

ABSTRACT

AUMAN, L. CORINNE. The Effect of Stereotype Threat on Cognitive Performance and Physiological Variability in Older Adults. (Under the direction of Thomas M. Hess)

Previous work has shown that the activation of negative stereotypes influences performance in members of the stereotyped group. The present study attempted to test the applicability of stereotype threat to middle-aged and older adults in a medical setting. Specifically, the assumption that stereotype threat occurs as a normal response to any conditions in which individuals feel that the potential to be stereotyped exists was examined. Based on the theory of stereotype threat proposed by Steele (1997), it was hypothesized that anxiety would increase and performance would decline when patient stereotypes were activated in outpatients at the VA clinic. To test this hypothesis, VA patients aged 46 to 86 years were interviewed in a manner designed to either heighten or reduce threat through reference to either their patient status or, conversely, some positive aspect of self. Participants' cardiovascular and galvanized skin conductance (GSR) responses were monitored throughout the study, and measures related to anxiety and performance outcomes were also completed. Stereotype-related variations in anxiety were evident, with patients who talked about their medical experiences reporting more feelings of anxiety than patients who were interviewed about their leisure activities. Additionally, patients who were asked about their medical experiences demonstrated greater changes in their GSR readings over the course of the experiment, suggestive of higher levels of stress. Potential explanations for these results are explored including those relating to the cognitive structures activated by the negative stereotypes associated with being a patient.

**THE EFFECT OF STEREOTYPE THREAT ON COGNITIVE PERFORMANCE
AND PHYSIOLOGICAL VARIABILITY IN OLDER ADULTS**

by

L. CORINNE AUMAN

A dissertation submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

PSYCHOLOGY

Raleigh

2002

APPROVED BY:

Chair of Advisory Committee

BIOGRAPHY

Lori Corinne Auman is originally from Franklinville, NC. She graduated from Eastern Randolph High School in 1993. In 1997, she graduated from Elon College with a Bachelor of Arts in Psychology and a minor in Human Services. Later that year she enrolled in a combined M.S. and Ph.D. program in developmental psychology at North Carolina State University in Raleigh, NC. Corinne's research for her master's program focused on stereotype influences on older adult performance, and she earned her M.S. in developmental psychology in 2000. She received a pre-doctoral fellowship to complete her dissertation from the Department of Veterans' Affairs, and used this opportunity to extend stereotype threat research into the health-care field. She is a member of the American Psychological Association and Gerontological Society of America.

ACKNOWLEDGEMENTS

There are many people who contributed directly to the work on this project. First and foremost, I wish to thank Dr. Thomas Hess, who served as my advisor during my graduate studies. The opportunities, knowledge, and guidance you have provided me with throughout these years have been invaluable. My appreciation also goes to the members of my doctoral committee, Dr. Samuel Snyder, Dr. Katherine Klein, and Dr. James Luginbuhl, for the time and energy they have invested in me. Finally, I would like to express special thanks to Dr. Hayden Bosworth at the Durham Veterans' Affairs Medical Center, who supervised and counseled me through my pre-doctoral fellowship.

I also wish to express my gratitude to the individuals who helped me develop personally and professionally during my undergraduate studies, thus enabling me to embark on a graduate career. Thank you to Drs. Maureen Vandermaas-Peeler and Catherine King, who guided my training at Elon while also becoming good friends. Thank you to Carolynn Whitley, who took incredibly good care of me on a daily basis. Thank you also to Dr. Stephen Braye, who taught me to dream big dreams. This one certainly would not have been accomplished without his care and support.

Finally, I would like to share my enormous gratitude for my friends and family who have had to put up with me over the past few years. Thank you to Sandy Waters for her wise counsel. To my friends Jana Turpish, Laura Batz, Jennifer Quinn, and Angela Carter, thank you for all the procrastination help, even when I didn't need it. Thank you also to my husband Chad, for your encouragement and patience. I am also thankful to my family, Jerry and Elaine Auman, and Corbin and Caroline Auman who supported me and were always optimistic that I would someday be finished.

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	v
LIST OF FIGURES.....	vi
LITERATURE REVIEW	
Stereotypes, behavior, and physiological Changes.....	5
Stereotype threat and aging.....	7
Ageism.....	9
Health perceptions.....	11
Stereotype threat and medical patients.....	16
The present study.....	17
METHOD	
Participants.....	20
Materials.....	21
Procedure.....	24
RESULTS	
Manipulation check.....	27
Participant characteristics.....	30
Physiological measures.....	30
Anxiety.....	38
Observed Tasks of Daily Living-Revised.....	39
DISCUSSION	
Physiological arousal and anxiety.....	43
Performance.....	49
Issues and concerns.....	50
The stereotype threat framework.....	53
Conclusions.....	54
LIST OF REFERENCES.....	56
APPENDIX.....	63

LIST OF TABLES

	Page
Table 1. Stereotype Activation Questions.....	23
Table 2. Mean Physiological Measures Across Trials.....	32
Table 3. State Anxiety and OTDL-R Means by Condition.....	40

LIST OF FIGURES

	Page
Figure 1. Age by Condition by Investment Interaction for Skin Conductance Readings	33
Figure 2. Condition by Trials Interaction for Skin Conductance Readings.....	35
Figure 3. Condition by Age by Investment Interaction for MAP Readings.....	37
Figure 4. Condition by Investment Interaction for OTDL-R Total Correct.....	41

Stereotypes about different groups in society are virtually unavoidable. These over-generalizations are shared throughout the culture and are known by the overwhelming majority of its members, regardless of their personal endorsement of the particular stereotype. Outward aspects of individuals such as age, race, or sex can activate stereotypes (Devine, 1989), but once a stereotype has been activated, it is not inevitable that it will be used to determine future actions. The perceiver's personal feelings of prejudice will decide if the stereotype will be applied to the current situation and individual. Prejudiced individuals will allow their behavior to be directed by the stereotype, whereas unprejudiced individuals will not be influenced (Devine, Monteith, Zuwerink, & Elliot, 1991).

Stereotypes about a group have the potential to affect members' performance in the stereotyped area. These individuals realize that the opportunity to be stereotyped is present and this knowledge may cause negative feelings to arise in them. These negative feelings can inhibit optimal performance because the group members know the opportunity to be categorized is present and thus, they may experience anxiety or overcompensate by expending extra effort on the task and second guessing their answers. They may also engage self-protective strategies and disengage from the task, resulting in poor performance but with an acceptable excuse for it. Steele (1997) proposed a theory for how stereotypes change the experience of the world for stereotyped individuals. The term he uses for the pressure individuals feel when they fear categorization based upon an outward identifier that places them in the membership of a particular group is *stereotype threat*.

Stereotype threat deals with situations where a negative stereotype becomes self-relevant and evokes the perception that it will change how others in that situation view members of the stereotyped group and their subsequent behavior. Examples of stereotype

identifiers are race, sex, and age, and assumptions by perceivers can be made based on any one of these characteristics. Such assumptions may or may not be correct, however, and have the potential to be very detrimental for the individual being stereotyped. For the observer, though, automatically categorizing an individual is often beneficial. Having these classifications readily available allows the individual to reserve cognitive resources for other purposes (Schneider, 1991).

Stereotype threat can affect anyone about whom a negative stereotype exists. It occurs in situations where the stereotype is applicable and the individual is personally invested in the performance outcome. For example, female math students may feel stereotype threatened and experience anxiety in math class. This in turn may cause performance outcomes to be below expectations based on actual capabilities, causing endorsement of the very stereotype that was feared. Such an outcome would be unlikely in English class, because there is no negative stereotype about females in that area. Additionally, stereotype threat would be unlikely to influence females in math class who do not care about that skill. English majors, for example, would probably not experience stereotype threat in math class because they do not use that domain to judge their own intellectual skill. Thus, the experience of stereotype threat is directly linked to identification with the stereotyped domain (Steele, 1997).

The impact of stereotypes on individuals has been studied primarily by examining how racial stereotypes influence performance. Steele (1997) uses the stereotype threat idea to explain why African-American students perform more poorly in academic settings than non-minority students. African-American students may feel as though they are going to be stereotyped and avoid allowing it to affect their self-esteem by not identifying with the

school domain. By making academics an area that they do not care about, the African-American students can keep from being stereotyped as having lack of ability. Instead, poor school performance can be attributed to lack of effort.

Steele and Aronson (1995) conducted a series of studies examining the relationship between racial identity and academic performance of African-Americans. These studies examined the conditions necessary to both activate stereotypes within African-American students and hinder their performance. Possible paths to activation were indicating that the test was diagnostic of ability in the instructions for the task, as well as having the individual indicate their race on a personal information sheet completed just prior to the ability task. Thus, there are multiple ways to activate stereotype threat within individuals.

This stereotype activation was evident in the performance outcomes and other measures gathered from participants in the stereotype threat condition. African-American participants in the threat condition had lower scores on a test of verbal ability than both the White participants and their non-threatened African-American counterparts. As further evidence of the effects of stereotype activation, it was demonstrated that the non-threatened African-American students scored equally to their White counterparts. Evidence that the race stereotype was activated was also gathered from the word-fragment completion and stereotype avoidance measures that were administered. African-American participants in the stereotype threat condition completed more race-related word fragment completions, which is suggestive of stereotype activation, and offered more reasons for their poor performance (e.g., did not get enough sleep, under too much stress) than did the other participant groups.

Researchers have also examined the stereotype threat idea in groups other than African-Americans. Aronson, Lustina, Good, and Keough (1999) conducted research investigating whether a history of stigmatization was necessary for stereotype threat to occur and subsequently influence performance. In this case, White males were tested in math, a domain for which there was no negative stereotype about their group. However, by comparing the White males to Asian males, a group for which there is a very positive stereotype about math, these researchers were able to activate stereotype threat within the White males by implying that they may confirm the stereotype that Americans of European descent have poorer math ability than Asians-Americans. The results supported the idea that a history of stigmatization was not necessary and that situational factors alone could cause stereotype threat to occur. This threat has the potential to prevent individuals from performing at their ability level in a domain that is important to them.

Shih, Pittinsky, and Ambady (1999) investigated how stereotype salience could be manipulated and influence subsequent performance outcomes within individuals. Specifically, these researchers examined a group for which two differing stereotypes applied: Asian-American women. For this group, the positive stereotype about Asians' superior math ability is relevant, as well as the negative stereotype about females' poor math skills. This research suggested that intellectual performance can be moderated by the social identity that is currently salient. The Asian-American women who had their ethnic identity brought to mind prior to testing had better performance outcomes than a control group, whereas the Asian-American women who were prompted to think about their gender performed worse than a control group. Thus, differing stereotypes can apply to the

same group of people and, depending upon the aspect of their identity that is brought to mind, influence cognitive performance in different ways.

Stereotypes, Behavior, and Physiological Changes

Previous research has also demonstrated that stereotypes can influence behavioral outcomes. Bargh, Chen, and Burrows (1996) investigated the behavioral consequences of activation of the aging stereotype. Associated with this stereotype is the idea that older adults are slow, frail, and weak. Thus, Bargh et al. (1996) proposed that the activation of this stereotype would cause individuals to have slower walking speeds than individuals who did not have the stereotype activated. Participants were primed with the older adult stereotype in a scrambled sentence task. The priming, however, did not deal with the aspects of the stereotype dealing with physical or mental slowness. This was done to demonstrate that the stereotype had been activated, and that participants were not just reacting to being primed with slowness-related items. The dependent measure was the length of time participants took to walk approximately 40 feet down a hallway as they were leaving the experiment. In support of their hypothesis, Bargh et al. (1996) found that individuals who had been primed with the older adult stereotype took longer to walk down the hall than the comparison group. Participants did not report any awareness of this slowing in their behavior or changes in their energy level.

Hausdorff, Levy, and Wei (1999) also examined the influence of age stereotypes on walking performance. Participants were older adults who were exposed to a subconscious reinforcement of either a positive or negative aging stereotype. These researchers demonstrated that the activation of positive aging stereotypes could partially reduce the age-related changes in gait and walking performance for older adults. There were no changes in

gait or walking performance for participants exposed to negative aging stereotypes. These results indicate that positive stereotypes influence performance. Whether this influence is a reversal of negative stereotypes or an enhancement of normal performance, however, is not clear.

In the health-care field, behavioral outcomes relating to stereotypes have been demonstrated in a long-term care setting. Langer and Rodin (1976) examined how the environment of older patients influenced their health and social outcomes. Older adults who were told that the staff was responsible for their environment (highlighting patient status) showed less interpersonal activity, such as visiting with other nursing home residents, and reported less happiness compared to older adults who were given responsibility for their environment. These patients also experienced more health deterioration than their counterparts who were given responsibility. Thus, expectations created by medical staff through interactions with patients can influence subsequent patient behaviors and outcomes.

