests may include picture completion tasks or sentence completion tasks to test for comprehension or production. Although there are no formalized test batteries for aging and language deficits, a wide range of tasks, such as those mentioned here, can be combined in order to paint a more complete picture of the deficits that older adults experience.

Overall, there are connections between an older adult's physical, psychological, and social aspects of quality of life. Wengryn and Hester (2011) found that the pragmatic language aspects used in everyday social communication by older adults mirror the pragmatic language aspects used in interactions with health care providers. Because of older adults' increased incidences of injury and illness, the social relationship with health care providers is important. If it falters, physical quality of life may decline. If physical health declines, or if an individual feels that they are not being respected or listened to by their health care provider, depression, anxiety, and other negative psychological and emotional reactions may occur. This can further decrease overall quality of life for individuals with a disability or chronic health condition. If physical and/or psychological health declines, an older adult may not feel motivated to seek social interaction or support, further negatively impacting their physical, psychological, and social quality of life. If social aspects of quality of life fail, older adults may worsen in their physical condition or may experience negative psychological effects. These possibilities may be predicted by an older adult's pragmatic language ability. If they are not able to carry out or detect social aspects of language when conversing with health care providers, they may not receive effective health care. If an older adult's pragmatic language ability is

hindering them from communicating with friends and family effectively, there may be a decrease in social contact, or the positive impact of social interaction may be lessened and create social isolation. If an older adult cannot properly utilize pragmatic aspects to communicate with strangers at a store, church, or health care facility, they may not receive the services that are needed. The cycle of difficulties that pragmatic language deficits contribute to life for older adults is not well tested for or known about popularly. The individuals themselves, families, friends, and health care providers who interact with older adults should be made aware of potential declines in pragmatic language ability. Awareness of changes in communication such as pragmatics may increase the quality of life of older adults overall.

The current study examined the extent to which decline in pragmatic language ability during aging was related to older adults' overall quality of life. Community-dwelling older adult volunteers aged 65-75 years were screened for cognitive ability to participate in language tasks. Participants who demonstrated good mental and physical health and normal cognitive aging completed an initial demographic sheet, then the CDC's health-related quality of life measure (CDC HRQOL-14). Participants then completed the Right Hemisphere Language Battery (RHLB; Bryan, 1994). The first hypothesis was that pragmatic language ability would predict quality of life scores. Specifically, it was expected that social functioning on the QOL scale would be predicted by pragmatic language functioning as demonstrated by subscores on the RHLB.

CHAPTER III

METHODOLOGY

Nine older adults in Stillwater, Oklahoma participated. There were six female participants (M = 71.2 years old) and three male participants (M = 69.5 years old). Five participants identified as Caucasian and four participants identified as biracial (all biracial participants endorsed Caucasian and Native American). On average, male participants had a significantly higher number of years of education completed, $t(7)$ = -2.543, p = .041. No other demographic variables were significantly different for males and females. Participants were recruited through a variety of sources, including wellness/fitness centers, continuing education classes, churches, word of mouth, Craigslist, and posting of flyers at public locations and on Facebook promotional pages. Participants were compensated $20 for participating.

Participants came to the Cognitive Science laboratory at Oklahoma State University-Stillwater or met the researcher at a place of their choosing to participate. The Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) was used to assess participants for dementia symptoms and other signs of abnormal aging before the experiment in order to obtain participants who are cognitively able to participate effectively in the task. The MMSE is a brief, 30-item measure that assesses orientation

to time and place, attention, and other cognitive functions and can be completed in ten minutes or less. The MMSE has been found to be a valid measure of discrimination between older adults showing dementia and abnormal aging symptoms and normally aging adults. The reliability of the MMSE ranges from $r = .82-.88$, and test-retest reliability is high at $r = .98$. All participants scored at a normally aging level on the MMSE and thus advanced to the study tasks themselves.

Several questionnaires were administered in addition to a basic demographic survey. A copy of all materials used in the protocol is included in the Appendix. Quality of life was assessed using the CDC's Healthy Days measure (CDC HRQOL-14; CDC, 2000). The CDC HRQOL is labeled as a health-related quality of life measure but focuses equally on mental, physical, and social health as it relates to QOL, compared to other studies that use HRQOL measures that focus mainly on physical health. With 14 items in all, it includes a 4-item core module that has been used in national surveys on health by the CDC since 1993, a 5-item activity limitations module, and a 5-item daily symptoms module, both of which have been used by the CDC since 1995. A copy of the CDC HRQOL-14 is included in the Appendix. The measure has been validated through several studies (Andresen, Fitch, McLendon, & Myers, 2000; Hennessy, Moriarty, Zack, Scherr, & Brackbill, 1994; Nelson, Holtzmann, Bolen, Stanwyck, & Mack, 2001; Verbrugge, Merrill, & Liu, 1992). It has also been deemed a reliable measure (Andresen, Catlin, Wyrwich, & Jackson-Thompson, 2001; Andresen, Catlin, Wyrwich, & Jackson-Thompson, 2003; Andresen, Vahle, & Lollar, 2001). It was developed based on data collected from the nationwide Behavioral Risk Factor Surveillance System (BRFSS) telephone survey and the National Health and Nutrition Examination Survey (NHANES)

face-to-face interviews. The measure emphasizes both positive and negative aspects of health and took roughly 15 minutes to complete.

In addition, a short, six-item hearing questionnaire was administered to participants. The questions addressed daily situations in which hearing problems may affect interaction with others or understanding of conversations. Participants chose YES, NO, or SOMETIMES to questions. Example questions included, "Do you have trouble talking with a cashier at stores?" and "Do you have trouble following the conversation when at a physician's office?" If participants circled YES or SOMETIMES, their response was counted as a confirmatory response to the question.

Questions were included to assess the amount of social activity and social isolation of participants as well. Per Donald and Ware (1984), questions were included such as, "How many times in a typical week do you speak on the phone to relatives, friends, or neighbors?", as well as questions about club, meeting, and worship attendance. Questions also addressed how often participants had face-to-face contact with friends, neighbors, or relatives, and how often they left the house to engage in physical activity. These questions were completed by participants in ten minutes or less.

The Fraboni Ageism scale (Fraboni, Saltstone, & Hughes, 1990) was also administered. The scale measures how strongly individuals endorse discriminatory and avoidant attitudes toward older adults in society. Participants were instructed to indicate on a scale from 1 (Strongly disagree) to 4 (Strongly agree) how they feel regarding given statements about older adults. Example questions include, "Most old people should not be trusted to take care of infants" and "Many old people just live in the past." The scale contains 29 items, with 6 items being worded positively and requiring reverse scoring.

The scale was included because very few studies have examined how prevalent ageist attitudes are in older adults themselves. Most studies have focused on the attitudes of teenagers and your adults. Therefore, it was important to include the scale in order to see how ageist older adults are toward adults who are similar in age to themselves, and how ageist attitudes may be correlated with health, social, or language scores. Participants completed the ageism scale in fifteen minutes or less.

A 24-hour nutritional diet recall was also conducted for each participant. Participants were shown measuring cups and water bottles with ounces indicated and were asked to record their food and drink intake for the last 24 hours (Van Horn et al., 1993). They were asked to record what they ate and drank, how much they ate and drank, the time of the meal or snack, and where the meal or snack occurred. This measure was included to casually assess the estimated hydration level, fat content, and other nutrient content of participants' diets, and any potential relationships to reported health issues such as overweight/obesity. Participants completed the diet recall within ten minutes.

