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WASHINGTON UNIVERSITY IN ST. LOUIS

Department of Psychology

Effects of an Interdisciplinary Gerontology Course on First-Year Undergraduate Students

by

Christine Caroline Merz

A thesis presented to the
Graduate School of Arts and Sciences
of Washington University in
partial fulfillment of the
requirements for the
degree of Master of Arts

May 2015

St. Louis, Missouri

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St. Louis, Missouri

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Acknowledgements

I would like to thank my advisor, Dr. Brian Carpenter, for all of his guidance and support on this project. I would also like to thank Dr. Jan Duchek and Dr. Mitch Sommers for serving on my committee. A special thank you to the undergraduate research assistants of the Clinical Geropsychology Lab, who dedicated their evenings and weekends to running research participants, and without whom this project would not have been possible. I would like to thank Blair Weidler for her gracious help with programming. Financial support came from the Lichtenberg Scholarship in Geropsychology and the Graduate School of Arts & Sciences Teaching Assistantship. Finally, I would like to thank my family, friends, and boyfriend for supporting me through this process.

Dedication

I dedicate this project to my grandmother, Eleanor Merz, who passed away the week I started graduate school.

ABSTRACT OF THE THESIS

Effects of an Interdisciplinary Gerontology Course on First-Year Undergraduate Students

by

Christine Caroline Merz

Master of Arts in Psychology

Washington University in St. Louis, 2015

Professor Brian D. Carpenter, Chair

This study evaluated the impact of an interdisciplinary course on aging designed to improve attitudes toward older adults and aging, and generate interest in aging-related careers. Main outcomes included knowledge of older adults and aging, attitudes toward older adults and aging, and anxiety about personal aging. Participants included first-year undergraduate students enrolled in the course (curricular intervention group) and first-year undergraduate students *not* enrolled in the course (control group). Data were collected at the beginning and end of one semester. At the end of the semester curricular intervention students had increased in their knowledge about aging and showed more positive explicit attitudes toward older adults, but they had no changes in implicit attitudes or anxiety about aging. As expected, control participants showed no changes in any outcomes. These findings suggest that objective knowledge of aging and explicit attitudes improve with curricular intervention, but implicit attitudes and anxiety might be more difficult to change.

Introduction

The United States is currently undergoing a demographic transformation: both the number and percentage of older adults (aged 65+) in America are steadily increasing (U.S. Census Bureau, 2014). The aging of the Baby Boom cohort – individuals born between 1946 and 1964 – and increased life expectancy combine to make older adults the fastest growing segment of the population. With these increases, the percentage of older adults in America is projected to hit 20% by 2030 (U.S. Census Bureau, 2014). Looking ahead, the millennial generation – individuals born between roughly 1980 and 2000 – represents yet another large demographic group that will repeat this same pattern. These drastic population changes will challenge every facet of society, and we will need a workforce prepared to address the needs of older adults in the near and long-term future.

Currently, however, there is a shortage of workers prepared to meet this demographic challenge. For example, the Institute of Medicine issued a consensus report on the future healthcare workforce for older Americans, concluding that the workforce is both too small and critically unprepared to meet the needs of older adults (Institute of Medicine, 2008). As a result, the report calls for bold initiatives to improve and increase education and training to create a cadre of professionals prepared to work with older adults.

A number of factors may be responsible for the shortage of people in aging-related careers, despite the unprecedented need. For example, widespread misperceptions about aging and negative attitudes toward older adults are pervasive. Bias favoring youth over older adults is displayed by younger and older adults alike (Gonsalkorale, Sherman, & Klauer, 2013). Lack of accurate knowledge of aging also has been well documented among both the general public and healthcare workers (see Cowan, Fitzpatrick, Roberts, & While, 2004 for a review). Furthermore,

anxiety about personal aging appears even among college-aged students (McConatha, Schnell, Volkwein, Riley, & Leach, 2003). All of these factors may contribute to a lack of interest in careers that involve working with older adults. Despite these findings, there is some research to suggest that negative attitudes toward older adults and aging may be amenable to change.

Education has been proposed as one instrument to decrease ageism and increase interest in aging-related careers. Educational interventions that increase knowledge about aging allow for a more accurate (and less biased) view of aging, thus reducing age-related stereotypes and negative attitudes toward older adults. Numerous studies have examined the effects of gerontology curricular intervention on undergraduate students' knowledge of and attitudes toward aging (Angiullo, Whitbourne, & Powers, 1996; Cottle & Glover, 2007; Knapp & Stubblefield, 1998, 2000; O'Hanlon & Brookover, 2002). Overall, these studies have found that objective knowledge of aging increases with curricular intervention, while changes in attitudes toward aging have been more variable. The inconsistency may be due to differences in curricular content, course format, and measurement tools across studies. Other factors such as lack of control groups, lack of *pre*-intervention data collection, and lack of longitudinal follow up have been methodological limitations, which also limit the conclusions that can be drawn from such curricular interventions. Fewer studies have looked at the ability of curricular intervention to change undergraduate students' personal anxiety about aging, though one study did find no differences in aging anxiety between students who had taken a psychology of aging course and students who had taken an introduction to psychology course at the end of the semester (Harris & Dollinger, 2001).

