Knowledge of Aging and Attitudes Toward Older People by Communication Sciences and Disorders Students

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The demographics of aging are changing dramatically, and the number of older adults is growing rapidly. The U.S. Census Bureau (Vincent & Velkoff, 2010) projected that by the year 2030, one in five U.S. residents will be age 65 years or older, and the number of U.S. residents of this age will double from 40.2 million in 2010 to 88.5 million in 2050. The fastest growing age group consists of individuals age 85 years or older, and their number is projected to more than triple, from 5.8 million in 2010 to 19 million in 2050 (Vincent & Velkoff, 2010).

More Americans are living longer because the leading cause of death during the last century has...
shifted from infectious diseases and acute illnesses to chronic diseases and degenerative illnesses (Centers for Disease Control and Prevention, 2013). The older population, but especially those persons in the oldest age group, will therefore most likely have multiple chronic conditions and will require additional caregiving and support (Institute of Medicine, 2008). This lengthening of the human life span and the increasing number of older adults has wide-ranging social, health care, and educational implications.

Audiologists and speech-language pathologists (SLPs), health care professionals who deal specifically with communication disorders, will increasingly encounter older patients as part of their caseloads because older adults are more likely than younger ones to present with hearing, speech, language, or cognition difficulties (American Speech-Language-Hearing Association [ASHA], 1988; Fein, 1983; Hoffman et al., 2005; Jorgenson, Palmer, & Fischer, 2014; Pullam & Dancer, 1996). For instance, hearing loss is the most common cause of communication disability among older adults. The prevalence of hearing loss in the general population is approximately 40% at age 60 years and increases to 80% at age 80 and beyond. The prevalence of hearing loss is estimated to be even higher for elderly persons in residential care facilities and hospitals (Cruickshanks et al., 2003; Hickson, Worrall, & Donaldson-Scarinci, 2005; Pryce & Gooberman-Hill, 2012). It appears that a majority of older adults will have some auditory dysfunction, and the consequences can be substantial. Hearing loss and diminished auditory processing capabilities can impact individuals’ communication, social engagements, emotional and physical health, cognitive abilities, and quality of life (Arlinger, 2003; Brink & Stones, 2007; Gates, Anderson, Feeney, McCurry, & Larson, 2008; Laplante-Levesque, Hickson, & Worrall, 2010; Lin et al., 2011; Pryce & Gooberman-Hill, 2012; Resnick, Fries, & Verbrugge, 1997; Weinstein, 2013).

Communication difficulties can also result from strokes, degenerative diseases, and changes in cognition due to mild cognitive impairments and demen- tias. Older adults’ diminished abilities to produce and comprehend both written and spoken messages can lead to activity limitations and participation restrictions (Zehnhoff-Dinnesen, Angersten, & Deuster, 2010). Additionally, an older person’s deficits in hearing, speech, language, and cognition may adversely impact his or her family members, caregivers, and other significant persons because effective communication skills are necessary for almost every activity of daily living (Savundranayagam, Hummert, & Montgomery, 2005; Scarinci, Worrall, & Hickson, 2008).

The demand for competent professionals who are willing to serve older adults with communication disorders will undoubtedly increase as the number of older adults increases. However, when informally queried, very few undergraduate communication sciences and disorders (CSD) students at the institution where this study occurred indicated a desire to eventually work with the elderly. Such lack of interest has also been found among other preprofessional students and is frequently attributed to negative attitudes, misconceptions, and a lack of knowledge about aging (Boswell, 2012; Cottle & Glover, 2007; Hughes et al., 2008; Ivey, Wieling, & Harris, 2000; Moriello, Smey, Pescatello, & Murphy, 2005; Robert & Mosher-Ashley, 2000; Van Dussen & Weaver, 2009; Voogt, Mickus, Santiago, & Herman, 2009; Weir, 2004).

**Literature Review**

A literature review revealed numerous studies on attitudes and knowledge of aging, especially among medical students, nursing students, and student social workers. However, only two published studies are available about students aspiring to become audiologists and SLPs. In the first, Pullam and Dancer (1996) found little knowledge about aging among undergraduate, first-semester graduate, and final-semester graduate CSD students. Percentage correct scores were barely above the guessing level for all three groups of CSD students on the Facts on Aging Quiz (FAQ; Palmore, 1977, 1981, 1998). Pullam and Dancer concluded that the infusion approach, where aging-related information is placed into discipline-specific courses, was not effective. They suggested that geriatric content must be more specific, focused, and routinely offered in order to successfully educate undergraduate and graduate CSD students.