Subtests of the Right Hemisphere Language Battery, 2nd edition (RHLB-2; Bryan, 1994) were used. The RHLB-2 was developed based on data obtained from right-hemisphere damaged and normal control individuals' performance on pragmatic and other language tasks. Although the participants in the current study were not brain-damaged, Bryan (1994) encouraged researchers to utilize the RHLB with other adult populations. Research has shown that there is evidence to support the fact that the right hemisphere may age faster than the left, and that cognitive aging can affect language abilities associated with the right hemisphere. The RHLB is suggested for use in both clinical and research settings. The first section of the RHLB contains an information

sheet for recording general facts about the participant, such as their emotional state, any cognitive or physical impairment that they endorse, and demographics such as age, sex, etc. The greeting session was video recorded to assess discourse analysis and nonverbal communication aspects after the close of the session.

There are seven subtests on the RHLB. Each one is comprised of a recording sheet for the experimenter and stimuli cards/sheets for the participants. Depending on the subtest, they were either delivered verbally to the participants, or the participants were asked to read the stimuli cards, and then the individuals were given the stimuli cards to refer to when answering questions on the subtests. For each correct answer on the subtests, individuals were given a point on the recording sheet. The first subtest is the metaphor picture test. It consists of one practice item and ten target items that contain a common metaphor (e.g., *She left the scene of the accident with a heavy heart*.). After being read an item, participants were provided with a set of four pictures: one depicting the correct metaphorical meaning, one portraying the literal meaning, and two pictures depicting only a single aspect of the sentence. Participants were instructed to point to the picture that matched the meaning of the sentence. There was no time limit for choosing a picture, and the sentence could be repeated once for the participant. During the practice item, the experimenter corrected errors made by the participant. The maximum score on the subtest is 10, and errors and other performance notes were recorded on the scoring form.

The second subtest is the written metaphor test. One practice and ten target items are included. The participant viewed each item on a card while the experimenter read it out loud. Then they were instructed to point to one of three sentence choices that

reflected the same meaning as the first item. The first choice in the alternatives list is a rough (incorrect) translation of the target metaphor, another alternative is the actual metaphoric translation, and the third choice is a statement focusing incorrectly on one aspect of the target sentence. There was no time limit for choosing an alternative, and the sentence could be repeated once for the participant. During the practice item, the experimenter corrected errors made by the participant. The maximum score on the subtest is 10, and errors and other performance notes were recorded on the scoring form.

The third subtest is comprehension of inferred meaning. It is made up of three short paragraphs (one conversational, one narrative, and one emotional) with four questions per paragraph. The questions after each paragraph require inference of information not specifically stated within the paragraph, such as what the people in the paragraph are doing based on their conversation with one another. The participant read each paragraph while the card with the paragraph and questions printed was placed in front of him/her. During the practice item, the experimenter corrected errors made by the participant. The maximum score on the subtest is 12 (one point for each question answered correctly), and errors and other performance notes were recorded on the scoring form.

The fourth subtest is appreciation of humor. One practice and ten target items are included. The items contain jokes with a choice of four punchlines for each joke. The choices are the actual punchline, a straight ending of neutral content, a straight ending of emotional content, and a surprise ending that does not relate to the body of the joke. The jokes and possible punchlines were printed on cards placed in front of the participant while the participant read each item and alternative endings. The participant was

instructed to point to the ending that would finish the joke and make it funny. During the practice item, the experimenter corrected errors made by the participant. The maximum score on the subtest is 10, and errors and other performance notes were recorded on the scoring form.

The fifth subtest is the lexical-semantic test. One practice and twenty target words are included from a range of semantic categories and are pictorially represented. For each target word, drawings of five associated items are also presented in a 6-square matrix. For example, if the target word was car, there would be a picture of a *car*, a picture of a *bus* and *van* (two semantic coordinates), a functional associate such as *drive*, a phonological control that rhymes with the target word such as *jar*, and a visual control such as *shoe*. Participants were shown each matrix of pictures and the examiner said the name of the target item. Participants were instructed to point to the picture representing the target word. During the practice item, the experimenter corrected errors made by the participant, and errors and other performance notes were recorded on the scoring form.

The sixth subtest is production of emphatic stress. It examines the use of stress in speech to distinguish new information from information that has already been provided (e.g., *He sold the big car and bought a small one.*). Each sentence is made up by two clauses and is joined by the word *and* or *but*. Each sentence is pictorially represented by two pictures corresponding to each clause of the sentence. Five of the ten target sentences have the main stress on the last word of the second part of the sentence, and five have the main stress on another part of the sentence. Both pictures of each item were placed in front of the participant and the experimenter pointed to picture A (corresponding to the first clause of the item) and read it out loud using the expected stress pattern dictated on

18

the Production of Stress response form. The experimenter ended their speech with the conjunction and then pointed to picture B for the participant to describe. Responses were audio/video recorded for later stress analysis. The maximum score for this subtest was 10, and a practice item was included.

The seventh and final subtest is discourse analysis. A discourse analysis rating scale was completed for 4 of the participants' performance on this subtest. The other participants were not able to be videotaped due to equipment malfunction or inability to complete the discourse analysis due to poor video quality. Supportive routines (e.g., social routines including greeting and thanks), humor, questions, assertive routines (e.g., complaints, demands, criticisms, advice), narrative (e.g., length of utterance and detail), variety of interaction, formality (e.g., level of formality and type of information disclosed), turn-taking (e.g., balance of interaction), meshing (e.g., timing of interactions), discourse comprehension, and ratings of prosody for the first 5 aspects listed above were assessed. The two recorded portions that were rated using the scale were the greeting that occurred between the experimenter and participant and one other spontaneously occurring conversation during the session. An initial impression was also recorded by the experimenter. The rating scales for each social/pragmatic area range from 0 (severely limited performance) to 4 (discourse skills in the normal range). The aspects of this scale address social appropriateness, communication effectiveness, and pragmatic language ability. Ratings for eye contact, gesture, organization of speech, and completeness are also included. Total length of administration of the RHLB varied by individual, but it took between thirty minutes and one hour to complete. To supplement the RHLB, participants were asked two questions at the end of the session. The questions

referred to self-perception of communication skills, which is a topic that has been studied in various populations in relation to right-hemisphere processing (Ihnen, Penn, Corrigan, & Martin, 1998). The first question was, "What type of impression do you feel you made on the researchers today?" and the second question was, "What is your overall social skill?" Participants chose a response from 1 (Very socially unskilled) to 8 (Very socially skilled). Prior research has shown that people are accurate in judging their social skill level when compared to their actual performance on social skills tasks. Total time for completion of the entire protocol was between fifty minutes and two hours.

CHAPTER IV

FINDINGS

Data from individuals who were deemed capable of understanding the consent

process and questionnaires were analyzed (i.e., successfully completed MMSE

questions). Data on participants' CDC HRQOL-14 responses were summed to yield both

an overall QOL score and also 3 subscores for the three separate modules of questions

(i.e., the core module, the activity limitations module, and the daily symptoms module).

Additionally, means for individual questions were obtained in order to evaluate questions

that assess physical, psychological, and social functioning. Participants' subscores on the

RHLB yielded six subscores, with some participants having seven subscores including

the discourse analysis ratings. Social isolation, physical activity, and organization

membership data were calculated by activities engaged in per week (for physical activity

and social isolation questions) and per month (for organization membership). Data from

the hearing questionnaire were calculated by counting a YES or SOMETIMES response

as a reported aspect of hearing difficulty. The Fraboni Ageism Scale was calculated by

the Fraboni et al. (1990) guidelines to yield an overall ageism score (higher scores

indicated more endorsement of ageist attitudes). Means for all demographic and test

variables can be found in Table 1.