The purpose of the current study was to address some of the methodological limitations of previous research and explore the impact of taking a semester-long, interdisciplinary course

on aging for first-year undergraduate students. A course on aging early in the college career may provide an opportunity to shift students' knowledge and attitudes, and thereby influence the trajectory of their future college activities and beyond. This research had three main aims:

1. Investigate changes in student *knowledge* of aging as a result of taking a gerontology course. It was hypothesized that students enrolled in the course, compared to a control group of students not in the course, would show an increase in knowledge of the aging process and facts about older adults at the end of the semester.
2. Investigate changes in *attitudes* toward aging. It was hypothesized that implicit and explicit negative attitudes toward older adults would decrease among students enrolled in the course but not among control group students.
3. Investigate changes in *anxiety* about personal aging. It was hypothesized that anxiety about aging would decrease among students enrolled in the course but not among control group students.

In addition to the three main aims, I also investigated changes in student opinions about the relevance of older adults and aging issues to their personal and professional lives. Students also predicted what influence such issues might have on their future undergraduate coursework, extracurricular activities, graduate education, and career. Finally, students enrolled in the course gave their assessment of the impact of different components of the course.

Method

Participants

One hundred and nine first-year undergraduate students at a four-year Midwestern university completed data collection for this study at the beginning of the fall semester of 2014. Approximately half of the students ($n = 51$) were enrolled in the interdisciplinary aging course; the remaining participants ($n = 58$) came from a randomly generated list of first-year

undergraduate students *not* enrolled in the interdisciplinary aging course. There were no other inclusion or exclusion criteria. Of students who completed data collection at the beginning of the semester, 72% also completed data collection at the end of the semester. This allowed for a total of 78 students (34 curricular intervention students; 44 control students) to be included in final data analyses.

Measures

Demographic characteristics. Demographic information collected for each student included age, gender, and race/ethnicity.

Experience with older adults. At baseline, prior experience with older adults was assessed with a series of questions about participants' interactions with their grandparents and great-grandparents (e.g., "How much time did you spend together growing up?", "How close were you?"), as well as time spent interacting with older adults through volunteering (e.g., nursing homes, assisted living facilities, senior centers). Total number of living grandparents and great-grandparents, both biological and through-marriage, was also collected. Examination of the Pearson correlations among these variables revealed that only four were significantly intercorrelated (r 's > 0.3 , p 's < 0.05): closeness to grandparents, time spent volunteering with older adults, time spent volunteering in nursing homes, and self-described level of experience with older adults. Closeness to grandparents was rated on a 6 point Likert-type scale from 0 (*not at all close*) to 5 (*very close*). Time spent volunteering with older adults and time spent volunteering in a nursing home were rated on a 6 point Likert-type scale from 0 (*no time*) to 5 (*a lot of time*). Self-described level of experience with older adults was rated on a 6 point Likert-type scale from 0 (*no experience*) to 5 (*a lot of experience*). These four variables were combined to create a composite variable (Cronbach's $\alpha = 0.68$).

Knowledge of aging. Knowledge of aging was measured using an updated and modified version of Palmore's Facts on Aging Quiz (FAQ; Palmore, 1977; Seufert & Carrozza, 2002). This measure consists of 25 True/False/Don't Know factual questions about the aging process and older adults. Scores can range from 0 – 25, with higher scores indicating more knowledge about aging. In the current sample, Cronbach's α was 0.53 at baseline and 0.76 at the end of the semester. Knowledge was also assessed using 10 multiple-choice questions taken from in-class quizzes given to students in the interdisciplinary aging course throughout the semester. The content of these items was based on lectures and reading assignments. Scores can range from 0 – 10, with higher scores indicating better knowledge of course content about aging.

Attitudes toward aging. *Implicit attitudes* toward older adults were measured using the Implicit Association Test for age (IAT; Greenwald, McGhee, & Schwartz, 1998). The IAT is a widely used measure of implicit attitudes and has been used to test bias toward various social groups based on factors such as race, gender, and religion, to name a few. In the version of the IAT used in this study, students sat at a computer and sorted visual stimuli (i.e., the faces of older adults and younger adults) and text stimuli (i.e., positive and negative words) into alternating categories of "good" and "bad" by pressing computer keys. Differences in speed of responding between trials of attitude-congruent associations (i.e., young faces with good words, old faces with bad words) and trials of attitude-incongruent associations (i.e., old faces with good words, young faces with bad words) are taken as a measure of the strength of automatic associations one has formed between age and positive and negative words.

The IAT for this study was programmed in PsychoPy programming software and used the standardized stimulus materials for age taken from the projectimplicit.net website. The order in which attitude-congruent vs. attitude-incongruent sorting categories were presented first was

counterbalanced across participants. This order was kept consistent within participants from the administration at the beginning of the semester to the administration at the end of the semester. Reaction time data were scored using the algorithm described by Greenwald, Nosek, & Banaji (2003) to produce a single *D* variable for each student at each administration. This variable represents a standardized difference score comparing reaction times between the attitude-congruent and attitude-incongruent sorting tasks. Positive *D* values indicate a bias against older adults compared to younger adults (with higher values indicating stronger bias), a *D* value of 0 indicates equivalent attitudes toward older and younger adults, and negative *D* values indicate more positive attitudes toward older adults relative to younger adults.

Explicit attitudes toward older adults were measured using the Polizzi Attitudes Toward the Elderly Scale (PATES; Polizzi, 2003), a revised and shortened version of the Aging Semantic Differential (ASD; Rosencranz & McNevin, 1969). In this measure, participants are given a list of 24 polar opposite adjective pairs on a 7-point Likert-type scale. Positively valenced items (e.g., “cheerful”) lie on the side of scale closest to 1, the corresponding negatively valenced items (e.g., “crabby”) lie closest to 7, and 4 lies in the middle to indicate neutral. Participants mark the point on the scale (1-7) they think best describes older adults. Total scores are calculated by averaging the ratings across the 24 individual items and can range from 1 - 7, with higher numbers reflecting more negative views of older adults. Cronbach’s α on the PATES was 0.92 at baseline and 0.94 at the end of the semester in the current sample.