In addition to behavioral changes, stereotype activation may also influence the physiological responses of individuals. Levy, Hausdorff, Hencke, and Wei (2000) demonstrated that the activation of aging stereotypes in older adults could influence cardiovascular functioning. Individuals were subliminally primed with either the positive or negative aging stereotype and then given several tasks (e.g., verbal and mathematical challenges) to complete. Measures of blood pressure and skin conductance indicated that those individuals who were exposed to the negative aging stereotype showed increases in these autonomic measures compared to their own baseline and to participants in the positive condition. Participants in the positive condition did not experience a significant increase in skin conductance or blood pressure.

Stereotype Threat and Aging

As demonstrated in the Levy et al. (2000) research, stereotypes can be activated within older adults. Such activation has been shown to influence aspects of older adults lives, such as their will to live (Levy, Ashman, Dror, 2000), longevity (Levy, Slade, Kunkel, & Kasl, 2002) and even aspects of behavior as simple as handwriting (Levy, 2000). Age is an outward characteristic that for the most part cannot be hidden, and for which there are negative stereotypes. These negative stereotypes are prevalent in American society and everyone has basic knowledge of them. Thus, the possibility for older adults to experience stereotype threat is present. For example, older adults may attempt to avoid situations that will utilize their memory ability due to the anxiety that stereotype threat may cause. Levy (1996) examined the role of stereotypes in the cognitive performance of older adults. Specifically, she investigated the idea that stereotypes can influence the performance of older adults without their awareness. Participants were given an initial memory task and then subliminally primed for either a stereotype of wisdom or senility. On a second set of memory tasks, the older adults' performance varied according to the stereotype that had been primed. That is, participants primed with the stereotype of senility scored lower on the second set of memory tasks compared to baseline, whereas participants primed with wisdom improved their performance compared to baseline. Thus, stereotypes about age could be subliminally primed in older adults and cognitive performance influenced without the individual realizing that the stereotype had been activated.

Stereotype threat, however, requires that individuals are aware of the potential to be stereotyped. Rahhal, Hasher, and Colcombe (2001) examined stereotype threat and aging by examining the idea that the instructions given during a experiment may be sufficient to

activate stereotypes and subsequently influence performance. In two experiments, these researchers gave instructions that either placed emphasis on the fact that they were administering a memory task or were memory neutral. On the subsequent memory task, it was found that whereas older adults performed just as well as younger adults in the memory neutral condition, their performance was worse than younger adults when memory was emphasized. This result, however, may be due as much to poorer performance by the young adults in the memory neutral condition as it is to better performance by older adults in the same condition. Nonetheless, this research supports the idea that the context in which a test is administered is not the same for different age groups when stereotypes are activated.

In a related study, Hess, Auman, Colcombe, and Rahhal (in press) also examined the relationship between stereotype threat and older adults' memory performance. Young and older adults were given a memory test after being exposed to conditions that varied in the type of information presented about the relationship of aging to memory. The positive condition presented information that contradicted the traditional views of aging and memory, whereas the negative condition reinforced these views (i.e., memory declines with age). The control condition presented no information prior to the memory task. This study found that older adults who were exposed to the negative information performed worse than older adults who were exposed to the positive information or were in the control group. Importantly, these results were moderated by participants' investment in their memory. Specifically, the more participants valued their memory ability, the worse they performed on the memory task in the negative condition. This is consistent with Steele's (1997) proposal that stereotype threat should only occur in individuals who value the particular domain.

Ageism

The Hess et al. (in press) study demonstrates the influence of contextual factors on older adults' memory performance. As the research on aging stereotypes demonstrates, negative views about older adults are prevalent in American society. The term ageism was originally coined by Butler (1969) to refer to a societal pattern of widespread devaluation of older adults. Similar to that which occurs with both racism and sexism, ageism presumably is thought to be responsible for avoidance behaviors and discriminatory practices (Cockerham, 1997; Gatz & Pearson, 1988). How individuals actually handle interactions with older adults in everyday life, however, varies widely. Individuals who hold negative aging stereotypes may deal with them through disdain, aversion and neglect (Butler, 1980), or through compassion (Binstock, 1983), emphasizing care for the older adult due to their frailty and presumed helplessness. Both stereotypes reinforce the assumption that aging is a process of decline and do not accurately represent the diversity of the older adult population.

Ageism is based partially on the accurate observation that health declines with age. Older adults and young children are the age groups who utilize health services the most (National Center for Health Statistics, 1995). Past research has shown that health care workers hold stereotypes about old age (Baker, 1984) and that they treat patients differently based upon age (Greene, Hoffman, Charon, & Adelman, 1987). For example, medical staff have been shown to spend less time with older patients (Keeler, Solomon, Beck, Mendenhall, & Kane, 1982), treat their symptoms less aggressively and respond less to their psychosocial needs (Greene et al., 1987). In recent years, however, there has been a push to educate medical personnel about the particular needs of older adults, and subsequently more are being trained in geriatrics than ever before (Alford, Miles, Palmer, & Espino, 2001;

Cockerham, 1997). There is still progress to be made, however, as medical residents report that they do not feel well-informed about older adults' conditions (Beall, Baumhover, Simpson, & Pieroni, 1991).

Research in the mental health field has also shown that psychiatrists, clinical psychologists, and social workers view older adults as less than ideal for services. Older adults are often viewed as having poorer prognoses than younger counterparts, and as being less desirable to work with than younger individuals with the same problem description (Dye, 1978; Garfinkel, 1975; James & Haley, 1995; Ray, McKinney, & Ford, 1987; Settin, 1984; Wilensky & Barmak, 1966).

Prejudice against older adults has also been studied in the general population. Brewer, Dull, and Lui (1981) examined and obtained support for the idea that the term "older adult" is a general category that contains several subcategories regarding different types of old people. These researchers had young adult participants sort photographs of older adults believed to be representative of the subcategories grandmother, elder statesman, and senior citizen. Schmidt and Boland (1986) extended this idea by demonstrating that young adults hold multiple subcategories for older adults, rather than just the three investigated by Brewer et. al (1981). In another study, Hummert (1990) presented participants with a deck of trait cards and asked them to sort the cards into piles of either traits typical for older adults or traits typical for younger adults. A subsequent cluster analysis revealed that different categorizations existed for young and older adults. An effect for stereotype was found, such that attitudes towards those who were hypothesized a priori to be negative (e.g., invalid) were poorer than towards those hypothesized in advance to be more positive (e.g., perfect grandparent). Interestingly, no differences were found between

the age groups for the category of invalid targets (young vs. old). Thus, individuals in poor health were viewed in a similar manner, regardless of their age. In a second study, Hummert (1990) found that there was no negative bias against older adults when compared to young adults in similar subcategories (e.g., invalid). Participants evaluated the older and young adults in the same category in a similar manner. This research demonstrates that personal traits, such as health status, may exert a more powerful influence upon a perceiver's attitude toward the target person than age, and suggests susceptibility to threat effects in these domains.

Health Perceptions

Given that individuals can be categorized based on the identifier of health status, it is important to consider the stereotypes and potential bias that come with such a grouping. Personal perceptions of health may influence behaviors such as adherence to treatment regimen or medical visits. Other individuals' views of health status also have the potential to influence how individuals see themselves and their willingness to seek help. These biases are particularly important for the individuals suffering from health problems, as well as the staff trained to interact with them.

Perceivers' views. Cockerham (1997) argues that health status is the single most important determinant of the quality of life for older adults. This makes sense, due to the fact that physical health is the factor that decides if individuals are able to pursue the activities of their choice or are limited by physical ailments. Good health also leads to positive affect and, contrary to popular notion, older adults do not report a decrease in happiness as they age (Witt, Lowe, Peek, & Curry, 1980). When asking older adults about

happiness, the key factor differentiating happy and unhappy people appears to be their perception of personal health (Witt et al, 1980).

When personal health problems do arise, individuals may be reluctant to seek care, particularly if their illness is perceived as socially unacceptable or presents a physical disability. Patients with less socially acceptable illnesses have been shown to be perceived more negatively by nurses than patients with less embarrassing problems (Larson, 1977), and the presence of a physical disability can influence the judgments of an individual that have no relationship with the disabling condition (Wright, 1980). Thus, health problems have the ability to activate affective reactions in the perceiver. Wright (1980) indicated that this influence could be positive, such as an inference of wisdom or courage (e.g., combat injuries), or it could be negative, such as an inference of deficiency. Work examining the effects of both age and health on individuals' attitudes toward a target, however, has supported a more negative than positive view. Specifically, health factors have been found to exert more potent effects than age in activating negative perceptions.

For example, Braithwaite (1986) presented Australian high school students with detailed vignettes in which the target's age (young vs. old), cognitive ability (alert vs. impaired), and physical ability (active vs. disabled) were varied. Age effects were not found, but targets with impaired physical or mental abilities were perceived more negatively, indicating that health is a more powerful activator of stereotypes than is age. Similarly, Gekoski and Knox (1990) presented college students with descriptions of targets that were varied according to age (young vs. old) and health status (poor, average, or excellent for their age). Participants were asked to rate their interpersonal perceptions of these targets. Main effects for health were found across all dimensions, such that those in

poorer health were rated more negatively than those in good health. Only one effect was found for age, with older individuals being rated as less effective than younger ones for dealing with everyday crises.

James and Haley (1995) investigated the roles of ageism and healthism in a study of practicing clinical psychologists. Participants were presented with vignettes describing a new patient presenting with depressive symptoms whose age varied (35 or 70) and health varied (unremarkable or poor). Data were collected concerning prognosis and interpersonal judgments for the potential client. There was evidence found for an age bias; however, evidence for health bias regardless of patient age was stronger. This research is important because older adults who seek mental health treatment are likely to also have other physical health problems. Health bias among clinical psychologists may impede the delivery of effective service to older adults.

These studies suggest two conclusions. First, society does exhibit what Gekoski and Knox (1990) termed healthism. That is, people tend to hold stereotypes that devalue individuals in poor health. Second, health appears to be a powerful factor in activating negative stereotypes. Thus, it is important to consider how an individual's health may cause others to stereotype them and, subsequently, how that threat of being stereotyped influences the individual themselves.

Individual perceptions. Leventhal, Nerenz, and Leventhal (1982) argued that an individual's experience of an illness is a dehumanizing process. This dehumanization occurs both by depriving individuals of their human qualities because an illness is overtaking their body, and through the mechanical and routine treatment that they receive from medical staff during treatment. Leventhal et al. (1982) propose that there are three

areas related to illness that threaten to dehumanize the individual. First, the individual's physical appearance may be threatened due to the toll that their illness will take on their body over time. Illnesses often cause physical changes that the individual realistically fears will cause others to reject them. This rejection (or fear of it) can cause changes in self-perception such that the individual no longer feels worthwhile as a human being.

Second, patients may also lose the ability to control the decisions in their lives and to act upon their own emotions and wishes. Thus, individuals' personal control over their lives is threatened. Patients may be put in wheelchairs when they are capable of walking, or may be instructed to follow a strict diet and exercise program that curtails their normal habits. It is difficult for individuals to feel in control of their own lives when an illness has taken over and changes multiple aspects their life (Leventhal et. al, 1982)

Finally, the patient's inner psychological life may be ignored due to the focus on the physical ailments being addressed. Additionally, the medical staff may not pay attention to individuals' ability to understand the medical terminology about their condition, and thus the patient may be lost as to what is going on with their illness. Medical personnel are trained to deal with the physical problems faced in an illness, but not the inner emotional struggle individuals face. The patient may end up feeling lost and as though they are just another patient because their personal concerns are ignored (Leventhal et al., 1982).

For these reasons, the patient-provider relationship is particularly important in maintaining a positive outlook within the patient. It is widely accepted in the medical field that patients should be given an opportunity to participate in the decisions that are made concerning their health and treatment. Increased involvement in medical decisions (Greenfield, Kaplan, & Ware, 1985) and greater patient control (Kaplan, Greenfield, &

Ware, 1989) have both been positively associated with health status. Such a style of care by the physician has also been positively associated with patient satisfaction (Braddock, Finn, Levinson, Jonsen, & Pearlman, 1997; Stewart, 1984). In recent years, emphasis has been placed on participatory decision-making (PDM). PDM is described as giving patients opportunity to discuss different treatment options and ultimately generating within them a feeling of control over their own care.