Means for all subscores on the RHLB for normally aging adults were provided by

Bryan (1994) for comparison. Participants in the current study scored lower than the mean for healthy controls in the Bryan (1994) study on the metaphor picture test, humor test, and emphatic stress test. Participants scored average on the written metaphor test and the lexical-semantic test. Participants in the current study scored higher than the mean for healthy controls on the inference test.

Of the nine participants, discourse analysis ratings were obtained from session video recordings for six participants. A Masters student in Speech-Language Pathology in the Communication Sciences and Disorders Department at Oklahoma State University conducted the discourse analysis for each person per Bryan's (1984) guidelines. The skills that were assessed were: supportiveness routines, humor, questions, assertiveness routines, narrative, variety, formality, turn-taking, mashing, discourse comprehension, prosody, and a total discourse analysis score. Four additional ratings of organization, completeness, eye contact, and gestures were also completed. A series of bivariate correlations was conducted to assess the direction and strength of relationships between the discourse analysis ratings and health-related QOL measures. Gesture usage was associated with the number of days of pain per month, $r = -.84$, $p = .04$. Gesture usage was also associated with total mental health rating, $r = -.81$, $p = .05$. Turn-taking ability during conversation was associated with number of days of pain experienced per month as well, $r = -.91$, $p = .01$. Turn-taking ability was also associated with total mental health scores, $r = -.84$, $p = .04$. Additionally, level of formality during conversation was associated with number of days of anxiety experienced per month, $r = -.860$, $p = .03$. Formality was also associated with total number of poor physical health days per month,

$r = -.86$, $p = .02$. Prosody ratings in the discourse analyses were associated with total

mental health ratings, $r = -.93$, $p = .008$. Use of questions properly in the discourse

analysis ratings was associated with number of days feeling anxious per month, $r = -.92$,

$p = .009$. The use of narrative during conversation was associated with the number of

days experiencing anxiety per month, $r = -.91$, $p < .01$. The use of supportive routines in

conversation was also associated with number of anxious days per month, $r = -.91$, $p <$

$.01$. Discourse analysis correlations are displayed in Table 3.

Several other significant relationships associated with health, QOL, and language

ability emerged. Scores on the inference subtest and days of depression per month

endorsed by participants were related, $r = -.82$, $p = .007$. The number of days per month

of anxiety was correlated with scores on the written metaphor test, $r = -.61$, $p = .04$ (one-

tailed). Days of restless or no sleep per month were correlated with scores on the lexical-

semantic subtest, $r = -.61$, $p = .04$ (one-tailed). Days of anxiety per month were

associated with scores on the emphatic stress subtest, $r = .61$, $p = .04$ (one-tailed).

Additionally, the number of times per week muscle-building/weightlifting occurred was

associated with scores on the lexical-semantic subtest, $r = -.74$, $p = .022$. The number of

religious services attended per week correlated with scores on the emphatic stress subtest,

$r = .69$, $p = .04$. In addition, scores on the ageism scale were associated with scores on the

written metaphor subtest, $r = -.63$, $p = .04$ (one-tailed).

Some relationships with demographic and health variables were present. The

number of years of education completed and days of poor mental health (including

depression and anxiety) were significantly correlated, $r = -.70$, $p = .037$. Additionally, the

more days of feeling anxious participants reported, the more days of poor physical health

they endorsed, $r = .72$, $p = .028$. The more days of restless or no sleep participants endorsed, the more days of depressed mood they reported per month, $r = .94$, $p = .005$. Regarding language ability and other variables, several correlations emerged as well. Age was associated with total score on the lexical-semantic subtest, $r = -.79$, $p = .012$.

An interesting aspect of the results was how scores on the humor subtest of the RHLB was associated with other variables. The more participants communicated by phone with friends, relatives, and neighbors, the higher they scored on the humor subtest, $r = .74$, $p = .022$. In addition, scores on the ageism scale were negatively correlated with scores on the humor subtest, $r = -.88$, $p = .002$.

Correlations were conducted using the module scores that were calculated on the CDC HRQOL, per CDC suggestions. The modules included a core health module, a limitations module, a pain module, and a vitality module. For participants who reported activity, mobility, or daily living limitations based on a physical or psychological problem ($N = 5$), there were several interesting relationships. The limitations module scores were significantly correlated with the vitality module scores, $r = -.957$, $p = .01$. The limitations module scores were also correlated with the number of religious services attended per month, $r = -.904$, $p = .04$. Additionally, participants who endorsed significant pain associated with their limitations endorsed higher scores on the core module, $r = .94$, $p < .001$. Participant scores on the pain module (including pain not associated with limitations) were also positively correlated with their total days of poor mental health per month ($N = 9$), $r = .72$, $p = .03$. In regards to the vitality module, higher vitality scores were associated with higher religious service attendance per month, $r = .89$, $p < .001$.

There were several notable relationships associated with social health and social isolation. First, there was a strong positive correlation between age and organization, club, and church membership, $r = .91$, $p < .001$. The older participants were, the more times they per month they participated in organizational activities. Additionally, the more religious services participants attended, the more days full of energy they endorsed on the CDC HRQOL scale, $r = .90$, $p < .001$.

Some correlations regarding physical activity emerged. Participants' jogging/running habits correlated with their swimming habits each week, $r = .97$, $p < .001$. Number of days with restless or no sleep in the last month were associated with the amount of jogging/running participants engaged in, $r = .81$, $p = .008$, and also with the amount of swimming participants engaged in, $r = .87$, $p = .003$. The more times per week participants reported jogging/running, the more instances of social get-togethers per week that they reported, $r = .91$, $p = .001$, and higher instances of swimming were also associated with more instances of social get-togethers, $r = .87$, $p = 002$. The older participants were, the more they engaged in muscle building/weightlifting, $r = .70$, $p = .04$. The more instances of walking for exercise or walking the dog that participants reported, the more they engaged in other forms of physical activity as well, $r = .77$, $p = .02$.

Some correlations regarding health and QOL approached significance. The amount of total unhealthy days reported (taking into account both mental and physical health judgments) were significantly correlated with total reported hearing problems, $r = .68$, $p = .06$. The more days of feeling anxious participants reported, the more days per month of physical pain they reported, $r = .61$, $p = .08$. The number of days of poor mental

health per month were associated with scores on the ageism scale, $r = .62$, $p = .08$.

Correlations are included in a matrix in Table 2.

CHAPTER V

CONCLUSION

The results of the current study provide evidence for the hypothesis that specific aspects of language ability (pragmatic language aspects) decline with older age and can affect quality of life. Prior research has demonstrated that pragmatic language and other right-hemisphere language functions decline with older age, but they have not investigated how overall quality of life can be affected by the deficits. Additionally, the expected results suggest that language changes in older adults affect social interactions and communication in particular. Scores on discourse analysis addressed actual conversation among the participant and the researcher, which the subtests of the RHLB addressed participants' language performance on laboratory tasks. The inability to express (and perhaps perceive) pragmatic language aspects, such as gestures, prosody, and inference of indirect meaning may cause severe problems in social interaction for older adults. Social interaction difficulties may result in issues such as increased social isolation, depression, and loss of social support, and can aggravate social issues already applied to older adults (e.g., loss of friends, decreased familial support, issues surrounding health problems, etc.). The results of this study suggest that all of these related factors play a role in the lives of older adults.