Gable, Searl, and Fulks (2003) similarly advocated for the inclusion of course work dealing with aging and the elderly in the CSD curriculum. Results of their study indicated that a knowledge of aging was positively associated with academic interest in aging and the elderly, the number of aging-related courses taken, and involvement in groups that included older adults. Gable et al. concluded that the provision of appropriate knowledge via course work, exposure to the elderly population, and experiences in gerontology can positively influence CSD students’ attitudes toward aging and help prepare them to become future professionals who can work effectively with older adults.

Despite the large number of studies and data available for students in various health care training programs, very few studies have explored these factors among students in CSD programs. The purpose of the present study was to add to the limited body...
of information regarding undergraduate CSD students’ knowledge about aging processes and their attitudes toward the elderly.

**METHOD**

**Sample and Procedure**

Undergraduate students in a medium-sized public university in the northwest United States participated in this study. Students in the undergraduate CSD program with the same academic standing were specifically chosen so as to minimize the impact of differences in education level on study findings. Some students in the present study had participated in an earlier and larger cross-sectional study of aging knowledge and attitudes that involved undergraduate CSD-major and non CSD-major students as well as graduate speech-language pathology students. Findings of this earlier study will be presented in a separate publication.

All of the students in the current study were seniors and CSD majors, and all were enrolled in a course on hearing loss and communication difficulties in adults. Students from 3 consecutive years of this course offering were pooled and constitute the final number of 147 participants. All of the students signed a university human subjects review committee-approved informed consent document that outlined the purpose and voluntary nature of the study. The majority of participants were traditional-aged students ($M = 22.6$ years; months), were female ($n = 137$, 93.2%), and identified themselves as Caucasian ($n = 124$, 84.4%).

At the first class meeting, each student was given a packet that contained all of the study materials and was instructed to return the completed materials by the next class period. Materials included a short participant information survey, Palmore’s FAQ, Polizzi’s Attitudes Toward the Aging Scale (PATES; Polizzi & Millikin, 2002) for a female target and PATES for a male target, blank pages as canvases for hand-drawn pictures, instruction sheets for student-generated drawings with space for providing descriptions of their drawings, and a box of crayons.

**Measures**

**Participant information survey.** The survey (see Appendix) included questions about the participants’ age, gender, and race/ethnic origin, as well as information on the number of CSD-major and non CSD-major courses taken that included content about the aging process and the geriatric population. Information about the students’ level of knowledge of aging and older adults, level of knowledge about communication disorders in older adults, general experience working with older adults, and amount of nonwork-related interactions with older adults was also requested. Four response categories were possible for questions related to knowledge levels, interaction, and experience: (a) none, (b) minimal, (c) some, and (d) a lot. All of the information gained via the survey was accepted as reported and was not confirmed via examination of the students’ academic records, course descriptions, course syllabi, or other method.

**FAQ (1 and 2).** The FAQ was used to assess the students’ knowledge about older adults and the aging process. I chose the FAQ because it is a widely used assessment tool of reasonable length. It covers the basic physical, cognitive, and social dimensions of aging as well as common misconceptions that people have about aging. According to Palmore (1998), the primary evidence for the validity of the FAQ is documentation of test items from statistics and local and national studies demonstrating the facts. Although initially developed and used primarily in the field of gerontology, the FAQ has also been used to assess aging-related knowledge and attitudes among students and professionals in various health care–related disciplines (Cole & Dancer, 1996; Eskildsen & Flacker, 2009; Moriello et al., 2005; Searl & Gabel, 2003).

I chose to use revised FAQ1 and FAQ2 quizzes (Palmore, 1998) with a multiple-choice format over the original true/false versions because the multiple-choice format has been shown to reduce the probability of guessing an item correctly (Palmore, 1992). Reliability or internal consistency of test items in the revised multiple-choice versions have been found to be low by general standards, with reported coefficient alphas of 0.15 for FAQ1 and 0.36 for FAQ2 (Harris & Changas, 1994; Harris, Changas, & Palmore, 1996). However, the low alpha values could be explained by the small number of questions and the low interrelatedness among test items due to heterogeneous constructs (Tavakol & Dennick, 2011). Palmore defended the use of the FAQ by stating that it was designed to “yield measurements that are directly interpretable in terms of specified performance standards” rather than to “place a person relative to a normative group on a relatively stable and homogeneous trait (such as intelligence)” (Palmore, 1998, p. 57). Therefore, higher total correct scores on the 25-item quiz would indicate a greater knowledge about aging.