Although PDM is the ideal in terms of patient-provider interactions, it does not always occur in real-world settings. Gotler, Flocke, Goodwin, Zyzanski, Murray, and Stange (2000) examined how prevalent the use of PDM was in family practices. Using research nurses' observations during a doctor-patient visit, these researchers found that the use of PDM is highly variable. Among the participating doctors, PDM was focused primarily on patients with the most complicated medical needs and who had the most complicated decisions to make. Patients with less complex medical needs were not engaged in PDM as often. Thus, although PDM is considered ideal, it is not used consistently with patients.

There are particular characteristics of the patient and the visit type that are associated with the utilization of PDM. Age, education level, and minority status have all been related to the use of PDM. Specifically, individuals who were over 75 and under 30 had less participatory visits than patients in the intermediate age-range. Education level was positively associated with the use of PDM, with individuals who had the highest levels of education being more involved with treatment decisions, and minority patients experiencing less PDM than non-minority patients (Cooper-Patrick, Gallo, Gonzales, Vu, Powe, Nelson, & Ford, 1999 ;Kaplan, Gandek, Greenfield, Rogers, & Ware, 1995). The visit characteristic

that was associated with the use of PDM was length of office visit. The longer the office visit, the more likely PDM was to be used by the physician. This finding is particularly important, given the push by insurance companies and HMOs to restrict elements of patient care such as the length of time per visit and the types of procedures that can be performed. (Kaplan et al., 1995)

Stereotype Threat and Medical Patients

As patients, individuals are aware of the potential dehumanizing that can happen during encounters with medical personnel and are often anxious to actively participate in their health care. Such knowledge, however, may cause patients to experience stereotype threat. Given the evidence of health stereotypes and the unpredictable use of PDM discussed earlier, feeling threatened is well justified. If patients feel that encounters with medical staff are opportunities to be stereotyped or to counteract what the staff already believes about them, then they may experience anxiety because they fear this categorization. Patients do not want to be viewed as simply another example of disease “X.” For example, an individual with heart disease does not want to be viewed as just another patient. They want to know the details of their disease, what caused it, and how to cope with it, in layman’s terms that are clear and understandable. Having medical staff take them through treatment routines without explanation is likely to make them feel as though they are unintelligent or incapable of understanding and participating in their own treatment. Thus, every encounter with the medical staff is an opportunity to be stereotyped as a patient. This stereotype entails helplessness, loss of control, and loss of independence. It is very important to the individual patient that she or he be viewed as capable of functioning in everyday life.

For the older adult patient, avoiding being categorized as a patient may be particularly important. Older adult patients are already dealing with potential stereotypes as they age, and thus the patient stereotype may be particularly threatening to them. Unlike younger patients who may suffer from an illness and then recover fully, older adults are likely to take longer to recover and to not recover to their former health. Older adults are also more likely to experience a loss in control in the health domain when compared to younger adults (Lachman, 1986), further suggesting that the negative connotations associated with patient status may be exacerbated in later life. If older adult patients know the potential exists to be viewed in this negative light when seeking medical treatment, they may be influenced to delay treatment or avoid it altogether.

Stereotype threat is one process through which patients may be influenced by their environment. Once the negative patient stereotype has been activated, individuals may experience anxiety and performance decline. These processes occur with minimal awareness on the part of the affected individual, but still influence the life and health of the patient. This study is an important step toward understanding the implications of stereotype threat for the behavior and health of patients.

The Present Study

This study examined patient stereotypes in an outpatient setting at the Durham Veteran's Affairs Medical Center (DVAMC). One reason for conducting this study was to expand the stereotype threat theory into a more applied, real-world setting. Up to this point, work with the stereotype threat framework has been conducted exclusively in the laboratory and almost entirely on college students. The objective was to explore the stereotype threat framework in the context of a previously unexamined stereotype, that of patients. Based on

the research reviewed here, the fear of being categorized in a negative fashion due to health problems appears realistic and thus, can threaten the individuals seeking medical treatment.

This threat may influence behavioral performance, anxiety levels, and physiological responses of patients. It was hypothesized that activation of negative patient stereotypes (e.g., sickness, dependency, helplessness) was likely to occur during patient and medical staff interactions. Once this activation has occurred, the individual may find it difficult to deviate from the sick role, due to the possible consequences. Keller (1971) found that patients who were submissive to the medical staffs' explanations and instructions received more services than patients who did not comply. Thus, it was reasonable to propose that the activation of the patient stereotype encourages individuals to allow others to direct them not only in how they deal with their medical condition, but in other tasks as well. The patient stereotype has the potential to influence individuals' ability to carry out everyday tasks independently. It was the goal of this study to determine if the activation of the patient stereotype causes anxiety for the individual, lowers individual behavioral performance on tasks related to everyday life, and causes changes in physiological systems.

Two conditions were employed in this study, a patient stereotype activation condition (medical interview) and a non-patient condition (leisure interview). These conditions were designed either to highlight a participant's status as a medical patient, or to highlight some positive aspect of his life. It was hypothesized that patient stereotype activation would play a role in lowering the performance outcomes on everyday tasks by increasing threat. Performance was examined using a section of the Observed Tasks of Daily Living-Revised (Diehl, Marsiske, & Horgas, 1998). This measure asks participants to complete a series of tasks that they might perform in everyday life. Performance decline

associated with stereotype threat was expected in terms of both a reduced number of correct answers, and an increased need for prompts from the experimenter in participants who had the patient stereotype activated compared to participants in the non-patient group. The influence of patient stereotype activation was expected to be shown in the physiological responses of elevated blood pressure, heart rate, and skin conductance, as well as in increased anxiety for participants who had their patient status highlighted, as compared to participants who were in the non-patient condition. These physical responses were hypothesized to contribute to the performance declines of individuals under stereotype threat.

Based on Steele (1997) it was also hypothesized that placing high value on independent living in everyday life would be associated with the poorest levels of performance for participants in the patient stereotype condition. Thus, the impact of the threat manipulation was expected to increase with the value placed on independence. Investment levels were not expected to influence the performance of participants in the non-patient condition due to the fact that the negative stereotype was not being activated. Anxiety and physiological responses were also examined as potential mediators that might account for performance variation associated with threat. It was expected that high anxiety or arousal levels would be observed in participants in the patient stereotype condition who were highly invested compared to individuals in the non-patient condition or individuals who did not value independent functioning, and that this variation in anxiety and/or arousal would account for performance variance.

Method

Participants

Potential participants were identified from a large pool of patients at the DVAMC who previously had been diagnosed with hypertension. There were several reasons for requiring participants to have this diagnosis. First, hypertension is one of the most prevalent diseases among older adults and thus was a convenient way to identify patients in the appropriate age-range (Cockerham, 1997). Additionally, it was important to identify patients who did not have life-threatening illnesses and selecting for this diagnosis allowed elimination of inappropriate patients. It can also be argued that selecting patients with a hypertension diagnosis allowed for the most reactive patients (e.g., larger range of blood pressure) to be included in the study, and thus would allow more power in providing insight into how stereotypes may influence reactivity.

The participants for this study were 122 male adults, ages 46 to 86, recruited at the DVAMC over a 10-month period. The original intention of this study was to have a power of .8, as is recommended by Cohen (1988) which would have required 144 patients. However, due to constraints placed on the study by the host institution, the sample is slightly smaller than expected. This reduction in sample size offers a power of .78 for detection of a medium ($d = .25$) effect. The sample included 47 African-American participants and 75 European-American participants. This ethnic distribution is representative of the population at the DVAMC, which consists of approximately 60% European-Americans and 40% African-Americans (Department of Veterans Affairs, 1995). Mean education level for the sample was 13.26 years of schooling, with a range from 4 to 20 years. Participants were evenly distributed across three general age groupings (approximately 46 to 59, 60 to 69, and

70 to 86) included in the sample, and each interview condition (medical or leisure) was balanced for minority participants.

Participants were contacted before a scheduled appointment at the DVAMC and asked to participate in the research study. At the beginning of the study, eligible participants were screened for dementia and poor reading ability, which might interfere with participation. The Short Portable Mental Status Questionnaire (MSQ; Pfeiffer, 1975) was used for dementia screening. This test consists of 10 questions relating to the current situation (e.g., What is the date today?) and the individual's personal information (e.g., How old are you?). Participants were allowed three wrong answers before being eliminated from the study. The Rapid Estimate of Adult Literacy in Medicine (REALM; Parker, Baker, Williams, & Nurss, 1995) was used to assess literacy level. This test consisted of a list of medical terms (e.g., flu, hormones, diagnosis) that the participant was asked to read out loud. Participants who were unfamiliar with 22 or more of the 66 total words were assessed as being functionally illiterate (below sixth grade reading ability) and were eliminated from the sample. These screening measures resulted in the elimination of seven participants.

Materials

Stereotype activation. Negative stereotype activation was accomplished through an interview containing a series of five questions designed to highlight awareness of the participants' medical condition. These questions were designed to activate the negative patient stereotype of sickness, loss of control, and dependence. Positive stereotype activation was accomplished through a series of five questions about favorite leisure activities. These questions were designed to highlight participants' awareness of their

abilities and competence in a personally relevant area, while at the same time downplaying their patient status. (See Table 1)

Observed Tasks of Daily Living (OTDL). The OTDL is a behavioral assessment of older adults in three domains (medications, phone use, and finances) of everyday problem solving. It is based upon instrumental activities of daily living (IADLs; see Lawton & Brody, 1969 for a description), which are frequently used in clinical gerontology to assess older adults' everyday competence (Fillenbaum, 1985). For this study, one portion of the revised OTDL (OTDL-R) related to the domain of medications was used (Diehl, et al., 1998). This section was chosen because the tasks from this section of the OTDL have been rated as among the most important for independent everyday functioning both by practitioners and by community-dwelling older adults (Diehl, Willis, & Schaie, 1990). The coefficient of internal consistency (Cronbach's α) for the taking medications portion of the OTDL-R was .70 (Diehl et al., 1998). This portion of the OTDL-R was also selected for use in this study because it is most related to the patient stereotype being assessed. Additionally, time constraints in the testing situation did not allow for the entire OTDL-R to be administered. This portion of the OTDL-R contained three parts: 1) directions, 2) comprehension, and 3) forms. The directions section presented the participant with a variety of medicine bottles and asked open-ended questions about correct dosages, side effects, and needs for refills. It contained 5 questions and 5 potential prompts. The comprehension portion presented the participant with an over-the-counter drug leaflet and asked open-ended questions about time intervals between dosages, and what to do if the pain lasts for an extended period of time. It contained 3 questions and 3 potential prompts. The forms portion asked participants to fill out a patient history record based on information provided

Table 1

Stereotype Activation Questions

Medical/Negative:

- 1) Why are you here today?
- 2) How long is your typical wait when you come for an appointment?
- 3) How often do you come for a medical appointment?
- 4) How long have you been a patient of the VA center?
- 5) How does your illness limit your ability to: a) complete physical tasks b) take care of yourself without help c) attend social activities

Leisure/Positive:

- 1) What activity do you do that makes you feel good?
- 2) How long have you been doing this?
- 3) How often do you participate in this activity?
- 4) What made you first become interested in this activity?
- 5) What are the particular aspects of the hobby that you enjoy?

to them. It contained 3 questions and 2 potential prompts. Thus, for the OTDL-R there was a total of 11 questions and 10 potential prompts.

Investment Scale. Stereotype threat theory is based on the idea that an individual must care about the stereotyped area in order for stereotype threat to influence them. That is, the stereotype must be personally relevant (Steele, 1997). Because the patient stereotype being activated in this study deals with dependence upon others due to poor health, an investment scale was included to measure how important independent living was to participants. This measure was based on a subscale of the Metamemory in Adulthood Questionnaire (MIA; Dixon and Hultsch, 1984). The original Memory Achievement subscale examined the importance of having a good memory to the individual participant. It consisted of 16 statements about memory achievement (e.g., It is important to me to have a good memory) for which participants provided ratings ranging from strongly agree to strongly disagree. Scores could range from 16 to 80, with lower scores meaning higher

investment. However, for this study the scale was reverse scored, such that high scores corresponded with high investment. This scale was also modified to deal with how invested the participants were in being able to function independently in everyday life (e.g., It is important to me to be able to live independently). The original scale had a reliability of .76 to .79 (Cronbach's α), and the reconfiguration of the scale for this study did not alter this result (Cronbach's $\alpha = .80$). See Appendix 1.