Anxiety about aging. Anxiety about aging was assessed using the Anxiety about Aging Scale (AAS; Lasher & Faulkender, 1993). On this measure participants rate the extent to which they agree or disagree with 20 statements about aging (e.g., “I fear it will be hard for me to find contentment in old age”, “It bothers me to see how my looks have changed with age”, “The older

I become, the more I worry about my health”). Items are rated on a 4-point Likert-type scale, from 1 (*strongly disagree*) to 4 (*strongly agree*). Total scores are calculated by averaging the ratings across the 20 statements and can range from 1 – 4, with higher scores reflecting more anxiety about growing old. In addition to this overall measure of anxiety about aging, the scale can be broken down into four subscales: Physical Appearance, Psychological Concerns, Fear of Old People, and Fear of Losses. In the current sample, Cronbach’s α for the AAS total score was 0.83 at baseline and 0.83 at the end of the semester.

Relevance and influence of aging. Participants were asked how *relevant* “aging and older adults” are to their 1) personal and 2) professional lives on a scale from 0 (*not at all relevant*) to 5 (*very relevant*). Participants were also asked a series of questions on how much of an *influence* “aging and older adults” will have on four aspects of their lives: the courses they subsequently take in college, the extracurricular activities they pursue, the topic of any graduate education they plan to pursue, and the focus of their future careers. All items were rated on a scale from 0 (*no influence*) to 5 (*strong influence*).

Curricular intervention components. To examine the subjective effect of the different components of the course, students enrolled in the course rated the impact of six course components: reading assignments, the community site project, discussion sections, lectures, self-directed learning assignments, and quizzes. For each component, students rated how much they *learned* from this component on a 7-point Likert-type scale from 1 (*very little*) to 7 (*a great deal*). They also rated how much this course component changed their *attitudes* toward older adults and aging on a 7 point Likert-type scale from -3 (*made my attitudes a lot more negative*) to 3 (*made my attitudes a lot more positive*), with 0 in the center (*did not change my attitudes*).

Procedure

Description of the course. The interdisciplinary course on aging was cotaught by three professors from the departments of psychology, social work, and occupational therapy. The course, “When I’m Sixty-Four: Transforming Your Future,” was advertised to first-year students and listed in the online course catalog. Students met once a week as a group for two-hour lectures in the fall semester of 2014. Lectures covered broad content on aging, much like a traditional social gerontology course, adopting a biopsychosocial framework of aging. Several guest lecturers appeared throughout the semester, and the instructors took efforts to integrate topics from week to week. In addition to the weekly lecture, students were divided into small groups of 7-15 students for 1-hour weekly discussions facilitated by another faculty member and graduate student. The discussion facilitators came from various departments across the university, including anthropology, business, social work, art, occupational therapy, and law.

Students had weekly reading assignments, in-class quizzes, and were required to complete two self-directed learning assignments that exposed them to additional aging-related content (e.g., watching a feature film, attending an aging-related event on campus, completing an advance directive, interviewing an older relative). Students wrote a brief reflection for each self-directed learning assignment. Small groups of 3-5 students also participated in a community site project in which they visited a local organization or business and evaluated its “age-readiness.” Each group produced a written report of their evaluation and a poster that was presented to the class at the end of the semester.

Research procedure. All students were invited to participate in this study via e-mail from the principal investigator at the beginning of the semester, before classes had begun. The instructors for the course had no contact with students regarding the research during the semester

and were unaware which students were participating. E-mail addresses for the students in the course were acquired from course instructors; e-mail addresses for the students not in the course were acquired from a university Dean, who provided a randomly generated list of 600 first-year students not in the course. The e-mail contained a link to a consent form and online survey that contained the assessment instruments described above. Once students completed the online survey, they were contacted by the principal investigator via e-mail to schedule an appointment to complete the IAT in person on a computer in the psychology department. Parental consent was obtained for six students who were 17 years old at the start of the study. Data were collected at the beginning of the semester and at the end of the semester. At both time points, participants were entered into a drawing to have \$100 credited to their student account.

Data Analysis

All data analyses were conducted in SPSS Version 21. Descriptive statistics were calculated to examine distributions for missing data and outliers. Students who completed data collection at the beginning of the semester but did not complete data collection at the end of the semester were excluded from analyses ($n = 31$). There were no significant differences on demographic variables between students who completed data collection at both time points and students who only completed data collection at the beginning of the semester and were then lost to follow-up.

A series of 2 x 2 (Group [curricular intervention, control] x Time [beginning of the semester, end of the semester]) repeated-measures analysis of variance (ANOVA) were conducted for the following measures: Facts on Aging Quiz, Polizzi Attitudes Toward the Elderly Scale, Anxiety about Aging Scale, Relevance of Aging items, Influence of Aging items. In addition, knowledge based on course quiz content (only available at the end of the semester)

was analyzed with an independent samples *t*-test comparing the curricular intervention group with the control group. Implicit attitudes data were analyzed using a 2 x 2 x 2 (Group [curricular intervention, control] x Time [beginning of the semester, end of the semester] x Order [attitude-congruent stimuli first, attitude-incongruent stimuli first]) repeated-measures ANOVA. For student feedback on the different course components, descriptive statistics of means and standard deviations were calculated.