The addition of a don’t know (DK) response option further minimized the likelihood of guessing and improved each quiz’s reliability (Clark, 1996; Courtenay & Weidemann, 1985). The DK response also allowed for a distinction between the FAQ total.
percentage incorrect due to misconception (error response) versus that due to ignorance or lack of knowledge (DK response). Indirect insight into attitude was also obtained by examining FAQ errors for positive and negative biases. Seven different scores were computed for the FAQ: (a) total percent correct as a measure of overall knowledge level, (b) percent error response as a measure of the amount of misconception or wrong idea, (c) percent DK response as a measure of the amount of ignorance or an absence of idea, (d) total percent incorrect as a sum of total percent error response and percent DK response, (e) percent ProAged bias as a measure of the amount of positive bias answers incorrectly chosen, (f) percent AntiAged bias as a measure of the amount of negative bias answers incorrectly chosen, and (g) percent NetBias (difference between ProAged and AntiAged biases) as a measure of the tendency for a student to think positively or negatively about the elderly.

I made one wording adjustment to item 25 on FAQ1 because the original quiz item was outdated. The date in the original item, which read: “The health and economic status of old people will be about the same or worse in the year 2000 (compared to younger people)” was changed to be one year ahead of the current year that the quiz was given. This revised version of the FAQ1 was completed by 28 students. To minimize the practice effect, students who had completed the FAQ1 in an earlier study as non-CSD majors (N = 119) completed the FAQ2.

According to Palmore (1998), results from the FAQ1 and FAQ2 (with a DK option) are similar enough to allow their usage as alternate measures of knowledge. The current study was designed and data were acquired with this perspective. However, a more recent study suggests that FAQ1 and FAQ2 are not alternate measures and actually deal with different domains of content regarding aging (Seufert & Carrozza, 2002). Therefore, I did not combine the FAQ1 results with the FAQ2 results for the statistical analysis.

PATES. I assessed the students’ attitudes toward older adults using the PATES, which is an adaptation of Rosencrantz and McNevin’s Aging Semantic Differential scale (ASD; Polizzi & Millikin, 2002; Rosencrantz & McNevin, 1969). According to Polizzi and Steitz (1998), their review of the existing literature revealed numerous problems associated with use of the original ASD as a measure of attitudes toward the elderly. Problems included the types of attitudinal objects used, the age of the instrument and adjective pairs, and the lack of reliability or internal consistency estimates. Polizzi and Millikin (2002) and Polizzi (2003) specified how the original ASD could be revised and developed the PATES as such a measure. Polizzi reported Cronbach’s alphas of .9737 and .9713 for the final list of adjectives used in PATES and test–retest reliabilities of .8127 and .7938 for PATES men and PATES women scales, respectively.

PATES consists of 24 bipolar adjective pairs that describe attributes or characteristics of older adults. Each adjective pair forms two poles of a 7-point Likert scale. Respondents are asked to place a check mark along the scale at the point, to their best judgment, that represents an older man or an older woman. To avoid a set response pattern bias, the position of the negative and positive adjective extremes is randomly reversed (i.e., the left column of the instrument consists of a random order of positive and negative items). Separate PATES were completed for male and female targets, and the presentation for male and female scales in the packet was counterbalanced in order to control for the order effect. In accordance with Polizzi’s recommendations, “a man 70–85 years of age” and “a woman 70–85 years of age” were used as attitudinal object descriptors (Polizzi, 2003, pp. 213–214).

Student-generated drawings and legend text analysis. The students’ perception of aging was also explored by analyzing student drawings and accompanying legends they used to describe each drawing. Each student generated two separate drawings and two accompanying legends. Instructions were as follows:

Hand-draw on the canvas below a picture of an elderly person. Draw the first image that came to your mind. Feel free to be as creative as you desire (color with crayons, magic markers, paint, etc.) with your hand-drawn illustration; however, please do not use photographs, visual media/magazine clips, etc. I have crayons for those who would like to borrow them. Be sure to include complete a legend explaining your illustration and your definition and age criterion of when a person is considered “elderly.”