State Anxiety. State anxiety was measured using the 10-item State-Trait Personality Inventory (Spielberger, 1979). This scale consisted of the 10 items from the original 20-item State anxiety scale that had the highest factor loadings. Participants were asked to indicate on a 4-point Likert scale how much the statements (e.g., I feel calm) describe their feelings at the present moment. The reliability for the long-form of this scale for working adults is .93, and is stable across ages 19 to 69, with alpha coefficients ranging from .90 to .94.

Procedure

Patients were contacted prior to a regularly scheduled appointment with their primary care physician and asked to participate in a research study dealing with how others' perceptions of us can influence our behavior. They were told that the study would be conducted prior to their scheduled appointment and they were asked to come in early to complete the study. However, not all participants were tested prior to their scheduled appointments. Due to such factors as participant tardiness and clinics seeing patients early, some participants were tested immediately following their medical appointment. Participants were tested individually and were quasi-randomly assigned to either the medical or leisure interview condition.

Condition assignment was quasi-random due to the investment questionnaire score being considered before participants were assigned to an interview condition. It was important that each condition have an approximately equal number of high versus low investment participants. Thus, the investment questionnaire was scored and used in assigning an interview condition. The interview conditions were also balanced for age and ethnicity.

At the beginning of the session, each participant signed an informed consent document detailing the study. Next, baseline physiological readings were gathered. The physiological measures included heart rate, blood pressure (systolic and diastolic), and skin conductance. Heart rate was the number of heartbeats per minute. Systolic blood pressure was the force of blood against the arterial walls when the heart is contracting. Diastolic blood pressure was this same force when the heart was relaxing. Skin conductance was a measure of electrodermal activity, which is related to the stimulation of the sweat glands in individuals' hands when they face a challenging situation and is indicative of stress. Following the procedure of Levy et al. (2000), the heart rate and blood pressure measures were gathered using a portable, automatic blood pressure and heart rate machine. Skin conductance was measured using a NeuroDyne monitor. For every skin conductance data point, three consecutive values were recorded. These values were measured 1 second apart, and then averaged to provide a more robust estimate of arousal. Participants were not allowed to view the screens for either of the devices during the study.

After the initial physiological readings, the MSQ was administered to screen for participants with dementia and the REALM was given to assess reading levels. Participants who did not pass the MSQ or had a reading level below sixth grade were taken through an

abbreviated version of the study and were subsequently eliminated from the sample. The investment questionnaire was administered next, followed by a brief demographic questionnaire. The investment questionnaire was scored while participants completed the demographic questionnaire and interview condition assignment was made at this point in the study.

Next, physiological readings were gathered again before participants completed either the medical or leisure activity interview, based upon condition assignment. After completing the interview, participants completed the state anxiety questionnaire. Physiological measures were observed again after the state anxiety questionnaire and then participants were reminded about the questionnaire they filled out earlier (leisure or medical). Participants then began the taking medications portion of the OTDL-R. This task was introduced as a measure that was being considered for use as a diagnostic tool to determine when hospital patients are ready to return home. This introduction was designed to highlight the task's relevance to the everyday life of the patient. Finally, physiological measures were gathered again after the taking medications portion of the OTDL-R was completed. Participants were carefully debriefed about the nature of the study.

Results

For this study, the primary interest was the impact of the stereotype threat manipulation on physiological responses, anxiety level, and performance on everyday tasks. The influence of interview condition, age, and level of investment in independent living on the dependent variables associated with each of the factors was examined using general linear model-based analyses of variance (ANOVA). Age and investment level were treated as continuous variables and centered at 0 through standardization (Aiken & West, 1991). In

order to examine significant relationships more closely, follow-up analyses used regression lines based on calculations using representative measures of age and investment one standard deviation above and below the mean for variables within each condition (see Cohen & Cohen, 1983). The ages represented by these were approximately 74 and 56, respectively. The investment levels represented by these points were 61.62 (low investment) and 74.97 (high investment).

In addition, the analyses of the physiological measures included a within-subjects variable due to repeated measurements during the study. All within-subjects effects were examined for violations of sphericity using the Huynh-Feldt ϵ . Following the recommendations of Hertzog and Rovine (1985), statistical tests were adjusted by using corrected p -values when violations occurred. The alpha level for all statistical tests in this report was set at .05.

Manipulation Check

The original conditions designed for this study were intended to activate either a negative stereotype about being a patient (medical interview) or a more positive aspect of self (leisure interview). Participants were quasi-randomly assigned to conditions, with scores from the investment measure taken into consideration for condition assignment to assure an equal balance of high and low investment individuals in each condition. To determine how successful the even distribution of high and low investment individuals was across ages and conditions, an Age X Condition ANOVA was conducted on investment scores. No significant effects were obtained ($ps < .48$), indicating that the assignment procedure was successful in creating conditions containing participants with similar distributions of investment scores.

An examination of the distribution of investment scores was also conducted. This revealed that the investment measure had a significantly skewed distribution, $z = -2.69$, with virtually all scores falling in the upper half of possible scores. Participants could receive a score ranging from 16 to 80, with higher scores indicating higher investment. However the range for participants in this study was limited from 41 to 80. In addition, the lowest score was an outlier, with the next closest scores being 54 and 58. Thus, use of the investment scale was fairly restricted. The limited range of variability for this scale has implications for what was considered high and low investment. Although these terms were designated at one standard deviation above or below the mean, the fact that the entire scale was not utilized influences the interpretation of these numbers. Based on this scale, it appears that participants in this study were moderately to highly invested in independent living, with no one indicating true low investment. Thus, the comparisons made in this study may be better thought of as between moderate and high investment, rather than low and high investment.

In addition to investigating the investment level of participants in the different conditions, responses to the interview questions were also examined. During the course of the study it became apparent that not all participants were responding to the interview questions in the intended manner. For example, participants in the leisure interview sometimes responded in a negative manner by talking about activities that they previously enjoyed. In other words, they talked about the hobbies that they enjoyed before their health failed, and the fact that they could no longer participate in these activities. A similar type of occurrence was observed in the medical interviews, with patients responding that they were in good health and had no worrisome health care issues.

Due to these irregularities, a manipulation check was conducted by coding the responses to the interview questions for valence (positive or negative), such that if an interview had one negative response it was considered a negative interview; otherwise it was considered positive. One experimenter coded the entire sample, with a second judge coding 25 randomly chosen interviews (20% of the sample). Inter-rater reliability was 1.0. The results of this coding suggested that, in 25 cases, the interviews did not prime participants as intended (16 positive medical interviews, 9 negative leisure interviews). To examine the possible consequences of this outcome, a second condition configuration was developed, taking these responses into account. All of the medical interview participants were left in their original condition, due to the fact that they were exposed to a negative prime, regardless of their response to it. For the leisure interviews, however, this was not the case. For participants who responded in a positive manner, the prime they were exposed to was positive because they discussed an activity that they currently enjoy doing. Participants who responded in a negative manner because they are no longer able to participate in their hobbies due to health problems, however, were inadvertently exposed to a negative prime. Thus, the negative leisure interviews were included with the medical interviews. This change in conditions resulted in a negative interview condition ($N = 71$) and a positive interview condition ($N = 51$).

All analyses reported below were conducted using both the original and reconfigured conditions. The results reported were based upon the original condition configuration. If differences in outcomes occurred between the two condition configurations, the results associated with the reconfigured conditions are reported as well.

Participant Characteristics

ANOVAs were conducted to examine potential confounds in condition assignment associated with the variables of literacy level (REALM), mental status (MSQ), and level of education. These analyses also provided information about subject characteristics (e.g., relationships between age and the aforementioned variables). There were no significant interview condition effects for education. For the REALM, there was a significant Condition X Age effect, $F(1,112) = 4.42$, with older participants in the leisure interview condition having a lower mean literacy level (60.05 words read accurately) than middle-aged leisure interview participants (63.90) or either age group in the medical condition (62.74 and 63.12 respectively). For the MSQ, there was a significant Condition X Investment effect, $F(1,112) = 7.19$, with high investment individuals in the medical interview ($M = 9.47$) scoring lower on the MSQ than their low investment counterparts ($M = 9.93$) and both high or low investment participants in the leisure interview condition ($M = 9.83$ and 9.69 , respectively). Inclusion of these measures as covariates in the primary analyses, however, did not alter the results.

Physiological Measures

For each of the physiological measures (skin conductance, heart rate, and blood pressure), a repeated-measures ANOVA was conducted to examine the relationship between interview condition, age, and level of investment on these variables across measurement times. The dependent variables for each of these measures were the first (Time 1), second (Time 2), and third (Time 3) readings taken during the study. The baseline measure was included as a covariate to control for individual differences in initial physiological readings.

Skin Conductance. In this analysis, 12 participants were removed due to outlier values for the skin conductance readings. One participant was removed from this and all subsequent analyses due to an outlier value for the investment measure. Outliers were defined as data points 2 standard deviations or more above the mean for that condition. This resulted in the exclusion of 1.5% of the participants in the leisure interview condition and .6% of the participants for the medical interview condition.

For the skin conductance measure, the hypothesized main effect of condition was found, $F(1,100) = 4.83$, with participants in the medical interview having higher mean skin conductance readings ($M = 3.42$) than their leisure interview counterparts ($M = 2.92$; see Table 2). The anticipated Condition X Investment interaction was not significant, $F(1,100) = .23$, $p < .64$, but an Age X Condition X Investment interaction was found, $F(1,100) = 4.12$ (see Figure 1). In order to investigate the source of this effect, more focused tests were conducted. These revealed that the interaction was due to a significant Age X Condition interaction in the low investment participants, $t(111) = 1.99$, with middle-aged medical interview participants having higher skin conductance readings than their leisure interview counterparts, $t(111) = -2.09$. In high investment participants, the expected trends occurred for older adults, with medical interview participants having higher skin conductance than the leisure interview participants, although this effect only approached significance, $t(111) = -1.62$, $p < .06$. When responses were examined within conditions, the hypothesized pattern of responses was observed for older adults in the medical interview, with elevated skin conductance readings occurring along with higher investment, $t(107) = 2.66$. There were no significant differences for the middle-aged adults in the medical interview condition

TABLE 2

Mean Physiological Measures Across Trials

Measures	<u>Medical Interview</u>							<u>Leisure Interview</u>						
	<u>Time 1</u>	<u>SD</u>	<u>Time 2</u>	<u>SD</u>	<u>Time 3</u>	<u>SD</u>	<u>M</u>	<u>Time 1</u>	<u>SD</u>	<u>Time 2</u>	<u>SD</u>	<u>Time 3</u>	<u>SD</u>	<u>M</u>
Skin Conductance	3.24	.99	3.42	1.10	3.63	1.08	3.43	2.81	.97	2.86	1.02	2.94	1.00	2.87
Heart Rate	74.18	14.67	72.98	14.71	73.11	14.85	73.42	70.38	14.07	70.62	14.65	69.68	14.42	70.23
MAP	102.93	12.47	102.51	12.36	104.39	13.28	103.27	99.60	10.47	100.71	10.89	100.83	10.52	100.38

Note: Readings have been adjusted for baseline measurements.