Results

A total of 78 students completed data collection at both the beginning and end of the semester. The sample included 34 students in the interdisciplinary aging course and 44 students in the control group. There were no significant differences between the groups on age, gender, race/ethnicity, or experience with older adults (see Table 1 for characteristics of the sample). Means and standard deviations of main outcome measures are presented in Table 2.

Knowledge of Aging

Examining changes on the Facts on Aging Quiz, there was a significant Group X Time interaction, $F(1,76) = 17.06, p < .001, \eta_p^2 = 0.18$. Scores for control students did not change from the beginning of the semester ($M = 13.66, SD = 2.89$) to the end of the semester ($M = 13.66, SD = 4.06$), whereas scores for students in the course increased significantly (M at baseline = 14.32, $SD = 2.74$; M after the course = 17.59, $SD = 2.82$). Data for this measure are presented in Figure 1. On the second measure of knowledge, a collection of quiz questions taken from course content, students enrolled in the class had significantly higher scores ($M = 8.06, SD = 1.24$) than control students ($M = 4.09, SD = 1.93$) at the end of the semester, $t(73) = -10.87, p < .001$, Cohen's $d = 2.55$.

Attitudes Toward Aging

As a group, students in the class had negative implicit attitudes toward older adults relative to younger adults, at both baseline ($M = 0.38$, $SD = 0.39$, range = -0.69 - 1.39) and at the end of the semester ($M = 0.49$, $SD = 0.47$, range = -0.74 - 1.04). Similarly, students in the control group had negative implicit attitudes toward older adults relative to younger adults at baseline ($M = 0.47$, $SD = 0.40$, range = -0.49 - 1.29) and at the end of the semester ($M = 0.45$, $SD = 0.31$, range = -0.26 - 1.18). The overall three way repeated-measures ANOVA for the Implicit Association Test (IAT) was not significant, $F(1, 63) = 4.15$, $p = .05$, $\eta_p^2 = 0.06$. Power for this analysis, however, was only .52, suggesting that the test might have reached significance with a larger sample size. Post-hoc univariate analyses revealed no differences based on group or time, but students who received Order 1 (attitude-congruent stimuli first) showed significantly more age bias ($M = 0.58$, $SD = 0.32$) than students who received Order 2 (attitude-incongruent stimuli first), ($M = 0.27$, $SD = 0.42$), $F(1,63) = 18.31$, $p < .001$, $\eta_p^2 = 0.23$. Developers of the IAT suggest that order of presentation should not significantly influence results (Greenwald et al., 1998), but in this study it may have, likely because Order 2 is more challenging as participants have to adjust to sorting attitude-incongruent stimuli after the relatively easier task of sorting attitude-congruent stimuli.

Looking at explicit attitudes on the Polizzi Attitudes Toward the Elderly Scale (PATES), as a group, students in the class reported slightly positive attitudes toward older adults, at both baseline ($M = 3.21$, $SD = 0.60$, range = 1.67 - 4.08) and at the end of the semester ($M = 2.86$, $SD = 0.76$, range = 1.33 - 4.04). Similarly, students in the control group reported slightly positive attitudes toward older adults at baseline ($M = 3.03$, $SD = 0.65$, range = 1.71 - 4.13) and at the end of the semester ($M = 3.10$, $SD = 0.75$, range = 1.00 - 4.42). There was a significant Group X

Time interaction, $F(1,74) = 7.30, p < .01, \eta_p^2 = 0.09$. While attitudes toward older adults among the control students remained stable from the beginning of the semester to the end of the semester, course students showed a small but statistically significant increase in positive attitudes. Data for this measure are presented in Figure 2.

Anxiety About Aging

Anxiety about aging was moderate in both groups at baseline and at the end of the semester, and there was no significant interaction and no significant main effects for the total score on the AAS or any of the subscales. Total scores on the AAS were similar for control students and students in the course, and scores remained stable over time for both the control students (baseline $M = 2.22, SD = 0.33$; end-of-semester $M = 2.25, SD = 0.36$), as well as for the students in the course (baseline $M = 2.34, SD = 0.34$; end-of-semester $M = 2.29, SD = 0.31$).

Relevance and Influence of Aging

With respect to how relevant students rated the topic of “older adults and aging” to their *personal* life, there was not a Group X Time interaction. There was, however, a main effect of Group, $F(1,76) = 8.86, p < .01, \eta_p^2 = 0.10$. Across both time points, students in the class rated that “older adults and aging” were more personally relevant to them ($M = 3.71, SD = 1.08$) than control students ($M = 2.94, SD = 1.38$). There was also a significant main effect of Time, $F(1, 76) = 5.03, p < .05, \eta_p^2 = 0.06$, such that students across both groups rated higher personal relevance at the end of the semester ($M = 3.41, SD = 1.21$) than at the beginning of the semester ($M = 3.14, SD = 1.40$).

With regard to how relevant students rated the topic of “older adults and aging” to their *professional* life, there was not a significant Group X Time interaction. There was, however, a main effect of Group, $F(1,76) = 11.22, p < .01, \eta_p^2 = 0.13$. At both time points, students in the

class rated that “older adults and aging” were more professionally relevant to them ($M = 3.24$, $SD = 1.29$) than control students ($M = 2.33$, $SD = 1.51$).