The results of the current study provide evidence for the hypothesis that specific aspects of language ability (pragmatic language aspects) decline with older age and can affect quality of life. Prior research has demonstrated that pragmatic language and other right-hemisphere language functions decline with older age, but they have not investigated how overall quality of life can be affected by the deficits. Additionally, the expected results suggest that language changes in older adults affect social interactions and communication in particular. Scores on discourse analysis addressed actual conversation among the participant and the researcher, which the subtests of the RHLB addressed participants' language performance on laboratory tasks. The inability to express (and perhaps perceive) pragmatic language aspects, such as gestures, prosody, and inference of indirect meaning may cause severe problems in social interaction for older adults. Social interaction difficulties may result in issues such as increased social isolation, depression, and loss of social support, and can aggravate social issues already applied to older adults (e.g., loss of friends, decreased familial support, issues surrounding health problems, etc.). The results of this study suggest that all of these related factors play a role in the lives of older adults.

Results of the discourse analyses showed that participants' total mental health ratings (taking into account both depressive and anxious days in the past month) were strongly negatively associated with gesture usage, turn-taking ability, and correct use of prosody. The more participants experienced poor mental health, the poorer they performed at these communicative skills during interaction with the researcher. Similarly, the more days of anxiety participants felt in the past month, the poorer they performed at maintaining proper formality, using questions effectively, using narrative appropriately,

and using supportive routines. These results suggest that cognitive or social difficulties caused by poor mental health can affect the carrying out of effective communication as it relates to these pragmatic language aspects. Poorer use of gestures, decreased ability to effectively take turns during conversation, and decreased formality of communication was associated with increased number of poor physical health days per month, including more days of pain. As such, it seems that poorer physical health is also associated with decreased ability to properly communicate using pragmatic language. Both chronic pain and mental health studies have shown that communication can falter due to pain levels (Gulbrandsen, Madsen, Benth, & Laerum, 2010) depressive and anxious symptoms (Kilmartin, 2005; McCrosky & Richmond, 1990; Savard, 2004). In fact, in the current sample, the more days of feeling anxious they reported, the higher the number of days of poor physical health, as well.

Based on participants' performance on the subtests of the RHLB, some similar relationships to the discourse analysis results emerged. However, performance on the subtests tended to be related to mental health variables rather than physical health variables. More days of depressive symptoms experienced in the past month were associated with poorer performance on the inference subtest. The decreased ability to infer meaning beyond what is explicitly stated in text has been shown consistently in aging studies (Hamm & Hasher, 1992; Sass, Legge, & Lee, 2006; Tompkins, Bloise, Timko, & Baumgaertner, 1994), and the current results suggest that mental health may play a role in inferential ability. Additionally, increased amounts of anxious days in the last month were associated with decreased performance on both the written metaphor test and the emphatic stress test. Studies have shown that production and perception of

29

emphatic stress can be affected by multiple factors, including anxiety (Quadflieg, Wendt, Mohr, Miltner, & Straube, 2007), which is in concordance with the current results. Lastly, the more days of restless or no sleep participants had in the last month, the poorer they performed on the lexical-semantic subtest. Sleep has been shown to profoundly affect performance on language tasks due to factors such as cognitive fog and lack of concentration (Alhola & Polo-Kantola, 2007; Harrison & Horne, 1998; Harrison & Horne, 1999). In the current sample, the more days of restless or no sleep the participants reported, the more days of depressive symptoms they reported, as well.

Participant age and education were related to several factors, as well. The more education participants had, the fewer days of poor mental health they reported in the past month. It is assumed that the more education a person has, the more likely they are informed about health issues and the greater the likelihood that they have means by which to seek treatment. The older participants were, the worse they performed on the lexical-semantic subtest. This result did not support the study's hypotheses, which expected a positive correlation between age and lexical-semantic performance, given that the lexical-semantic test can be used as somewhat of a control task in the RHLB. However, some prior research has shown that lexical retrieval during tasks of this nature can be impaired even during healthy aging (Bowles, Obler, & Albert, 1987; Nicholas, Obler, Albert, & Goodglass, 1985). Additionally, the older participants were, the more they engaged in muscle building/weight lifting. Weight-bearing activities have been shown to preserve bone health and prevent osteoporosis in older adults, helping maintain a more active lifestyle (Layne & Nelson, 1999; Suominen, 2006; Zehnacker & Bemis-Dougherty, 2007).

Physical activity itself was quite frequent in the current sample. The more jogging/running participants engaged in, the more frequently they swam for exercise. The more instances of walking they did, the more participants engaged in other physical activity as well. Physical activities such as these that involve aerobic activity have been shown to reduce and even reverse brain tissue loss, thus preserving cognitive functioning (Chapman et al., 2013; Colcombe et al., 2003). In addition, more physical activity was associated with greater instances of attending social gatherings each week. This result suggests that maintenance of good cardiovascular and brain health is a factor in continuing to stay mobile and maintain social functioning, potentially decreasing the likelihood of social isolation. Participants in the study also had healthy diets, on average. The fact that the physical activity level was relatively high in this sample could be related to their healthy diets, as well.

Social functioning and frequency of social contact were related to several aspects of health and language. A reassuring finding was that the older participants were, the more organizations, church groups, or clubs they participated in. Common perceptions of older adults contend that the older one gets, the more isolated they must be. However, in the current sample, this was not the case. The more religious services participants attended per month, the higher they scored on the emphatic stress subtest of the RHLB, and the more religious services they attended, the more days full of energy they reported having per month. On the other hand, the more health limitations participants experienced, the fewer religious services they attended per month, and higher vitality scores were associated with more religious service attendance per month. These results indicate that positive health and language outcomes may result from increased social

exposure, including using pragmatic skills regularly. The comforts derived from religious services may serve to invigorate older adults and provide them with energy and social support.

Also associated with social contact were participants' scores on the humor subtest of the RHLB. The more participants communicated with friends, relatives, or neighbors by phone, the higher scores they had on the humor subtest. This may be another instance of regularly using right-hemisphere processing to enhance or maintain social connections. Also related to increased humor scores were decreased ageism scores. Social aspects of humor may also be related to attitudes about those considered "old" in today's society.

The current study had several limitations. First, obtaining participants was difficult, resulting in a small sample size. Additionally, although the normally-aging population utilized in the study actually performed at or below the averages on the RHLB subtests set forth by Bryan (1984), the study was still somewhat homogeneous in regards to being at a relatively high education and health level. If a larger sample size with more diversity in these two domains were obtained, more definitive conclusions could be drawn about the role of pragmatic language ability in an aging sample more representative of the population. Another limitation of the study was that technical and equipment errors prevented all nine participants from being filmed for the later discourse analysis ratings. More data to use when analyzing the discourse analysis scores may have indicated different relationships than the ones that are reported.

One finding in the study was that scores on discourse analysis ratings that were also subtests in the RHLB (e.g., humor, prosody/emphatic stress) were not related to one another in participants' performance. This may be due to the fact that the subtests of the

RHLB were conducted in a more formal manner and allowed unlimited time to generate an answer. The discourse analysis was conducted based on natural greetings and conversation during the session between the participants and the researcher, occurring in "real-time." Future research may delve into comparisons of individuals' performance on laboratory and "real-time" language tasks in order to better understand whether temporal allowance is a factor in increased performance on activity involving right-hemisphere language abilities.

A good example of the formal test versus "real-time" comparison of skills is older adults' abilities to comprehend humor. Older adults may find it odd to try to select the correct punchline for a joke on paper, but are they more (or less) competent at using and comprehending humor in real-life conversation? Future research should further address the role of humor in older adults' lives. Although the ability to comprehend jokes and other humorous materials declines with age (Bryan, 1994), participants in the current study showed that increased humor scores were associated with lower ageism scores. Could humor be a protective factor against ageism? No studies have examined this link, to the researcher's knowledge.