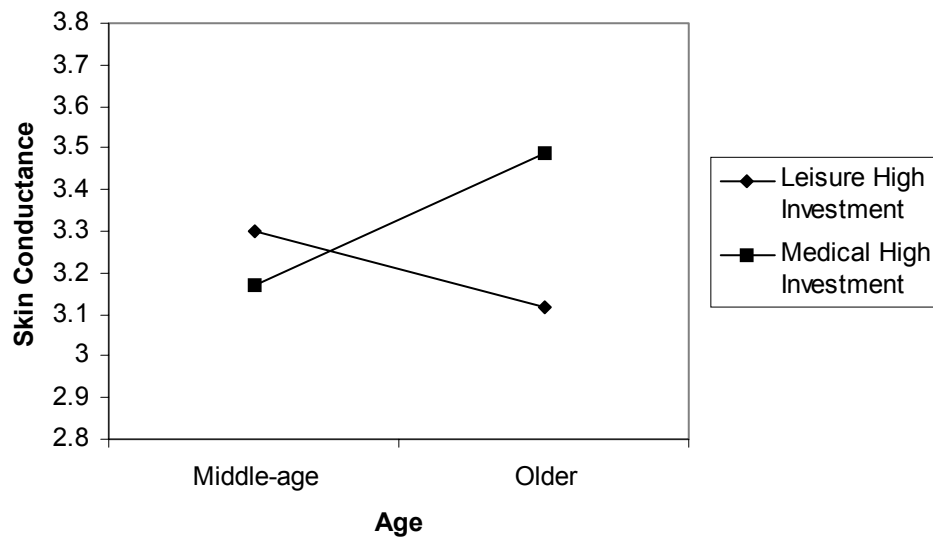
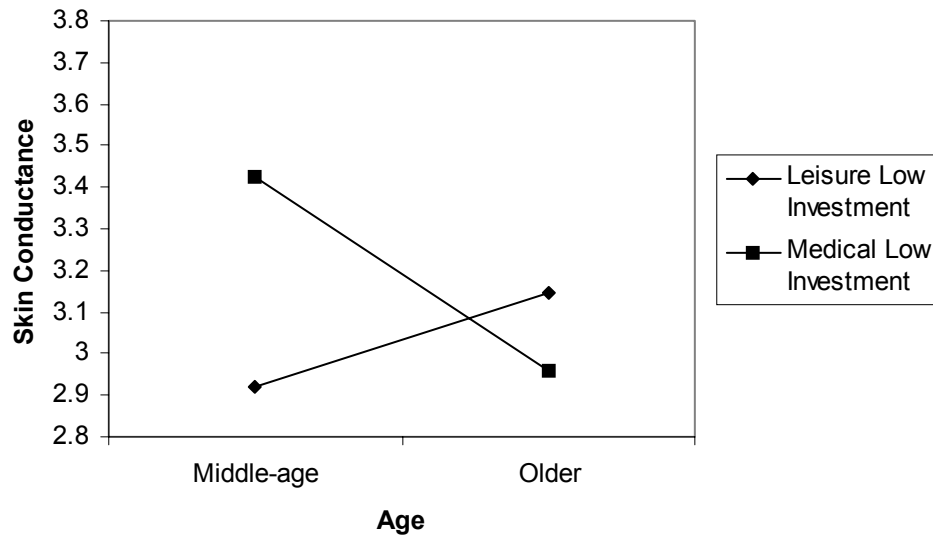


Figure 1. Age by Condition by Investment interaction for skin conductance readings.

($p < .12$) or for either age group in the leisure interview condition ($p < .07$ for middle-age, $p < .47$ for older adults).

The interaction involving low investment participants was unexpected, but this interpretation is tempered somewhat given the skewed distribution of investment scores (i.e., -1 SD = moderate investment). The results for older adults in the medical interview condition, however, did coincide with hypotheses. Thus, these results partially supported the expectation that for the medical interview condition, skin conductance readings would rise as individuals became more invested in independent living.

A significant Condition x Time interaction was also obtained, $F(2, 200) = 7.78$ (see Figure 2). ANOVAs conducted for each time point revealed that this outcome was in part due to a significant condition effect at Time 3, $F(1,98) = 6.46$, with the medical interview being associated with significantly higher skin conductance than the leisure interview. Examination of time effects within conditions revealed a significant effect for the medical interview condition, $F(2,92) = 3.55$, but not for the leisure interview condition, $F(2,106) = 1.34$, $p < .27$. The anticipated Condition X Investment X Time interaction was not significant, $F(2,200) = .85$, $p < .43$.

Overall, the results for the skin conductance readings were generally consistent with expectations. Condition assignment had the anticipated impact on these readings, with medical interview participants having higher skin conductance than their leisure interview counterparts. Additionally, level of investment had the expected influence on the responses of older adults in the medical interview condition, but the lack of a significant 3-way interaction tempered conclusions regarding this variable somewhat.

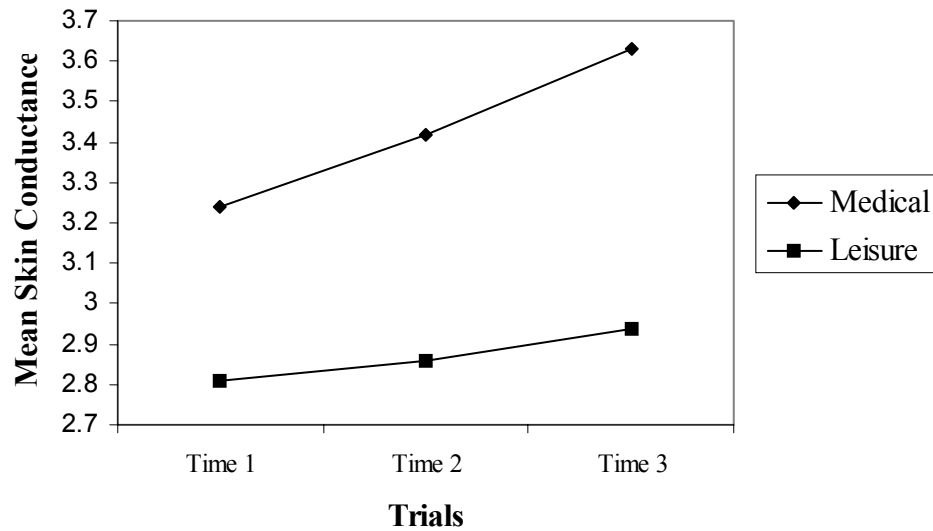


Figure 2. Condition by Trials interaction for skin conductance readings.

Blood Pressure. Systolic and diastolic blood pressure were examined next. To simplify analysis of these data, the Mean Arterial Pressure (MAP) was calculated from the blood pressure readings and used as the dependent variable. MAP is the average force exerted against the artery wall by blood during the cardiac cycle. It is commonly used in the medical field when examining blood pressure and is widely accepted (Blascovich, Spencer, Quinn, & Steele, 2001; Larsen, Schneiderman, & Pasin, 1986; Rogers, Small, Buchan, Butch, Stewart, Krenzer, & Husovsky, 2001; Zarnke, Feagan, Mahon, & Feldman, 1997). It is calculated as follows: $MAP = (2/3) \text{ Diastolic BP} + (1/3) \text{ Systolic BP}$ (in mmHG).

For the MAP analyses, 4 participants were excluded from analyses due to outliers in blood pressure readings, and 2 were excluded due to equipment malfunctions during testing. This resulted in a .9% reduction in the number of participants in the medical interview and a .2% sample size reduction in the leisure interview condition.

The anticipated main effect of condition was not significant $F(1,106) = 1.81, p < .18$, nor was the expected Condition X Investment interaction $F(1,106) = .64, p < .43$. The Age X Condition X Investment interaction approached significance, $p < .06$ (See Figure 3), however, and when conditions were reconfigured, this interaction became significant, $F(1,106) = 4.33, p < .04$. Follow-up analyses using the original conditions revealed that the interaction was due to a significant Age X Condition interaction in the low investment participants, $t(112) = -2.11$, with MAP readings being higher for middle-aged participants in the medical condition than their leisure interview counterparts $t(112) = -1.67$, but with the opposite trend occurring for older participants ($p < .10$).

The trends observed in the low investment participants were unexpected; however, trends for the high investment individuals did reveal the anticipated pattern of responses. Although the differences between high and low investment participants were not significant for either age group ($p < .32$ for middle-aged, $p < .06$ for older adults), the medical interview participants' skin conductance readings were higher than leisure interview participants' readings for both middle-aged and older adults.

The Condition X Time interaction was expected, but not found, $F(2,212) = 2.16, p < .12$. This was also the case for the anticipated Condition X Investment X Time interaction, $F(2,212) = .69, p < .50$. A significant Age X Investment X Time interaction was obtained, $F(2,212) = 3.64$, with subsequent ANOVAs at each time point revealing that this interaction was due to a significant Age X Investment interaction at Time 1 of the MAP readings, $F(1,109) = 6.56$. Age and investment did not interact at the second or third measurements.

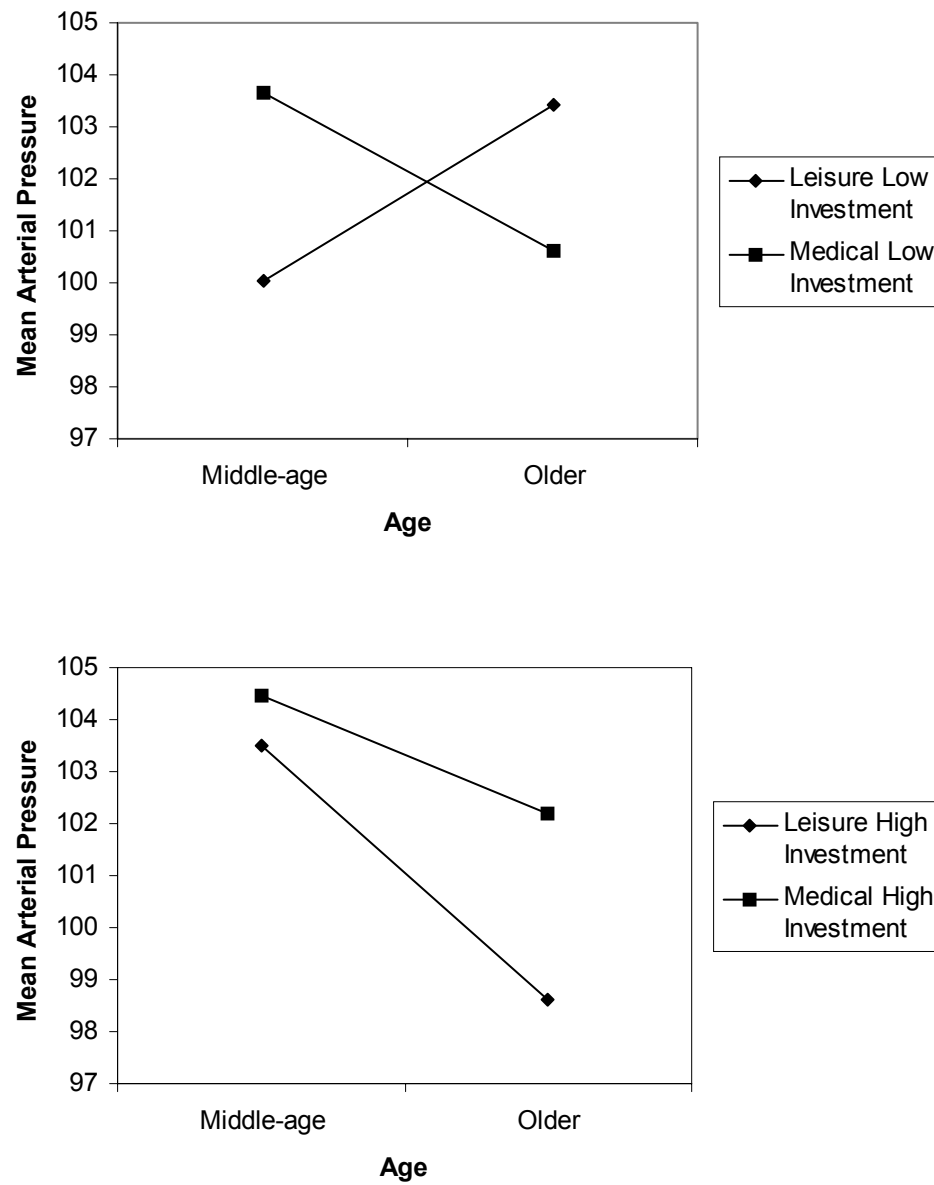


Figure 3. Condition by Age by Investment interaction for MAP readings.

The results of the analyses of MAP were not entirely consistent with the hypotheses. The anticipated impacts of condition assignment and investment level were not obtained. Additionally, the interaction of age, condition, and investment level that was obtained did not reflect changes in the medical interview condition, as would have been expected. Trends for high investment participants did take the expected form across conditions for older participants, however, with medical interview MAP readings being higher than leisure interview readings.

Heart Rate. For the heart rate analyses, 4 participants were excluded due to outliers in heart rate readings, and 2 were excluded due to equipment malfunctions during testing. This resulted in a .9% reduction in sample size for the medical interview and a .2% reduction for the leisure interview.

The analyses of the heart rate readings did not reveal the expected main effect of condition, $F(1,106) = .08, p < .78$, or the predicted Condition X Investment interaction, $F(1,106) = 1.34, p < .25$. In addition, neither the Condition X Time interaction, $F(2,212) = 2.17, p < .12$, nor the Condition X Investment X Time were significant $F(2,212) = 1.46, p < .24$. The lack of significant results for the heart rate readings is not entirely surprising. Heart rate is the least reactive of the physiological measures, and response tends to diminish with age (Steptoe & Tavazzi, 1996; Steptoe, Moses, & Edwards, 1990). Thus, this measure may not be as sensitive of a measure of changes in the cardiovascular system as is MAP.