No multivariate effects were found for the items related to the influence of issues related to “older adults and aging” on students’ future actions. For influence on subsequent undergraduate courses, however, there was a significant main effect of Group, $F(1,76) = 7.96$, $p < .01$, $\eta_p^2 = 0.10$, such that students in the class reported that “older adults and aging” would have a higher influence on the courses they would take ($M = 2.19$, $SD = 1.35$) than control students ($M = 1.39$, $SD = 1.39$). The same main effect of Group emerged for influence on extracurricular activities, $F(1,73) = 4.01$, $p < .05$, $\eta_p^2 = 0.05$; students in the class reported that “older adults and aging” would have more of an influence on their extracurricular activities ($M = 1.81$, $SD = 1.09$) than control students ($M = 1.33$, $SD = 1.22$). There were no significant effects for the influence of “older adults and aging” on future graduate education or career.

Curricular Intervention Components

The course components that received the highest ratings as having contributed to students’ *learning* were lectures ($M = 5.71$, $SD = 1.32$), the community site project ($M = 5.42$, $SD = 1.57$), and the small group discussion sessions ($M = 4.97$, $SD = 1.52$). The items that received relatively lower ratings included the self-directed learning assignments ($M = 3.45$, $SD = 1.59$), reading assignments ($M = 3.39$, $SD = 1.71$), and class quizzes ($M = 2.84$, $SD = 1.55$). A similar pattern emerged for student ratings on how much the different course components changed their *attitudes* toward older adults. (Negative values indicate more negative attitudes toward older adults, positive values indicate more positive attitudes toward older adults, and zero indicates no change in attitudes toward older adults.) Average ratings for all course components fell above zero, indicating that students felt the course components made their attitudes more

positive. The components that received the highest ratings were lectures ($M = 2.00$, $SD = 1.26$), the community site project ($M = 1.63$, $SD = 1.22$), and the small group discussion sessions ($M = 1.57$, $SD = 1.17$). The items that received lower ratings from students, but were still positive, included the self-directed learning assignments ($M = 0.60$, $SD = 1.04$), reading assignments ($M = 0.53$, $SD = 1.33$), and class quizzes ($M = 0.07$, $SD = 1.08$).

Discussion

This study sought to examine the effects of an interdisciplinary gerontology course on knowledge, attitudes, and anxiety about aging in first-year undergraduate students. Findings from the current study suggest that some outcome measures were more easily affected by the curricular intervention than others. While knowledge of aging and explicit attitudes toward older adults improved among students in the course, implicit attitudes toward aging and anxiety about aging were resistant to change. Courses in gerontology may achieve some desirable outcomes, but articulating their goals and evaluating their impact is more multifaceted than it might at first seem.

Knowledge of Aging

This course was effective at increasing student knowledge of aging. Students entered the course with moderate knowledge about aging and older adults, and by the end of the semester they had gained an increased awareness of the aging process and some of the challenges and opportunities posed by growing older. However, students nonetheless ended the semester with some remaining gaps in their knowledge. Other curricular interventions with college students have shown a similar increase in knowledge (e.g., Angiullo et al., 1996; Cottle & Glover, 2007; Knapp & Stubblefield, 1998, 2000). Increasing knowledge about older adults and aging may be an important step in improving students' attitudes of older adults. While an important

educational outcome, increased knowledge is only one goal of a gerontology course, and others may be more meaningful for different purposes.

Attitudes Toward Aging

Attitudes toward older adults and aging are another important target of curricular interventions. Results from the current study demonstrated improvement in *explicit* attitudes toward older adults, but no significant change in *implicit* attitudes. On average, students in the course reported positive explicit attitudes about older adults at the beginning of the semester, and their attitudes became slightly more positive by the end of the semester. Previous studies have found mixed results with regard to changes in explicit attitudes. Harris & Dollinger (2001) found that students in a psychology course focused on adulthood and aging reported more positive attitudes than control students, but this cross-sectional study at the end of the semester was not able to examine change over time, thus calling into question whether the group differences were an effect of the course. Studying students in a psychology of aging class, Knapp & Stubblefield (2000) found no changes in student attitudes from the beginning of the semester to the end. In an earlier study, these same authors found an *increase* in negative attitudes following curricular intervention (Knapp & Stubblefield, 1998). The inconsistency of results across studies may be due to the variety of measures used to assess attitudes (e.g., Aging Semantic Differential, Fabroni Scale of Ageism, net bias scores from the Facts on Aging Quiz, etc.).

In contrast, students in the course showed a bias against older adults (indicating a preference for youth over age) on an implicit test of attitudes, and that bias remained after participating in the course. These results are consistent with other studies that have found more negative attitudes toward older adults compared to younger adults (see Kite, Stockdale, Whitley, & Johnson, 2005 for a review). Negative attitudes about older adults and aging are present at an

early age (Newman, Faux, & Larimer, 1997) and they persist, even among older adults themselves (Gonsalkorale, Sherman, & Klauer, 2013). These implicit negative attitudes may be damaging because, like explicit negative attitudes, they are associated with prejudice and discrimination (Greenwald, Andrew, Uhlmann, & Banaji, 2009), and they may be even more subversive than explicit negative attitudes because they operate outside of a person's awareness (Dovidio, Kawakami, Smoak, & Gaertner, 2009). That is, a person may say they are not biased against older adults, but they may nonetheless act in biased ways, even if their actions are unintended. In our study, students reported positive attitudes toward older adults and aging, but their implicit attitudes were consistently negative. A potential explanation for the discrepancy is the effect of social desirability. Students do not want to appear biased against older adults, so they endorse positive attitudes on the Polizzi Attitudes Toward the Elderly Scale, even though they demonstrate negative attitudes on the IAT, a measure of underlying automatic evaluations (Greenwald et al., 1998).