The main implication that was visualized by obtaining positive results in the study was that of patient-provider relationships. If interactions with physicians or nurses are ineffective due to the older individual's pragmatic language decline, important medical information may not be conveyed. The individual may also not be able to properly convey their own concerns or questions due to pragmatic language decline. Health care implications could be very serious in these situations. In fact, Gulbrandsen et al. (2010) found that health care providers at a back pain clinic had significantly poorer

communication with patients experiencing chronic back pain. Additionally, Savard (2004) advocated for more careful bridging of the communication gap between physicians and patients who have depression, including physical symptoms such as pain, and Kilmartin (2005) emphasized that men with depression can suffer from extreme difficulty with communicating with health care providers. The results of the current study suggest that physicians and other health care providers should be more aware of how pragmatic language decline can affect their interactions with older patients, and how other health factors may play a role in communication. Older adults should be made more aware of the mental changes they will experience, outside of the more well-known issues such as memory loss and sensory dysfunction. Families of older adults should also be more aware of these changes, which can inform decisions made about the care of older relatives, and can address concerns about communicative quality decline as the person ages. The results may also inform policy makers about decisions involving quality of life of the growing aging population. Due to changes in the economy and increased age of workers, custodial grandparenthood, and other age-related social changes, pragmatic aspects of communication may become even more important for older adults to maintain, in addition to affecting their overall quality of life.

REFERENCES

Adams, C. (2002). Practitioner review: The assessment of language pragmatics. *Journal of Child Psychology and Psychiatry, 43*(8), 973-987. doi: 10.1111/1469-7610.00226

Albrecht, G. L., & Devlieger, P. J. (1999). The disability paradox: High quality of life against all odds. *Social Science & Medicine, 48*, 977-988.

Alhola, P., & Polo-Kantola, P. (2007). Sleep deprivation: Impact on cognitive performance. *Neuropsychiatric Disease and Treatment, 3*(5), 553-567.

Andresen, E. M., Catlin, T., Wyrwich, K., & Jackson-Thompson, J. (2001). Retest reliability and validity of a surveillance measure of health-related quality of life. *Quality of Life Research*, 10(3), 199.

Andresen, E. M., Catlin, T. K., Wyrwich, K. W., & Jackson-Thompson, J. (2003). Retest reliability of surveillance questions on health related quality of life. *Journal of Epidemiology and Community Health, 57*(5), 339-343. doi: 10.1136/jech.57.5.339

Andresen, E. M., Fitch, C. A., McLendon, P. M., & Meyers, A. R. (2000). Reliability and validity of disability questions for US Census 2000. *American Journal of Public Health*, *90*(8), 1297–1299.

Andresen, E. M., Vahle, V. J., & Lollar, D. (2001). Proxy reliability: Health-related

quality of life (HRQOL) measures for people with disability. *Quality of Life
Research,* 10, 609–619.

Ariel, M. (2002). The demise of a unique concept of literal meaning. *Journal of
Pragmatics, 34*, 361-402. doi: 10.1016/S0378-2166(01)00043-1

Baernholdt, M., Hinton, I., Yan, G., Rose, K., &Mattos, M. (2012). Factors associated

with quality of life in older adults in the United States. *Quality of Life Research:
An International Journal of Quality of Life Aspects of Treatment, Care and
Rehabilitation, 21*(3), 527-534. doi: 10.1007/s11136-011-9954-z

Barofsky, I. (2012). Can quality or quality-of-life be defined? *Quality of Life Research,
21*, 625-631. doi 10.1007/s11136-011-9961-0

Beeman, M. J., & Chiarello, C. (1998). Complementary right- and left- hemisphere

language comprehension. *Current Directions in Psychological Science, 7*(1), 2-8.

Berg, R. L., Hallauer, D. S., & Berk, S. N. (1976). Neglected aspects of quality of life.

Health Services Research, 11(4), 391-395.

Bowles, N. L., Obler, L. K., & Albert, M. L. (1987) Naming errors in health aging and

dementia of the Alzheimer type. *Cortex, 23*(3), 519-524.

Brownell, H. H., Michel, D., Powelson, J., & Gardner, H. (1983). Surprise but not

coherence: Sensitivity to verbal humor in right-hemisphere patients. *Brain and
Language, 18*, 20-27.

Bryan, K. L. (1994).*Right Hemisphere Language Battery* (*2nd edition*). London: Whurr Publishers.

Byrd, M. (1991).Adult age differences in the ability to read and remember metaphor.*Educational Gerontology, 17*(4), 297-313.

Centers for Disease Control and Prevention.Measuring Healthy Days. Atlanta, Georgia: CDC, November 2000**.**

Chapman, S. B., Aslan, S., Spence, J. S., Defina, L. F., Keebler, M. W., Didehbani, N., & Lu, H. (2013). Shorter term aerobic exercise improves brain, cognition, and cardiovascular fitness in aging. *Frontiers in Aging Neuroscience, 12*, 575. doi: 10.3389/fnagi.2013.00075

Cocks, N., Morgan, G., & Kita, S. (2011). Iconic gesture and speech integration in younger and older adults.*Gesture, 11*(1), 24-39.doi 10.1075/gest.11.1.02coc

Colcombe, S. J., Erickson, K. I., Raz, N., Webb, A. G., Cohen, N. J., McAuley, E., & Kramer, A. F. (2003). Aerobic fitness reduces brain tissue loss in aging humans. *Journal of Gerontology: Medical Sciences, 58A*(2), 176-180.

Crosby, R. D., Kolotkin, R. L., & Williams, G. R. (2003). Defining clinically meaningful change in health-related quality of life. *Journal of Clinical Epidemiology, 56*, 395-407. doi: 10.1016/S0895-4356(03)00044-1

Depp, C. A., &Jeste, D. V. (2006). Definitions and predictors of successful aging: A comprehensive review of larger quantitative studies. *American Journal of Geriatric Psychiatry, 14*(1), 6-20.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-mental state". A practical

method for grading the cognitive state of patients for the clinician. *Journal of*

Psychiatric Research, 12(3), 189-98.

Fraboni, M., Saltstone, R., & Hughes, S. (1990). The Fraboni Scale of Ageism (FSA): An

attempt at a more precise measure of ageism. *Canadian Journal on Aging, 9*(1),

56-66.

Gardner, H., & Brownell, H. H. (1986). *Right Hemisphere Communication Battery.*

Boston: Psychology Service, VAMC.

Grice, H. P. (2002). Logic and conversation. In D. J. Levitin (Ed.), *Foundations of*

cognitive psychology: Core readings (719-732). Cambridge, MA, US: MIT Press.

Gulbrandsen, P., Madsen, H. B., Benth, J. S., & Laerum, E. (2010). Health care providers

communicate less well with patients with chronic low back pain: A study of

encounters at a back pain clinic in Denmark. *Pain, 150*(3), 458-461.

Guyatt, G. H., Feeny, D. H., & Patrick, D. L. (1993). Measuring health-related quality of

life. *Annals of Internal Medicine, 118*, 622-629.

Halvorsrud, L., &Kalfoss, M. (2007). The conceptualization and measurement of quality

of life in older adults: A review of empirical studies published during 1994-2006.

European Journal of Ageing, 4, 229-246. doi 10.1007/s10433-007-0063-3

Hamm, V. P., & Hasher, L. (1992). Age and the availability of inferences. *Psychology*

and Aging, 7, 56-64.

Harrison, Y., & Horne, J. A. (1998). Sleep loss impairs short and novel language tasks having a prefrontal focus. *Journal of Sleep Research, 7*, 95–100.