Anxiety

The results of the State-Trait Personality Inventory short form were examined next (Spielberger, 1979). Participants could receive a score between 10 (low anxiety) and 40 (high anxiety). The ANOVA revealed the predicted main effect of condition, $F(1,113) =$

4.34, with participants in the medical interview condition reporting significantly more anxiety than their leisure interview counterparts (See Table 3). The expected Condition X Investment effect was not significant, $F(1,113) = .56, p < .46$. Thus, these results were consistent with the expectation that interview condition would affect anxiety levels, but no support was obtained for the prediction that investment would moderate this effect. Once again, however, failure to find the anticipated investment effects may be related to the skewed distribution of investment scores in the sample.

Observed Tasks of Daily Living-Revised: Taking Medications Section

Performance was measured using the scores from the OTDL-R task. Participants received a total correct score that could range from 0 to 11. This score reflects the total number of correct responses given during the task. A prompts score was also calculated and could range from 0 to 10. This score reflects the number of times a participant said, “I don’t know” or sat for 15 seconds without a response. When this occurred, a second question was asked in order to prompt the participant into answering the original question. Five participants were excluded from the analysis of the OTDL-R due to missing data. These participants did not bring their reading glasses to the experiment and could not see the small print on the medicine bottles. This resulted in a .6% reduction in sample size for the medical interview condition and a .2% reduction for the leisure interview.

For total correct responses, a main effect of condition was expected, with participants in the medical interview condition performing worse compared to participants in the leisure interview condition. This effect was not significant, $F(1,108) = .01, p < .93$. A main effect of Age was expected for the total correct scores, with performance declining as age increased. This prediction was supported, $F(1,108) = 17.03$, with the middle-aged

TABLE 3

State Anxiety and OTDL-R Means by Condition

<u>Measures</u>	<u>Medical Interview</u>		<u>Leisure Interview</u>	
	M	<u>SD</u>	M	<u>SD</u>
State Anxiety	17.55	5.94	15.21	5.35
OTDL-R				
Total Correct	8.00	1.65	7.88	1.61
Prompts	1.19	1.25	1.27	1.64

Note: Possible range of scores: State Anxiety: 10 to 40; Total correct: 0 to 11; Prompts: 0 to 10

adults performing better ($M = 8.41$) than the older participants ($M = 7.45$). A Condition X Investment interaction was also expected, with participants who were highly invested in the medical interview condition performing worse than both participants in the medical interview who were not invested and their leisure interview counterparts. This interaction was not significant, $F(1,108) = .42, p < .52$ (see Figure 4).

For the prompt responses, a main effect of condition was expected, with participants in the medical interview condition needing more prompts than their leisure interview counterparts. This effect was not significant, $F(1,104) = .79, p < .38$; when conditions were reconfigured, however, it approached significance, $F(1,104)=3.40, p < .06$, with the positive interview participants using more prompts than the negative interview participants. A main effect of Age was expected, with older adults needing more prompts than middle-age

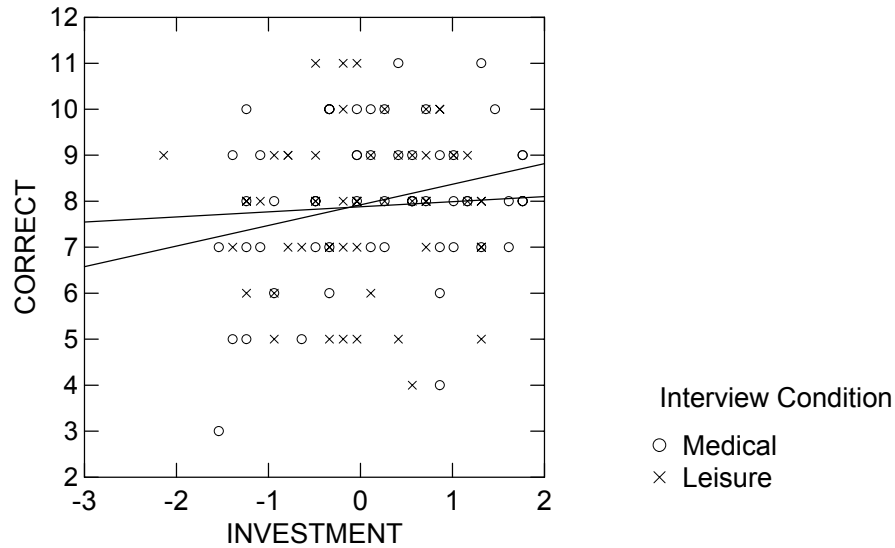


Figure 4. Condition by Investment interaction for OTDL-R total correct

participants. This effect was not significant, $F(1,104) = .11, p < .74$. A Condition X Investment interaction was also expected, with participants who were highly invested in the medical condition needing more prompts than either participants in the medical condition who were not invested or their leisure interview counterparts. This effect was also not significant, $F(1,104) = 1.12, p < .29$.

One potential problem with these performance data may relate to ceiling effects for the total correct measure and floor effects for the prompts measure. Examinations of the distributions for both of these variables indicated that they were significantly skewed ($z = -2.19$ for total correct, $z = 8.43$ for prompts), which may have precluded the identification of expected effects. The total correct responses exhibited a ceiling effect, with participants doing well on the task and getting most of the answers correct. For prompts use, there was a floor effect, with very few participants needing prompts in order to answer the questions.

In sum, the trends for the OTDL-R did not support the hypotheses. An unexpected trend was reflected in prompts use, with participants in the positive interview using more prompts than their negative interview counterparts. However, the predicted effects for both the total correct and prompts use were not significant. These results are likely due in part to ceiling and floor effects observed in this task.

Discussion

The purpose of this research was to examine the potential influence of stereotype threat on the health and performance outcomes of patients. Specifically, this study sought to determine if patient stereotypes had an impact on patients' anxiety levels, physiological responses, and performance. Although it has been demonstrated that stereotypes about health exist, it has not been established how such stereotypes influence patients as they seek out medical help and adhere to treatment regimens. Additionally, whereas Levy et al. (2000) demonstrated that implicitly activated stereotypes could influence cardiovascular measures and skin conductance readings, it has not been demonstrated that activation of stereotypes occurs in less contrived circumstances. This study sought to determine if patient interviews conducted in a medical setting would subsequently influence patient physiological measures, anxiety levels, and performance. The goal was to examine stereotypes and their impact on individuals in a more realistic manner.

This is one of the first studies to test the stereotype threat framework in a non-laboratory setting. Previous research has been confined to the laboratory, and thus has potential limitations in generalizability to other populations as well as problems involving the nature of the tasks. It is impossible to know if the mechanisms operative in the lab setting are the same, or even similar to, the mechanisms that are operative in everyday life

without studies done in the real-world. The present study offers a first experimental investigation of the effects of stereotype threat on older adults outside of a laboratory setting. Additionally, this study also addresses the unknown generalizability of laboratory-based findings by examining a population that does not consist of university students. Patients at the DVAMC are different from traditional study participants in terms of education, socio-economic status, and racial diversity, thus providing a good test of the generalizability of the stereotype threat framework.

Physiological Arousal and Anxiety

Physiological and anxiety measures were important aspects of this study for several reasons. First, recent work on stereotypes (Levy et al., 2000) has demonstrated that subliminally activated stereotypes could impact physiological measures. However, such changes had not been examined in stereotypes activated with participant awareness, as is the case with stereotype threat. This study was the first to examine physiological arousal associated with stereotype threat in older adults.

The impact of stereotype threat on physiological responses is important to consider, because physiological reactivity as a response to stress has been attributed to the development of health problems. Research has found that an individual's cardiovascular response to a cognitive stressor can predict the development of hypertension (Blascovich et al., 2001; Falkner, Onesti, & Hamstra, 1981) and atherosclerosis (Barnett, Spence, Manuck, & Jennings, 1997). Additionally, acute and chronic stressors have been demonstrated to increase individual susceptibility to illness (Cacioppo, 1994; Suinn, 2001). Thus, to the extent that stereotype threat causes stress and anxiety within individuals, it may also impact their health through changes in physiological systems.

Interview effects. The conditions in this study were designed to activate either a negative patient stereotype or a positive aspect of self. To demonstrate the impact of stereotype threat on patients, evidence for different responses to the interview conditions was necessary. Although stereotype activation was not measured directly, coding of the interviews during the manipulation check revealed that the majority of interviews did have the expected result. Specifically, the medical interviews tended to result in negative responses about ones' health whereas the leisure interviews tended to produce more positive responses about everyday functioning. Additionally, when interviews were reconfigured based partially on the valence of the interviews, it made few differences in the outcomes of the analyses.

Differences between the two interview conditions were expected to be evident in the physiological measures and anxiety levels of participants. If the conditions activated the negative patient stereotype or positive leisure activity as designed, then the medical interview should be associated with increased physiological reactivity as well as higher anxiety levels and lower performance.

The expected pattern of responses was obtained for both the skin conductance measure and state anxiety. For skin conductance, participants in the medical interview had significantly higher mean skin conductance readings than their leisure interview counterparts. Additionally, at the end of the study, medical interview participants' readings were significantly higher than participants in the leisure interview condition. These results indicate that the interview manipulation did differentially impact physiological systems of participants in the two conditions. Because skin conductance is indicative of stress

experienced by the individual, these readings suggest a higher stress level for participants in the medical interview condition than for those in the leisure interview condition.

The responses on the State Anxiety measure also indicated differences in condition. Participants in the medical interview condition reported significantly more anxiety than did participants in the leisure interview condition. These results have important implications for medical professionals. If patients experience elevated levels of anxiety and stress when discussing their medical issues, they may not be able to communicate their thoughts clearly. Additionally, such responses have the potential to hinder patients' understanding of the information being presented to them. Thus, it is important that the role of stress and anxiety is considered in patient-provider interactions.

Interview effects were less evident in the heart rate and MAP readings. It was anticipated that each of the physiological measures would respond to the interview manipulation in a similar manner. Specifically, each measure was expected to indicate increases in physiological reactivity for participants in the medical interview condition and stable physiological reactivity for leisure interview participants. It may be that variations in skin conductance readings were consistent with this hypothesis because skin conductance is one of the fastest responding measures of stress, whereas MAP and heart rate are slower to respond. This does not entirely explain this outcome, however, because blood pressure reactivity increases with age (Steptoe & Tavazzi, 1996; Steptoe, et al., 1990). Because this study examined middle-aged and older adults, blood pressure was expected to be a useful indicator of interview effects.

Investment effects. Although it was important for the condition manipulation to differentially impact participants, activating a negative stereotype is not thought to be

sufficient to hinder performance or cause physiological change. Based on the stereotype threat framework proposed by Steele (1997), other conditions such as applicability of the negative stereotypes (i.e., the individual must be a member of the stereotyped group) and value placed on the ability are also necessary for stereotype threat to occur. These conditions led to the expectation that level of investment in independent living would moderate whether or not participants were vulnerable to stereotype threat. If individuals are not personally invested, then stereotype threat should not influence their responses.

Based on these ideas, it was anticipated that investment would play a role in the responses of participants in the medical interview condition, due to its association with the negative patient stereotype. Specifically, highly invested individuals were expected to experience elevated physiological responses, and anxiety levels as compared to both their low investment counterparts and participants in the leisure interview condition. Whereas the medical interview was expected to activate negative thoughts about individuals' health and abilities, the leisure interview was expected to activate positive thoughts about these same topics. Subsequently, two possible outcomes were considered for the role of investment in the leisure interview. Based on the stereotype threat framework, it was thought that the leisure condition would result in stable responses throughout the study. Previous work, however, has indicated that positive stereotypes can have a positive impact on responses. This impact has been observed in the form of protection from contextual factors that may hinder performance (Levy et al, 2000), or improved performance on cognitive tasks (Shih, et al., 1999). In this study, such an impact was expected in the form of reduced anxiety and physiological measures for individuals with high investment. Thus the leisure interview was

expected to either lower individual physiological readings and anxiety levels, or have little influence.

For the skin conductance measure, older adults in the medical interview condition demonstrated that being highly invested in independent living did result in higher skin conductance readings. Thus, consistent with the stereotype threat framework, skin conductance responses were most affected in older adults who were exposed to threat and had personal investment in their ability to function independently. In contrast, this pattern of responses was not evident in the middle-aged adults in the medical interview, with no difference being observed between high and low investment participants. Importantly, the same relation was not observed between investment level and skin conductance in the leisure interview condition.

Another measure that reflected the role of investment was the MAP readings. An interaction of age, condition, and investment was found for both MAP and skin conductance. For the MAP readings, however, it only approached statistical significance. This interaction took a similar form in both measures, with interview effects being observed specifically in the low investment participants. Additionally, the middle-aged adults drove both of these interactions, where the medical interview participants had higher physiological readings than their leisure interview counterparts. These results are in contrast to the stereotype threat framework, which supposes that individuals must be invested in a particular domain in order for them to be affected by a stereotype. It should also be noted, however, that the high investment older adults in both interactions did demonstrate the anticipated trends, which approach significance.