A component of the IAT to keep in mind, however, is that it is a measure of attitudes toward a social group in *comparison* to another social group (e.g., older adults vs. younger adults, black people vs. white people, women vs. men). Thus, the IAT does not measure attitudes toward older adults in an absolute sense, but rather gives a *relative* rating of attitudes toward older adults *compared* to younger adults. In theory, a person could have positive attitudes toward older adults and positive attitudes toward younger adults at the same time, but if the strength of their association with young and good is stronger (faster reaction times) than their association with old and good, they would produced an aging bias score on the IAT. This comparison feature is important to keep in mind when interpreting our findings.

Anxiety about Aging

Anxiety about personal aging was relatively low in this group of students and did not change over the course of the semester. In a similar study that used the same scale, Harris & Dollinger (2001) reported means comparable to those seen in the current study. They also found no differences when comparing students who had taken an aging psychology course to students in an introductory psychology course. Our findings are also consistent with a study by Katz (1990) in which there was no change in college students' attitudes toward their own aging following a gerontology course. Katz proposes that attitudes toward one's own aging may be related to personality traits, such as neuroticism, and therefore less likely to change even with intervention due to the relative stability of personality traits. It also may be that traditional college students are simply too young to be worried about their own aging; growing old, and all that comes with it, may not yet seem relevant. Indeed, mean anxiety levels in the current sample are relatively low, comparable to those found in similarly aged samples of both American and German college students (McConatha et al., 2003).

Relevance and Influence of Aging

Compared to students not in this class, students in the class reported that issues of aging were more relevant to their personal and professional lives, perhaps reflecting interests that propelled them to sign up for the class in the first place. They also thought that these issues would have an impact on their future coursework and extracurricular activities. These ratings did not change over time, however, suggesting that what students found interesting and important about aging at the beginning of the semester remained stable. So, while the course did not increase how students thought about the influence of aging, neither did it diminish their perception of its influence. That could be a real concern with a class in gerontology: when

students learn about some of the more difficult realities of aging, it could discourage their interest and reinforce negative stereotypes and attitudes. It should also be noted that these are cross-sectional self-reports, and only longitudinal follow up will confirm whether student predictions are accurate.

Curricular Intervention Components

This class included some of the same pedagogical features that appear in many other gerontology courses. With regard to student feedback on the course components, there was a clear message about what they found to be effective. Lectures received the highest ratings as having contributed to knowledge and influenced their perceptions of older adults in a positive way. Students reported the lowest impact for quizzes. It is important to note that these data are self-report and do not provide objective information about how individual components of the course are related to changes in student learning and attitudes. More sophisticated research designs would be needed to isolate the impact of specific course features.

Limitations of the Current Study

One limitation of the current study was that many of the statistical analyses are underpowered, due in part to our relatively small sample size. Enrollment was limited by the size of the course ($n = 51$) and further reduced due to attrition. A data collection method that included both an online survey and an in-person computer task lead to a further reduction of participation, because not all students that completed the online survey came into the psychology department to complete the IAT. Several of our results approached significance, and as I collect data when the course runs again in the fall of 2015 I may have greater power to detect effects.

There is also evidence that the students who participated in the course might have been self-selecting. Compared to students in the control group, those in the class said they felt issues

of aging were more relevant to their personal and professional lives, even at the beginning of the semester. Random assignment is typically not possible in curricular interventions, but it may be possible to randomly assign students within a class to particular features, to pinpoint specific pedagogical approaches that are most effective.

Another limitation is that there were significant differences in IAT performance based on order of stimuli presentation. Previous research suggested stimulus order has a small effect on bias scores (Greenwald et al., 1998), which is why order was counterbalanced and kept consistent from the beginning of the semester to the end of semester administrations. However, these differences suggest a potential methodological flaw with the IAT.

Finally, I was not able to collect baseline data on the second measure of knowledge based on quiz items. The total set of items had not been written at the start of the semester, so no baseline assessment could be completed. Though I did find significant and large differences in knowledge between the student groups, I cannot say those differences are an effect of the course.

Future Research

Future research could investigate the relationships among knowledge, attitudes, and anxiety and their association with subsequent behavior. If one goal within gerontology education is to promote interest in careers in aging, it would be important to know what characteristics of students best predict interest and participation in an aging career. Once researchers have pinpointed predictors of educational and career choices, these variables can be the subject of intervention. It is quite possible that the variables I examined do not have a major impact on interest in aging careers, and that other variables such as expected salary, job security, or opportunities for entrepreneurialism – variables not examined in this study – are better predictive of later curricular and career choices. Longitudinal research that gathers baseline information on

such predictor variables and then tracks behaviors over time can answer these questions. In fact, I plan to follow the students in the class for the next four years, evaluating the courses they choose, the extracurriculars they pursue, and their post-graduation plans to see if class participation influenced the trajectory of their college career.

Another goal of future research would be to disentangle which components of curricular interventions (e.g., lectures, group projects, discussion sections) are driving change in outcome measures. Many different pedagogical methods have been employed within the field of gerontology education. Authors have argued for unique and alternative ways to teach students about aging that go beyond the traditional lecture format, such as bringing older adults into the classroom (Hantman, Oz, Gutman, & Criden, 2013); intergenerational service learning, in which younger adults participate in community service with older adults (Roodin, Brown, & Shedlock, 2013); and using film to introduce students to aging-related issues (Karasik, Hamon, Writz, & Moddu Reddy, 2014). Others argue for the implementation of a fusion model: instead of offering a gerontology *course*, gerontology material should be incorporated throughout curriculums to enhance student attitudes toward older adults (Cummings, Cassie, Galambos, & Wilson, 2006). Systematic research to investigate which pedagogical methods are most effective would be a vital contribution to the field.