Harrison, Y., & Horne, J. A. (1999). One night of sleep loss impairs innovative thinking and flexible decision making. *Organizational Behavior and Human Decision Processes, 78*, 128–45.

Hennessy, C. H., Moriarty, D. G., Zack, M. M., Scherr, P. A., & Brackbill, R. (1994). Measuring health-related quality of life for public health surveillance. *Public Health Reports*, 109, 665–672.

Ihnen, G. H., Penn, D. L., Corrigan, P. W., & Martin, J. (1998). Social perception and social skill in schizophrenia. *Psychiatry Research, 80*, 275-286.

Jordan, T. E. (2009). Source, method, and surmise: Quality of life in history. *Social Indicators Research, 94*, 227-239. doi: 10.1007/s11205-008-9419-0

Keller-Cohen, D., Fiori, K., Toler, A., &Bybee, D.(2006) Social relations, language and cognition in the 'oldest old.' *Aging & Society*, 26(4),585-605. doi10.1017/S0144686X06004910

Kilmartin, C. (2005). Depression in men: Communication, diagnosis, and therapy.

Kim, E. S., Bayles, K. A., & Beeson, P. M. (2008). Instruction processing in young and older adults: Contributions of memory span. *Aphasiology, 22*(7-8), 753-762. doi 10.1080/02687030701803788

Lambrecht, L., Kreifelts, B., &Wildgruber, D. (2012). Age-related decrease in

    recognition of emotional facial and prosodic expressions. *Emotion, 12*(3), 529-

    539. doi 10.1037/a0026827

Layne, J. E., & Nelson, M. E. (1999). The effects of progressive resistance training on

    bone density: A review. *Medicine & Science in Sports & Exercise, 31*(1), 25-30.

McCroskey, J. C., & Richmond, V. P. (1990). Willingness to communicate: A cognitive

    view. *Journal of Social Behavior and Personality, 5*(2), 19-37.

Mitchell, R. L. C. (2007). Age-related decline in the ability to decode emotional prosody:

    Primary or secondary phenomenon? *Cognition and Emotion, 21*(7), 1435-1454.

    doi10.1080/02699930601133994

Morris, R. G., Worsley, C., & Matthews, D. (2000). Neuropsychological assessment in

    older people: Old principles and new directions. *Advances in Psychiatric*

    Treatment, 6, 362-372. doi: 10.1192/apt.6.5.362

Nelson, D. E., Holtzman, D., Bolen, J., Stanwyck, C. A., & Mack, K. A. (2001).

    Reliability and validity of measures from the Behavioral Risk Factor Surveillance

    System (BRFSS). *Sozial- und Praventiv medizin* , 1(46 Suppl.), S3–42.

Nicholas, M., Obler, L., Albert, M., & Goodglass, H. (1985). Lexical retrieval in healthy

    aging. *Cortex, 21*(4), 595-606.

Prutting, C. A., &Kirschner, D. M. (1987).A clinical appraisal of the pragmatic aspects of

    language.Journal of Speech and Hearing Disorders, 52(2), 105-119.

Quadflieg, S., Wendt, B., Mohr, A., Miltner, W. H. R., & Straube, T. (2007). Recognition

 and evaluation of emotional prosody in individuals with generalized social

 phobia: A pilot study. Behaviour Research and Therapy, 45, 3096-3103.

Roberts, R. M., & Kreuz, R. J. (1994). Why do people use figurative language?

 Psychological Science, 5(3), 159163.

Sass, S. M., Legge, G. E., & Lee, H.-W. (2006). Low-vision reading speed: Influences of

 linguistic inference and aging. Optometry and Vision Science, 83(3), 166-177.

Savard, M. (2004). Bridging the communication gap between physicians and their

 patients with physical symptoms of depression. The Primary Care Companion to

 the Journal of Clinical Psychiatry, 6(1), 17-24.

Suominen, H. (2006). Muscle training for bone strength. Aging Clinical and

 Experimental Research, 18(2), 85-93.

The WHOQOL Group. (1985). The World Health Organization Quality of Life

 assessment (WHOQOL): Position paper from the World Health Organization.

 Social Science & Medicine, 41(10), 1403-1409.

Tompkins, C. A., Bloise, C. G. R., Timko, M. L. , & Baumgaertner, A. (1994). Working

 memory and inference revision in brain damaged and normally aging adults.

 Journal of Speech, *Language, and Hearing Research, 37*, 896-912.

 doi:10.1044/jshr.3704.896

Uekermann, J., Thoma, P., &Daum, I. (2008). Proverb interpretation changes in aging.

 Brain and Cognition, 67, 51-57. doi 10.1016/j.bandc.2007.11.003

United States Administration on Aging. (2011). *Aging Statistics*. Retrieved March 24,

    2013, from http://www.aoa.gov/aoaroot/aging_statistics/index.aspx

Weed, E. (2011). What's left to learn about right hemisphere damage and pragmatic

    impairment? *Aphasiology, 25*(8), 872-889. doi10.1080/02687038.2010.545423

Wengryn, M. I., & Hester, E. J. (2011). Pragmatic skills used by older adults in social

    communication and health care contexts: Precursors to health literacy.

    Contemporary Issues in Communication Science and Disorders, 38, 41-52.

Westbury, C., &Titone, D. (2011). Idiom literality judgments in younger and older adults:

    Age-related effects in resolving semantic interference. *Psychology and Aging,*

    26(2), 467-474. doi10.1037/a0022438

Wilson, I. B., & Cleary, P. D. (1995). Linking clinical variables with health-related

    quality of life: A conceptual model of patient outcomes. *Journal of the American*

    Medical Association, 273(1), 59-65.

Van Horn, L. V., Stumbo, P., Moag-Stahlberg, A., Obarzanek, E., Hartmuller, V. W.,

    Farris, R. P., Kimm, S. Y., Frederick, M., Snetselaar, L., & Liu, K. (1993). The

    Dietary Intervention Study in Children (DISC): dietary assessment methods for 8-

    to 10-year-olds. *Journal of the American Dietetic Association, 93*(12), 1396-403.

Zanini, S., Bryan, K., de Luca, G., & Bava, A. (2005). The effects of age and education

    on pragmatic features of verbal communication: Evidence from the Italian version

    of the Right Hemisphere Language Battery (I-RHLB). *Aphasiology, 19*(12), 1107-

    1133.

Zehnacker, C. H., & Bemis-Dougherty, A. (2007). The effect of weighted exercises on

bone mineral density in postmenopausal women: A systematic review.

APPENDICES

Participant Information

Informed consent (waiver of consent granted)

Thank you for your interest in our research.

Project Title: Language use and health in adults.

Investigators: Rachel Messer, M.S., and Shelia Kennison, Ph.D.

Purpose: The purpose of this research study is to examine how older adults use different aspects of language.

Procedures: If you participate today, you will complete tasks regarding your hearing, personal characteristics, everyday health, and language use.

Risks of Participation: There are no known risks associated with this research study that are greater than those ordinarily encountered in everyday life.

Benefits: Your participation in this research study may help you better understand your language use. The results of our study may one day benefit society, as this research may lead to a better understanding of language abilities in adults.

Confidentiality: The records of this research study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records. The data will be retained for five years following publication.

Mini Mental Status Exam (MMSE)

- Orientation

    ◦ What is the (year) (season) (date) (day) (month)?

    ◦ Where are we (state) (country) (town) (floor)?

- Registration

    ◦ Name 3 objects: 1 second to say each. Then ask the patient all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3. Count trials and record. Trials ___

- Attention and calculation

    ◦ Serial 7's. 1 point for each correct answer. Stop after 5 answers. Alternatively spell "world" backwards.