One potential reason for unexpected results for middle-aged adults with low investment may relate to the participants' age. It is likely that susceptibility to threat is related to patients' length of illness, which may also be correlated with age. Thus, because middle-aged adults do not face the same health problems as older adults, and probably have been patients for a shorter period of time, it is likely that patient-related stereotype threat did not apply to them. Instead, middle-aged adults may have been experiencing other-stereotype activation, rather than a self-stereotype activation. This type of activation is different from stereotype threat, because it is the activation of stereotypes about a group with which the individual does not identify, and thus, investment level does not matter. When the activation of these cognitive constructs occurs, research has demonstrated that assimilation may take place, where individual behavior becomes consistent with the primed stereotype (Dijksterhuis & Van Kinippenberg, 1998). Thus, the low investment middle-aged adults may have been experiencing a stereotype that was not personally relevant and taking on the characteristic of that stereotyped group.

Trends for MAP in the medical interview condition took the expected form. Although there were no significant differences between high and low investment participants for both middle-aged and older adults, highly invested individuals did have higher MAP than their low investment counterparts. The expected trend was also observed when comparing older adults across conditions, with high investment participants in the medical interview condition having higher MAP than their high investment leisure interview counterparts. These trends are consistent with stereotype threat theory's proposition that changes in response should be associated with exposure to a negative stereotype and personal investment in the domain.

Thus, this study demonstrates multiple forms of arousal and anxiety responses to threat, and provides support for anxiety as a possible mediator. Such responses to stereotype threat are important, because individuals who experience threat on a regular basis, and the stress that comes along with such threat, may actually be incurring inadvertent damage to their health. Stress has been linked to the development of health problems, and individual stress-related physiological reactions have been shown to be stable over time (Cohen, Hamrick, Rodriguez, Feldman, Rabin, & Manuck, 2000). For patients who must seek out health care often and are already in poor health, this continual exposure to stereotype threat may compound their existing problems. Such experiences may influence individuals' decisions to seek care or withdraw from healthcare completely. Thus, the impact of threat on physiological outcomes needs to be more thoroughly explored.

Performance

Along with changes in physiological measures, this study was also interested in performance changes associated with the experience of threat and the possibility that anxiety and physiological arousal responses mediated the relationship between threat and performance. Unfortunately, the patterns of responses on the taking medications section of the OTDL-R were not consistent with expectations. For the total correct, there was no apparent impact of condition or investment level. There were differences in age, with performance declining as participants got older. These differences were expected, due to problems such as declining eyesight or limited processing resources (Salthouse, 1992).

One factor in the lack of predicted results on the OTDL-R is skew. The distributions of both the total correct and the prompts scores were skewed, indicating that most participants did very well on the task and needed few prompts to help them answer

questions. Thus, this task appears to have been too easy for participants to detect any changes in performance. Another potential issue relates to reading ability. Although all participants had a sixth grade reading ability or better, scores for the OTDL-R total correct and the REALM literacy measure were significantly correlated ($r = .34$), although this was not the case for the prompts ($r = -.28, p < .43$). Inclusion of REALM as a covariate, however, did not change the results of the analysis. Thus, reading ability may have impacted individuals' performance on the OTDL-R rather than interview condition assignment.

Issues and Concerns

The present study suggests that patients do experience stereotype threat. The strength of the effects, however, does not offer a clear understanding of when and how threat impacts individuals. Thus, it was important to examine potential problems that may be precluding the examination of stereotype threat and patients.

Investment measure. A few potential problems should be noted about the investment measure. One issue was the use of the scale. The restricted use of the scale noted earlier changes the interpretation of what high and low investment means in this study. Participants indicated that they were moderately to highly invested in independent functioning, with virtually no one indicating low investment. Thus, the comparisons made in this study may be more accurately described as between moderate and high investment individuals, rather than between high and low investment individuals.

This may help explain some of the trends found that were in the appropriate direction, but were not statistically significant. For instance, in the medical interview condition the expected trend was found for the MAP readings, with high investment individuals having higher MAP than their low investment counterparts. The difference

between the two investment levels was not significant, but this may be due to the moderate level of investment. If there had been participants who reported true low investment on the scale, the differences observed between high and low investment in the medical interview condition of the MAP readings may very well have been significant, with moderate investment individuals in between.

The reason for such a limited range of responses may in part be the great value placed on independence and self-sufficiency in American society. Because of this value, there are socially appropriate answers to be given on a questionnaire that asks if individuals like to accomplish tasks on their own or have others help them. It would be useful in future studies to develop a measure of investment that was not as obvious in its line of questioning or was not self-report. The use of two measures would also assist in obtaining accurate measurements of individuals' personal investment in independent living.

Heart Rate. The goals relating to all the physiological measures were to examine how the patient role may influence physiology. Changes in physiological responses have important implications for medical personnel. Problems may arise such as inaccurate assessment of an individuals' health, as well as patients' inability to feel comfortable and relaxed when communicating with care providers. Although the skin conductance and MAP measures demonstrated expected changes associated with condition and investment, this was not the case for the heart rate measure. These measurements did not demonstrate any impact of the condition manipulation or investment effects. This finding is consistent with Levy et al. (2000), who found significant changes in blood pressure and skin conductance readings, but not in heart rate. These results may be partially explained by literature that indicates decreases in responsiveness of heart rate with age (Step toe & Tavazzi, 1996; Step toe et al.,

1990). It is still unclear, however, why the middle-aged participants did not demonstrate changes in heart rate. The differences in responses for heart rate, blood pressure, and skin conductance may be due to the sensitivity levels of the different measurements. Such sensitivity issues indicate that blood pressure and skin conductance may be the more useful indicators of physiological changes when examining stereotypes, particularly with older adults.

Interview Manipulation. As noted previously, the interview manipulation did not turn out exactly as expected. It had been anticipated that the medical interview would cause individuals to think about their health-related issues and the hassles associated with them, such as dependence upon others for help. There were individuals in the study, however, who were in very good health and reported no problems even though they were at the VA for a medical appointment. The leisure interview, on the other hand, was anticipated to highlight individuals' ability to participate in activities they enjoy. However, some participants discussed activities they had previously been able to participate in, but could not do so any longer due to poor health. Previous studies have activated stereotypes by assigning participants to conditions where they were subliminally primed for a particular stereotype. Although these studies have successfully obtained differences in individual performance based on such exposure (Levy, 1996; Levy et al., 2000), this type of activation is not what happens in real life. The goal of this study was to mimic what might actually occur when a patient encounters medical personnel and has to answer questions about his health. The open-ended questions allowed participants to discuss what they felt comfortable with and thus, the topics were not always what had been anticipated. More specific questions might have been useful in exposing everyone to the anticipated type of prime.

The Stereotype Threat Framework

This study adds to the literature the first examination of stereotype threat in a non-laboratory setting with older adults. It is one of the first studies to identify physiological arousal and anxiety effects associated with threat. Although Levy et al. (2000) found similar effects associated with stereotype activation, these researchers were not examining changes associated with threat, because participants were unaware of the activation of stereotypes. In order for stereotype threat to occur, participants must be aware that the potential to be stereotyped exists in a particular situation (Steele, 1997; Wheeler & Petty, 2001).

It was also the plan of this study to examine potential mediators of threat on performance. Previous research (Steele & Aronson, 1995) has demonstrated that cognitive performance can be impacted by the activation of threat. Potential mediators of this impact have been proposed, such as anxiety and/or amount of effort put forth. Unfortunately, this study was unable to examine mediational relationships, due to a lack of significant results on the performance measure. However, this study did find significant differences in level of anxiety, thereby offering support for the role of anxiety as a possible mediator.

This study both sheds insight and raises questions about the stereotype threat framework and the activation of stereotypes in general. Stereotype threat has been largely researched on stereotypes that individuals encounter throughout their lives, such as ethnicity and sex. This theory is now being explored, however, in domains where the applicability of particular stereotypes changes as individuals move through the lifespan and different situations. For example, aging stereotypes do not apply to individuals for much of their adult life. Although everyone who lives long enough will have this stereotype apply to them, it may not have exactly the same impact or operate through the same mechanisms as a

stereotype dealt with throughout life. Patient stereotypes are even more complex. Unlike the aging stereotype, there is no guarantee everyone who lives long enough will encounter it. Additionally, although most everyone goes to a doctor at some point in their lives, the influence of patient stereotypes may be correlated with length and severity of illness. Thus, although further research needs to be conducted to understand patient stereotypes fully, this study is a first step in exploring how stereotype threat may operate in these unique situations.

Conclusions

The present study extends work with stereotype threat into a previously unexplored area: health related stereotypes. It was found that a brief medical interview designed to highlight individuals' patient status and subsequently activate associated patient stereotypes could influence physiological responses and anxiety levels. These results are important for medical personnel when encountering patients, because such changes may hinder the provision of proper care. Patients who feel stressed or anxious in medical situations may be more reluctant to seek treatment and may be less able to express their concerns when receiving care.

Another important aspect of this study was its setting. This study was conducted in a VA hospital, rather than in a laboratory. Thus, it adds to the literature an examination of the influence of stereotype threat in the real-world. Instead of using methods such as subliminal priming to activate stereotypes, this study attempted to activate them in a manner more similar to what might happen in the everyday encounters between patients and medical personnel. It supports the idea that stereotype threat occurs during everyday interactions and impacts the participants in those interactions. More studies of this nature are needed in

order to fully understand how and why stereotype threat influences individuals as they go through their everyday lives.

REFERENCES

- Aiken, L. S. & West, S. G. (1991). Multiple regression: Testing and interpreting interactions. Newbury Park, CA: Sage Publications.
- Alford, C. L., Miles, T., Palmer, R., & Espino, D. (2001). An introduction to geriatrics for first year medical students. Journal of the American Geriatrics Society, *49*, 782-787.
- Aronson, J., Lustina, M. J., Good, C., & Keough, K. (1999). When White men can't do math: Necessary and sufficient factors in stereotype threat. Journal of Experimental Social Psychology, *35*, 29-46.
- Baker, R. (1984). Attitudes of health care providers toward elderly patients with normal aging and disease-related symptoms. The Gerontologist, *24*, 543-545.
- Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. Journal of Personality and Social Psychology, *71*, 230-244.
- Barnett, P. A., Spence, J. D., Manuck, S. B., & Jennings, J. R. (1997). Psychological stress and the progression of carotid artery disease. Journal of Hypertension, *15*, 49-55.
- Beall, C., Baumhover, L.A., Simpson, J.A., & Pieroni, R.E. (1991). Teaching geriatric medicine: Residents' perceptions of barriers and stereotypes. Gerontology & Geriatrics Education, *11*, 85-95.
- Binstock, R. (1983). The aged as scapegoat. The Gerontologist, *23*, 136-143.
- Blascovich, J., Spencer, S. J., Quinn, D., & Steele, C. (2001). African Americans and high blood pressure: The role of stereotype threat. Psychological Science, *12*, 225-229.
- Braddock, C. H., Finn, S. D., Levinson, W., Jonsen, A. R., & Pearlman, R. A. (1997). How doctors and patients discuss routine clinical decisions: Informed decision making in the outpatient setting. Journal of General Internal Medicine, *12*, 339-345.
- Braithwaite, V. A. (1986). Old age stereotypes: Reconciling contradictions. Journal of Gerontology, *41*, 353-360.
- Brewer, M. B., Dull, V., & Lui, L. (1981). Perceptions of the elderly: Stereotypes as prototypes. Journal of Personality and Social Psychology, *14*, 656-670.
- Butler, R. (1969). Ageism: Another form of bigotry. The Gerontologist, *9*, 243-246.
- Butler, R. (1980). Protection of elderly research subjects. Clinical Research, *28*, 33-35.