A larger issue facing gerontology is defining the purpose of these classes, which will then likely inform the pedagogical methods used. Instructors develop learning objectives for their gerontology classes, articulating what they hope students will accomplish in their class. These learning objectives are relatively straightforward to evaluate: did students learn essential course content, did they gain the competencies expected, etc. There are likely a set of meta goals that instructors have for gerontology courses as well. For instance, the current course sought to

reduce negative bias toward older adults and to encourage more students to pursue aging-related careers. These are not learning objectives per se, but they are goals of the course that emerge from a particular professional (and perhaps personal) stance and can be submitted to evaluation of their own. Yet they can only be evaluated if instructors are explicit about their goals. The Association for Gerontology in Higher Education (AGHE) has developed a set of competencies for undergraduate education, and that may provide a starting point for the clear articulation of at least one set of curricular goals. More research is clearly needed in this area.

Conclusion

The United States is currently experiencing a dramatic increase in both the number and percentage of older adults. The American workforce is not adequately prepared to address this demographic transformation, and professionals with an adequate knowledge of aging and sensitivity toward older adults are desperately needed. Undergraduate education is one way to reach future professionals and expose them to the field of aging. A one-semester course on aging geared toward first-year students is effective at promoting some changes in knowledge and attitudes, but it may not be sufficient to alter the trajectory of students' education and careers. If we hope to address the upcoming workforce shortage *and* reduce negative attitudes about older adults, future research on effective curricular interventions is needed.

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Table 1

Participant Characteristics

Measure	Curricular Intervention Group (<i>n</i> = 34)	Control Group (<i>n</i> = 44)
	<i>M</i> (<i>SD</i>) / <i>n</i> (%)	<i>M</i> (<i>SD</i>) / <i>n</i> (%)
Age	18.0 (0.46)	18.1 (0.44)
Gender (female)	20 (58.82)	24 (54.55)
Race/Ethnicity		
White	20 (58.82)	30 (68.18)
Asian	9 (26.47)	14 (31.82)
Hispanic	3 (8.802)	0 (0)
Black	1 (2.94)	0 (0)
Missing	1 (2.94)	0 (0)
Experience with Older Adults	12.53 (3.73)	12.36 (4.31)

Table 2

Means and Standard Deviations of Outcome Measures

Measure	Curricular Intervention Group (<i>n</i> = 34)				Control Group (<i>n</i> = 44)			
	Beginning of Semester		End of Semester		Beginning of Semester		End of Semester	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Facts on Aging Quiz	14.32	2.74	17.59	2.82	13.66	2.89	13.66	4.06
Course Content Items	-	-	8.06	1.24	-	-	4.09	1.93
Implicit Association Test	0.38	0.39	0.49	0.47	0.47	0.40	0.45	0.31
Polizzi Attitudes Toward the Elderly	3.21	0.60	2.86	0.76	3.03	0.65	3.10	0.75
Anxiety about Aging Scale	2.34	0.34	2.29	0.31	2.22	0.33	2.25	0.36
Relevance of Aging								
Personal	3.47	1.21	3.94	0.89	2.89	1.50	3.00	1.28
Professional	2.91	1.40	3.56	1.11	2.23	1.67	2.32	1.36
Influence of Aging								
Coursework	2.03	1.28	2.35	1.45	1.48	1.52	1.32	1.25
Extracurriculars	1.87	1.06	1.74	1.15	1.43	1.34	1.23	1.10
Graduate education	2.26	1.39	2.06	1.41	1.77	1.51	1.57	1.35
Career	2.55	1.50	2.42	1.40	2.18	1.57	1.86	1.41