- Recall

    ◦ Ask for 3 objects repeated above. Give 1 point for each correct answer.

- Language

    ◦ Name a pencil and a watch.

    ◦ Repeat the following: "No ifs, ands, or buts"

    ◦ Follow a 3-stage command: "Take a paper in your hand, fold it in half, and put it on the floor."

    ◦ Read and obey the following: CLOSE YOUR EYES

    ◦ Write a sentence.

    ◦ Copy the design shown.

◦ Level of consciousness: alert, drowsy, stupor, coma
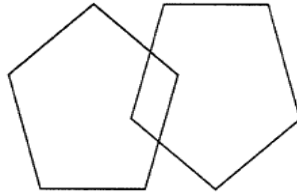
Demographic/Individual Differences Questionnaire

Participant #: _____   Age: _____ (years, months) Sex: __

Ethnicity: Caucasian ___ African American ___ Hispanic ___

Native American ___ Asian or Pacific Islander ___ Biracial ___

Other ___

Handedness: L   R   A

Highest education achieved: _____

Employment status: Currently employed Unemployed   Retired

Living status: Live alone Live with spouse or partner   Live with other

(family, etc.)   Live in assisted living community

Other: _____

How many times in the last month did you participate in these physical activities?

Jogging or running ___

Riding a bicycle or exercise bike ___

Swimming ___

Aerobic dancing ___

Other dancing, calisthenics, or floor exercises ___

Gardening or yard work ___

Weightlifting ___

Brisk walking/dog walking ___

How many times in a typical week do you speak on the phone to relatives, friends, or neighbors?

___

How many times in a typical week do you get together with friend, relatives, or neighbors (e.g. going out together or visiting each other's homes)? ___

How often do you attend church or religious services? ___

Are you a member of any clubs or organizations, such as a church group, union, fraternal, athletic, or school group? If so, how many times per month do you attend meetings for the organization? ___

Fraboni Ageism Scale

Many old people are not interested in making new friends, preferring instead the circle of friends they have had for years.

1	2	3	4
Strongly Disagree	Disagree	Agree	Strongly agree

Many old people are stingy and hoard their possessions.

	1	2	3	4

Strongly   Disagree   Agree Strongly agree

Disagree

Many old people just live in the past.

	1	2	3	4

Strongly   Disagree   Agree Strongly agree

Disagree

Teenage suicide is more tragic than suicide among the old.

	1	2	3	4

Strongly   Disagree   Agree Strongly agree

Disagree

Complex and interesting conversation cannot be expected from most old people.

	1	2	3	4

Strongly   Disagree   Agree Strongly agree

Disagree

Old people deserve the same rights and freedoms as do other members of our society.

| 1 | 2 | 3 | 4 |

Strongly   Disagree   Agree Strongly agree

Disagree

I would prefer not to live with an old person.

| 1 | 2 | 3 | 4 |

Strongly   Disagree   Agree Strongly agree

Disagree

I do not like it when old people try to make conversation with me.

| 1 | 2 | 3 | 4 |

Strongly   Disagree   Agree Strongly agree

Disagree

Old people should try to find friends their own age.

| 1 | 2 | 3 | 4 |

Strongly   Disagree   Agree Strongly agree

Disagree

Most old people should not be trusted to take care of infants.

| 1 | 2 | 3 | 4 |

Strongly   Disagree   Agree Strongly agree

Disagree

Old people can be very creative.

| 1 | 2 | 3 | 4 |

Strongly   Disagree   Agree Strongly agree

Disagree

Most old people should not be allowed to renew their driver's license.

| 1 | 2 | 3 | 4 |

Strongly   Disagree   Agree Strongly agree

Disagree

Old people do not need much money to meet their needs.

1   2   3   4

Strongly   Disagree   Agree   Strongly agree

Disagree

Most old people would be considered to have poor personal hygiene.

1   2   3   4

Strongly   Disagree   Agree   Strongly agree

Disagree

Most old people can be irritating because they tell the same stories over and over again.

1   2   3   4

Strongly   Disagree   Agree   Strongly agree

Disagree

The company of most old people is quite enjoyable.

1   2   3   4

Strongly   Disagree   Agree   Strongly agree

Disagree

Old people should feel welcome at the social gatherings of young people.

    1   2   3   4

Strongly   Disagree   Agree Strongly agree

Disagree

Many old people are happiest when they are with people their own age.

    1   2   3   4

Strongly   Disagree   Agree Strongly agree

Disagree

I would prefer not to go to an open house at a seniors club, if invited.

    1   2   3   4

Strongly   Disagree   Agree Strongly agree

Disagree

Old people complain more than other people do.

1	2	3	4

Strongly	Disagree	Agree	Strongly agree
Disagree			

It is best that old people live where they won't bother anyone.

1	2	3	4

Strongly	Disagree	Agree	Strongly agree
Disagree			

Most old people are interesting, individualistic people.

1	2	3	4

Strongly	Disagree	Agree	Strongly agree
Disagree			

I sometimes avoid eye contact with old people when I see them.

1	2	3	4

Strongly	Disagree	Agree	Strongly agree
Disagree			

It is sad to hear about the plight of the old in our society these days.

1	2	3	4

Strongly   Disagree   Agree Strongly agree

Disagree

Feeling depressed when around old people is probably a common feeling.

1	2	3	4

Strongly   Disagree   Agree Strongly agree

Disagree

I personally would not want to spend much time with an old person.

1	2	3	4

Strongly   Disagree   Agree Strongly agree

Disagree

Old people do not really need to use our community sports facilities.

1	2	3	4

Strongly   Disagree   Agree Strongly agree

Disagree

Old people should be encouraged to speak out politically.

1   2   3   4

Strongly   Disagree   Agree   Strongly agree

Disagree

There should be clubs set aside within sports facilities so that old people can compete at their own level.

1   2   3   4

Strongly   Disagree   Agree   Strongly agree

Disagree

24-hour Diet Recall

Nutrition

In this part of the study, you will be asked to remember what you have eaten and drank in the past 24 hours, and how much of each type of food or drink you consumed.

	Time eaten	What did you eat?	Location of the meal (home, restaurant, family member's house)
Breakfast			
Lunch			
Dinner			
Snacks			

Centers for Disease Control Health-Related Quality of Life Healthy Days measure

Core Module

1. Would you say that in general your health is:

a. Excellent

b. Very good

c. Good

d. Fair

e. Poor

2. Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?

a. Number of Days __

b. None

3. Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?

a. Number of Days __

b. None

4. During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

a. Number of Days __

b. None

<div align="center">Activity Limitations Module</div>

1. Are you LIMITED in any way in any activities because of any impairment or health problem?

a. Yes

b. No

2. What is the MAJOR impairment or health problem that limits your activities?

a. Arthritis/rheumatism

b. Back or neck problem

c. Fractures, bone/joint injury

d. Walking problem

e. Lung/breathing problem

f. Hearing problem

g. Eye/vision problem

h. Heart problem

i. Stroke problem

j. Hypertension/high blood pressure

k. Diabetes

l. Cancer

m. Depression/anxiety/emotional problem

n. Other impairment/problem

3. For HOW LONG have your activities been limited because of your major impairment or health problem?

a. Days __

b. Weeks __

c. Months __

d. Years __

4. Because of any impairment or health problem, do you need the help of other persons with your PERSONAL CARE needs, such as eating, bathing, dressing, or getting around the house?

a. Yes

b. No

5. Because of any impairment or health problem, do you need the help of other persons in handling your ROUTINE needs, such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?