- Cacioppo, J. T. (1994). Social neuroscience: Autonomic, neuroendocrine, and immune responses to stress. Psychophysiology, *31*, 113-128.
- Cockerham, W. C. (1997). This aging society. Upper Saddle River, NJ: Prentice Hall.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences. Hillsdale, NJ: Laurence Erlbaum.
- Cohen, J., & Cohen, P. (1983). Applied multiple regression analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cohen, S., Hamrick, N., Rodriguez, M. S., Feldman, P. J., Rabin, B. S., & Manuck, S. B. (2000). The stability of and intercorrelations among cardiovascular, immune, endocrine, and psychological reactivity. Annals of Behavioral Medicine, *22*, 171-179.
- Cooper-Patrick, L., Gallo, J. J., Gonzales, J. J., Vu, H. T., Powe, N. R., Nelson, C., & Ford, D. E. (1999). Race, gender, and partnership in the patient-physician relationship. Journal of the American Medical Association, *282*, 583-589.
- Department of Veterans Affairs (1995). National survey of veterans. Washington, DC.
- Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. Journal of Personality and Social Psychology, *56*, 5-18.
- Devine, P. G., Monteith, M. J., Zuwerink, J. R., & Elliot, A. J. (1991). Prejudice with and without compunction. Journal of Personality and Social Psychology, *60*, 817-830.
- Diehl, M., Willis, S. L., & Schaie, K. W. (1995). Everyday problem solving in older adults: Observational assessment and cognitive correlates. Psychology and Aging, *10*, 478-491.
- Diehl, M., Marsiske, M., & Horgas, A. L. (1998, November). Psychometric Properties of the Revised Observed Tasks of Daily Living (OTDL-R). Poster presented at the 51st Annual Scientific Meetings of the Gerontological Society of America, Philadelphia, PA.
- Dijksterhuis, A., & Van Knippenberg, A. (1998). The relation between perception and behavior, or how to win a game of trivial pursuit. Journal of Personality and Social Psychology, *74*, 865-877.
- Dixon, R. A., & Hultsch, D. F. (1984). The Metamemory in Adulthood (MIA) instrument. Psychological Documents, *14*, 3.
- Dye, C. J. (1978). Psychologists role in the provision of mental health care for the elderly. Professional Psychology, *9*, 38-49.

- Falkner, B., Onesti, G., & Hamstra, B. (1981). Stress response characteristics of adolescents with genetic risk for hypertension: A five year follow-up. Clinical and Experimental Hypertension, *3*, 583-591.
- Fillenbaum, G. G. (1985). Screening the elderly: A brief instrumental activities of daily living measure. Journal of the American Geriatrics Society, *33*, 698-706.
- Gatz, M., & Pearson, C. G. (1988). Ageism revised and the provision of psychological services. American Psychologist, 184-188.
- Garfinkel, R. (1975). The reluctant therapist. The Gerontologist, *15*, 136-137.
- Gekoski, W. L., & Knox, V. J. (1990). Ageism or healthism? Perceptions based on age and health status. Journal of Aging and Health, *2*, 15-27.
- Greene, M., Hoffman, S., Charon, R., & Adelman, R. (1987). Psychosocial concern in the medical encounter: A comparison of the interaction of doctors with their old and young patients. The Gerontologist, *27*, 164-168.
- Greenfield, S., Kaplan, S., & Ware, J. E. (1985). Expanding patient involvement in care: Effects on patient outcomes. Annals of Internal Medicine, *102*, 520-528.
- Gotler, R. S., Flocke, S. A., Goodwin, M. A., Zyzanski, S. J., Murray, T. H. & Stange, K. C. (2000). Facilitating participatory decision-making. What happens in a real-world community practice? Medical Care, *38*, 1200-1209.
- Hausdorff, J. M., Levy, B.R., & Wei, J.Y. (1999). The power of ageism on physical function of older persons: Reversibility of age-related gait changes. Journal of the American Geriatrics Society, *47*, 1346-1349.
- Hertzog, C., & Rovine, M. (1985). Repeated-measures analysis of variance in developmental research: Selected issues. Child Development, *56*, 787-809.
- Hess, T. M., Auman, C., Colcombe, S. J., & Rahhal, T. A. (in press). The impact of stereotype threat on age differences in memory performance. Journal of Gerontology: Psychological Sciences.
- Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. Psychological Review, *94*, 319-340.
- Hummert, M. L. (1990). Multiple stereotypes of elderly and young adults: A comparison of structure and evaluations. Psychology and Aging, *5*, 182-193.
- James, J. W. & Haley, W. E. (1995). Age and health bias in practicing clinical psychologists. Psychology and Aging, *10*, 610-616.

- Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (1997). The sixth report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI). Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health.
- Kaplan, S. H., Greenfield, S., & Ware, J. E. (1989). Assessing the effects of physician-patient interactions on the outcomes of chronic disease. Medical Care, *27*, 110-127.
- Kaplan, S. H., Gandek, B., Greenfield, S., Rogers, W., & Ware, J. E. (1995). Patient and visit characteristics related to physicians' participatory decision-making style: Results from the medical outcomes study. Medical Care, *33*, 1176-1187.
- Keeler, E. B., Solomon, D. H., Beck, J. C., Mendenhall, R. C., & Kane, R. L. (1982). Effect of patient age on duration of medical encounters with physicians. Medical Care, *20*, 1101-1108.
- Keller, N. S. (1971). Compliance, previous access and provision of services by registered nurses. Journal of Health and Social Behavior, *12*, 321-330.
- Lachman, M. E. (1986). Personal control in later life: Stability, change, and cognitive correlates. In M. M. Baltes & P. B. Baltes (Eds.), The psychology of control and aging (pp. 207-236). Hillsdale, NJ: Erlbaum.
- Langer, E. J., & Rodin, J. (1976). The effects of the choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. Journal of Personality and Social Psychology, *34*, 191-198.
- Larson, P. A. (1977). Influence of patient status and health condition on nurse perceptions of patient characteristics. Nursing Research, *26*, 416-421.
- Larson, P., Schneiderman, N., & Pasin, R. D. (1986). Physiological basis of cardiovascular psychophysiology. In M. Coles, E. Donchin, & S. Porges (Eds.), Psychophysiology: Systems, processes and applications (pp. 122-165). New York: Guilford.
- Lawton, M. P. & Brody, E. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. The Gerontologist, *9*, 179-185.
- Leventhal, H., Nerenz, D. R., & Leventhal, E. (1982). Feelings of threat and private views of illness: Factors in dehumanization in the medical care system. In A. Baum & J. E. Singer (Eds.), Advances in environmental psychology, vol. 4 (pp. 85-114). Hillsdale, NJ: Erlbaum.
- Levy, B. R. (2000). Handwriting as a reflection of aging self-stereotypes. Journal of Geriatric Psychiatry, *33*, 81-94.

- Levy, B. R. (1996). Improving memory in old age through implicit self-stereotyping. Journal of Personality and Social Psychology, *71*, 1092-1107.
- Levy, B. R., Ashman, O., Dror, I. (1999-2000). To be or not to be: The effects of aging stereotypes on the will to live. Journal of Death and Dying, *40*, 409-420.
- Levy, B. R., Hausdorff, J. M., Hencke, R., & Wei, J. Y. (2000). Reducing cardiovascular stress with positive self-stereotypes of aging. Journal of Gerontology, *55B*, P205-P213.
- Levy, B. R., Slade, M.D., Kunkel, S. R., & Kasl, S. V. (2002). Longevity increased by positive self-perceptions of aging. Journal of Personality and Social Psychology, *83*, 261-270.
- National Center for Health Statistics, (1995). Health United States 1994. Washington, DC: U.S. Government Printing Office.
- Parker, R.M., Baker, D.W., Williams, M.V., & Nurss, J.R. (1995). The test of functional health literacy in adults: A new instrument for measuring patients' literacy skills. Journal of General Internal Medicine, *10*, 537-541.
- Pfieffer, E. A (1975). Short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. Journal of the American Geriatric Society, *23*, 431-433.
- Rahhal, T. A., Hasher, L., & Colcombe, S. J. (2001). Instructional manipulations and age differences in memory: Now you see them, now you don't. Psychology and Aging, *16*, 697-706.
- Ray, D. C., McKinney, K. A., & Ford, C. V. (1987). Differences in psychologists ratings of older and younger clients. The Gerontologist, *27*, 82-86.
- Rogers, M.A.M., Small, D., Buchan, D. A., Butch, C. A., Stewart, C. M., Krenzer, B. E., Husovsky, H. L. (2001). Home monitoring service improves mean arterial pressure in patients with essential hypertension: A randomized clinical trial. Annals of Internal Medicine, *134*, 1024-1032.
- Salthouse, T. A. (1992). The information-processing perspective on cognitive aging. In R. J. Sternberg & C. A. Berg (Eds.), Intellectual development (pp.261-277). New York: Cambridge University Press
- Schmidt, D. F., & Boland, S. M. (1986). Structure of perceptions of older adults: Evidence for multiple stereotypes. Psychology and Aging, *1*, 255-260.

- Schneider, D. J. (1991). Social cognition. In M. R. Rosenzweig & L. W. Porter (Eds.), Annual Review of Psychology, vol. 42 (pp. 527- 561). Palo Alto, CA: Annual Reviews.
- Settin, J. M. (1984). Clinical judgment in geropsychology practice. Psychotherapy: Theory, Research and Practice, 19, 397-404.
- Shih, M., Pittinsky, T. L., & Ambady, N. (1999). Stereotype susceptibility: Identity salience and shifts in quantitative performance. Psychological Science, 10, 80-83.
- Spielberger, C. (1979). Preliminary manual for the State-Trait personality Inventory (STPI). Tampa, Florida: University of South Florida.
- Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. American Psychologist, 52, 613-629.
- Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African-Americans. Journal of Personality and Social Psychology, 69, 797-811.
- Step toe, A., & Tavazzi, L. (1996). The mind and the heart. In D. G. Julian, A. J. Camm, K. M. Fox, R. J. Hall, & P. A. Poole-Wilson (Eds.). Diseases of the heart (pp. 1430-1441). Philadelphia: W. B. Saunders.
- Step toe, A., Moses, J., & Edwards, S. (1990). Age-related differences in cardiovascular reactions to mental stress tests in women. Health Psychology, 9, 18-34.
- Stewart, M. A. (1984). What is a successful doctor-patient interview? A study of interactions and outcomes. Social Science and Medicine, 19, 167-175.
- Suinn, R. M. (2001). The terrible twos-anger and anxiety: Hazardous to your health. American Psychologist, 56, 27-36.
- Wheeler, S. C., & Petty, R. E. (2001). The effects of stereotype activation on behavior: A review of possible mechanisms. Psychological Bulletin, 127, 797-826.
- Wilensky, H., & Barmak, J. E. (1966). Interests of doctoral students in clinical psychology in work with older adults. Journal of Gerontology, 21, 410-414.
- Witt, D. D., Lowe, G. D., Peek, C. W., & Curry, E. W. (1980). The changing association between age and happiness: Emerging trend or methodological artifact. Social Forces, 58, 1302-1307.
- Wright, B. A. (1980). Developing constructive views of life with a disability. Rehabilitation Literature, 1, 274-279.

Zarnke, K. B., Feagan, B. G., Mahon, J. L. & Feldman, R. D. (1997). A randomized study comparing a patient-directed hypertension management strategy with usual office-based care. American Journal of Hypertension, 10, 58-67.

APPENDIX 1

Investment Questionnaire

This is a questionnaire about your feelings concerning being able to function independently in everyday life. Please indicate the extent to which you agree or disagree with each statement. Provide the answer that is right for you by circling it below each statement. For example, if you **strongly agree** with the statement, you would circle **a**. If you **strongly disagree** with the statement, you would circle **e**. If you are **undecided** you would circle **c**.

1. It is important to me to be able to do things for myself.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly
2. I think being able to take care of myself is something of which to be proud.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly
3. It bothers me when others notice that I can't take care of myself.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly
4. Being able to live independently would be nice, but it is not very important.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly
5. It doesn't bother me when I am unable to do a task by myself.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly
6. I think it is important to work at sustaining my independence.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly
7. I work hard at trying to improve my ability to function on my own.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly
8. I admire people who live on their own.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly
9. My friends often notice my self-sufficiency.
a. strongly agree b. agree c. undecided d. disagree e. disagree strongly

10. I often notice my friends' self-sufficiency.

a. strongly agree b. agree c. undecided d. disagree e. disagree strongly

11. It's important that I am very accurate when remembering appointments.

a. strongly agree b. agree c. undecided d. disagree e. disagree strongly

12. It's important that I am very accurate when taking my medications.

a. strongly agree b. agree c. undecided d. disagree e. disagree strongly

13. It bothers me when I am unable to run errands on my own.

a. strongly agree b. agree c. undecided d. disagree e. disagree strongly

14. I like to do things on my own, without relying on other people to help me.

a. strongly agree b. agree c. undecided d. disagree e. disagree strongly

15. I'm highly motivated to do things on my own.

a. strongly agree b. agree c. undecided d. disagree e. disagree strongly

16. It gives me great satisfaction to be able to accomplish tasks independently.

a. strongly agree b. agree c. undecided d. disagree e. disagree strongly