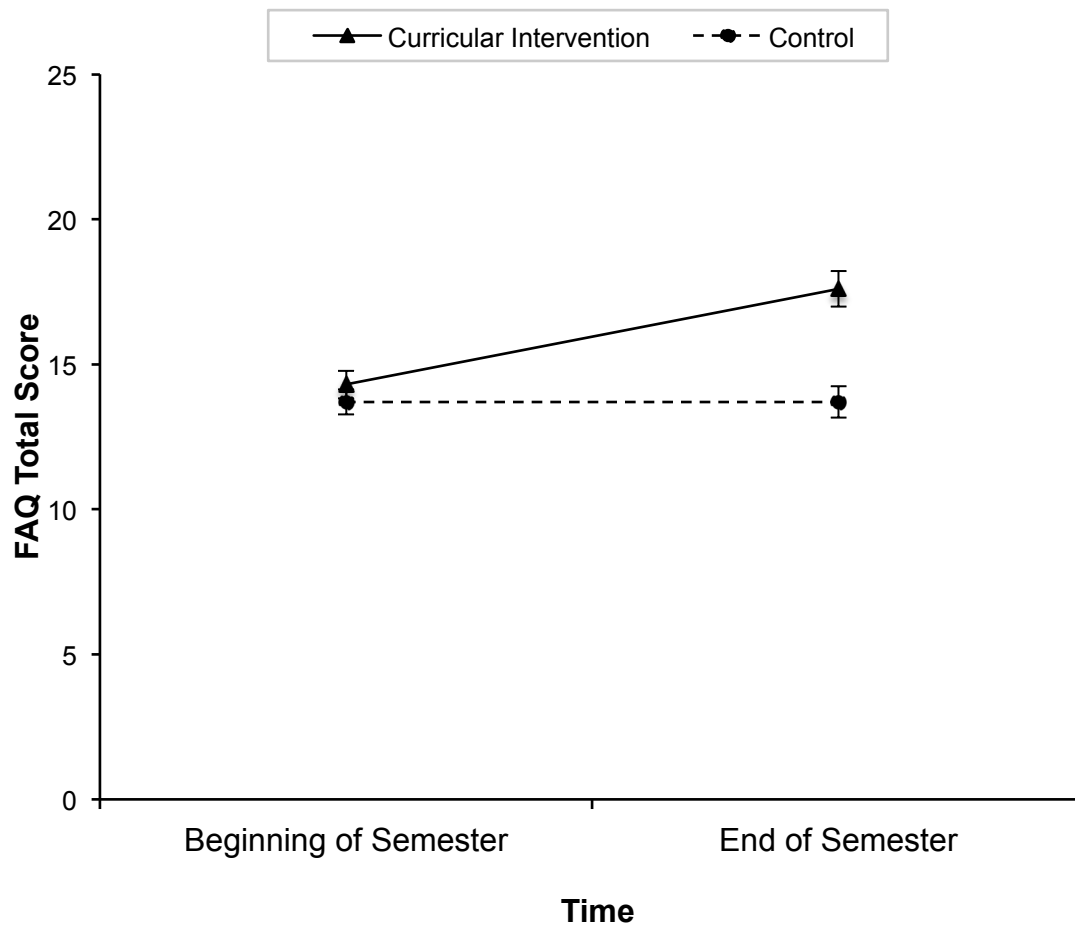


Figure 1. Change in total scores on the Facts on Aging Quiz (FAQ) for curricular intervention students and control students, from the beginning to end of the semester. Error bars represent standard error.

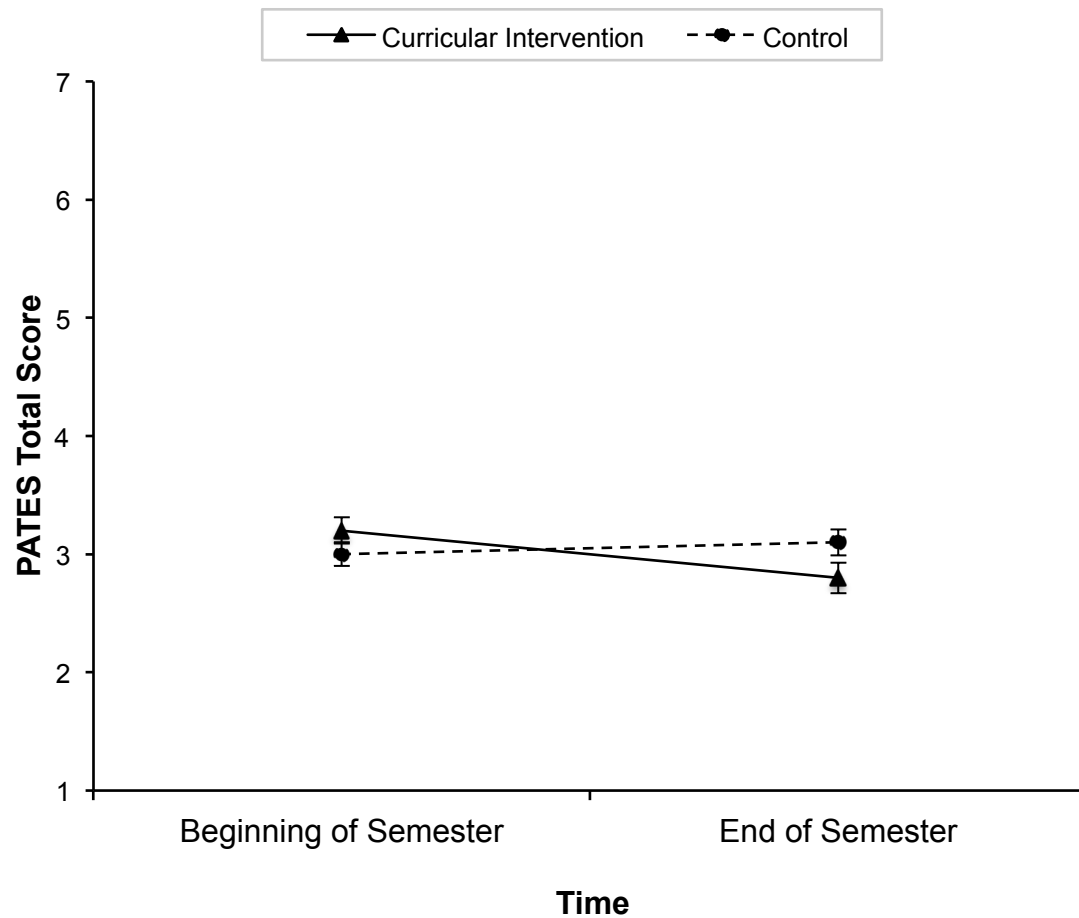


Figure 2. Change in total scores on the Polizzi Attitudes Toward the Elderly Scale (PATES) for curricular intervention students and control students, from the beginning to end of the semester.

Note: 1 was next to the positively valenced word, 7 was next to the negatively valenced word, and 4 was considered neutral. Error bars represent standard error.