a. Yes

b. No

Symptoms Module

1. During the past 30 days, for about how many days did PAIN make it hard for you to do your usual activities, such as self-care, work, or recreation?

a. Number of Days __

b. None

2. During the past 30 days, for about how many days have you felt SAD, BLUE, or DEPRESSED?

a. Number of Days __

b. None

3. During the past 30 days, for about how many days have you felt WORRIED, TENSE, or ANXIOUS?

a. Number of Days __

b. None

4. During the past 30 days, for about how many days have you felt you did NOT get

ENOUGH REST or SLEEP?

a. Number of Days __

b. None

5. During the past 30 days, for about how many days have you felt VERY HEALTHY

AND FULL OF ENERGY?

a. Number of Days __

b. None

Table 1

Descriptive statistics for demographic variables and variables of interest

	M (SD)	Min	Max
Age	70.63(5.99)	65.42	75.96
Years of education	17.44(3.13)	12.00	22.00
Jogging/Running	.56(1.33)	.00	4.00
Riding bike	1.56(2.60)	.00	6.00
Swimming	1.11(3.33)	.00	10.00
Aerobic dancing	.00	.00	.00
Other physical activity	4.44(3.28)	.00	30.00
Gardening	5.00(7.30)	.00	20.00
Weight lifting	3.11(5.86)	.00	17.00
Walking	6.33(6.67)	.00	20.00
Phone communication	15.33(10.25)	3.00	10.25

	M (SD)	Min	Max
Get-togethers (social)	4.56(3.21)	1.00	12.00
Religious services	2.89(1.83)	.00	5.00
Organization memberships	9.00(9.58)	.00	25.00
Days of poor physical health	.33(6.56)	.00	20.00
Days of poor mental health	.33(.71)	.00	2.00
Days of pain	2.44(5.25)	.00	15.00
Days depressed	.44(.34)	.00	3.00
Days anxious	.78(1.09)	.00	3.00
Days of restless/no sleep	1.00(1.73)	.00	5.00
Days full of energy	23.11(12.57)	.00	30.00
Total unhealthy days	3.00(6.48)	.00	20.00
Totals hearing problems	2.00(1.51)	.00	4.00

	M (SD)	Min	Max
Metaphor picture test	9.22(1.09)	7.00	10.00
Metaphor written test	9.67(.50)	9.00	10.00
Inference test	10.56(1.24)	8.00	12.00
Humor test	8.33(.71)	7.00	9.00
Lexical-semantic test	19.67(.71)	18.00	20.00
Emphatic stress test	8.56(1.33)	7.00	10.00
Supportive routines- DA (*N* = 5 for all DA)	3.60(.89)	2.00	4.00
Humor- DA	2.80(1.79)	.00	4.00
Questions- DA	3.20(1.79)	.00	4.00
Assertiveness- DA	3.6(.89)	2.00	4.00
Narrative- DA	3.20(1.79)	.00	4.00
Variety- DA	3.20(1.79)	.00	4.00
Formality- DA	3.00(1.73)	.00	4.00

	M (SD)	Min	Max
Turn-taking- DA	3.20(1.10)	2.00	4.00
Meshing- DA	4.00(.00)	4.00	4.00
Discourse comprehension- DA	4.00(.00)	4.00	4.00
Prosody- DA	3.20(1.10)	2.00	4.00
Total- DA	3.40(.89)	2.00	4.00
Organization- DA	4.00(.00)	4.00	4.00
Completeness- DA	4.00(.00)	4.00	4.00
Eye contact- DA	4.00(.00)	4.00	4.00
Gestures- DA	2.00(2.00)	.00	4.00
Ageism	66.44(6.48)	60.00	81.00
Core module	6.33(11.23)	1.00	36.00
Limitations module ($N = 5$)	3.55(4.86)	.00	11.00
Pain module	2.44(5.25)	.00	15.00

Mental health module	1.22(1.30)	.00	3.00
Vitality module	24.11(12.61)	.00	33.00

Notes: DA indicates discourse analysis. Physical activity, health, and organization/social attendance scores are per month. Communication is per week.

Table 2

Correlation matrix of health, social, demographic, and physical activity variable by RHLB subtest

	Picture metaphor	Written metaphor	Inference	Humor	Lexical-semantic	Emphatic stress
Age	-.71*	.17	.09	.13	-.79*	-.47
Years of education	-.47**	.03	.45	.09	-.09	-.13
Jogging/Running	-.27	.31	-.14	.31	-.31	.02
Riding bike	-.05	.45	.01	.50	-.09	.30
Swimming	-.08	.25	-.17	.35	-.35	.13
Aerobic dancing	----	----	----	----	----	----
Other physical activity	-.69*	.19	.18	-.17	.24	-.31
Gardening	.14	-.31	-.21	-.41	-.10	.17
Weight lifting	-.24	-.07	.06	.23	-.74*	-.17
Walking	-.47	-.04	.27	-.10	.18	.07
Phone communication	.09	.46	-.01	.74*	-.41	.10
Get-togethers (social)	.40	.44	-.15	.18	-.35	-.20
Religious services	.26	-.59	.20	-.26	-.13	.69*
Organization membership	-.86*	.24	.000	.11	-.61	-.46
Poor physical health	.26	-.46	.35	-.11	.11	.32
Poor mental health	.38	-.35	-.52	-.50	.25	-.09

Note. * indicates significance at the .05 level, ** indicates significance at the .01 level.

Table 2

Correlation matrix of health, social, demographic, and physical activity variables by RHLB subtest (continued)

	Picture metaphor test	Written metaphor test	Inference	Humor	Lexical-semantic	Emphatic stress
Days of pain	.37	-.37	.07	-.01	.25	.19
Days depressed	.35	.08	-.82**	.12	.22	-.39
Days anxious	.36	-.61*[a]	.29	-.22	.05	.61*[a]
Days of restless/no sleep	-.13	.43	-.52	.61	-.61*[a]	-.22
Days full of energy	-.11	-.41	.25	-.16	-.21	.47
Ageism	.27	-.68*	.28	-.88**	.23	.26

Note. * indicates significance at the .05 level, ** indicates significance at the .01 level. [a] indicates one-tailed test.

Table 3

Correlation matrix of health variables and discourse analysis ratings

	Gestures	Turn taking	Formality	Prosody	Questions	Narrative	Supportive routines
Days of poor physical health	-.65	-.71	-.86*	-.50	-.86*	-.99**	-.99**
Days of pain	-.84*	-.91*	-.83*	-.65	-.73	-.89*	-.89*
Days of anxiety	-.49	-.44	-.86*	-.47	-.92**	-91*	-.91*
Total mental health	-.81*	-.84*	-.77	-.93**	-.61	-.53	-.53
Total unhealthy days	-.65	-.72	-.92*	-.58	-.90*	-.99**	-.92*

Note. * indicates significance at the .05 level, ** indicates significance at the .01 level.

VITA

RACHEL HELEN MESSER

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE ROLE OF PRAGMATIC LANGUAGE IN AGING AND ITS RELATIONSHIP WITH QUALITY OF LIFE

Major Field: Lifespan Developmental Psychology

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Lifespan Developmental Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2014.

Completed the requirements for the Master of Science in Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2012.

Completed the requirements for the Bachelor of Science in Psychology and French at Morehead State University in Morehead, Kentucky in 2009.

Experience: Graduate teaching assistant for 5 years, lab manager for Cognitive Science lab for 4.5 years.

Professional Memberships:
Association for Psychological Science (APS)
Southwestern Psychological Association (SWPA)
Oklahoma Network for Teaching of Psychology (ONTOP)
Psychology Graduate Student Association (PGSA)