Hand-draw on the canvas below what you project YOU will look like and what you hope to be doing when you are elderly. Feel free to be as creative as you desire (color with crayons, magic markers, paint, etc.) with your hand-drawn illustration; however, please do not use photographs, visual media/magazine clips, etc. I have crayons for those who would like to borrow them. Be sure to include complete a legend explaining your illustration and your definition and age criterion of when you will be an “elderly” person.

Drawings were examined and coded by four raters (three graduate assistants and the author) for inclusion of select features that fell into five categories: (a) gender, (b) facial expression, (c) physical dependency, (d) social interaction, and (e) locale. The five categories were initially based on feature codes used in previous studies that also used sketches as a means...
for tapping into student views and attitudes toward the elderly (Barrett & Cantwell, 2007; Barrett & Pai, 2008). The feature codes adopted from these earlier studies included gender, facial expression, and physical features. Two additional graduate assistants coded a portion of the data set within these initial categories. The final coding categories used in the present study were developed after discussions regarding ease or difficulty of the coding process and what additional feature categories seemed warranted. The accompanying legend that described each drawing was not made available during the coding process.

The legend text was analyzed using the Linguistic Inquiry and Word Count (LIWC2007) computerized text-analysis program (Pennebaker, Booth, & Francis, 2007). The LIWC2007 was developed “in order to provide an efficient and effective method for studying the various emotional, cognitive, structural and process components present in individuals’ verbal and written speech samples” (Pennebaker et al., 2007, p. 3). The LIWC2007 has two central features: a processing program and a dictionary. The program goes through a text file, compares each word with the default dictionary file, and calculates a percentage of words falling into each of the 80 different default word categories. Examples of default word categories are standard language (e.g., articles, prepositions), psychological processes (e.g., emotion, cognitive, sensory, social), and specific content areas (e.g., work, school). Seven categories were chosen from these 80 default word categories for analysis in the current study: (a) positive emotion, (b) negative emotion, (c) cognitive process, (d) see, (e) hear, (f) feel, and (g) social process.

Research conducted by LIWC2007 program developers (Pennebaker, Booth, & Francis, 2007) revealed a high level of interrater discrimination of category word elements and moderate-to-strong correlations between judges’ ratings and the LIWC2007’s word count strategy. These findings provide support for the program’s validity and reliability (Bantum & Owen, 2009; Pennebaker & Francis, 1996; Pennebaker, Mayne, & Francis, 1997; Tausczik & Pennebaker, 2010). Rationale for text analysis in the present study was based on the premise that the words that the students used to describe their drawings may allow insight regarding their views about aging and the elderly.

RESULTS

Participant Information Survey

Examination of the survey data revealed that very few of the students had taken courses in gerontology or courses with geriatric content. The number of non-CSD major courses taken with geriatric content ranged from no courses for 71.0% (103/145) of the students to three courses for 1.4% (2/145) of the students. On average, the students recalled taking only two CSD-major courses with some information on the aging process and its relations to communication disorders; however, 30.5% (43/141) of the students recalled no exposure to such information in CSD-major courses. The majority of students (52.4%, 75/143) reported a minimal level of knowledge about aging and older adults, and a smaller number (37.1%, 53/143) reported some level of knowledge. The majority of students (57%, 81/142) professed to have some level of knowledge about communication disorders in older adults, and a smaller number (34.5%, 49/142) had minimal knowledge. The amount of nonwork-related interactions with older adults ranged from none (8.3%, 12/145), minimal (33.1%, 48/145), to some (45.5%, 66/145), whereas the amount of general experience interacting with older adults ranged from none (37.7%, 55/146), minimal (28.1%, 41/146), to some (29.5%, 43/146).

FAQ

Cronbach’s alpha reliability coefficients indicated good internal consistency for both versions of the FAQ that were used in the current study (FAQ1 $\alpha = .873$; FAQ2 $\alpha = .774$). The smaller group of study participants ($n = 28$) who completed the FAQ1 answered 37.57% ($SD = 14.29$) of the answers correctly as compared to 30.00% ($SD = 10.89$) for the larger sample of students who completed the FAQ2 ($n = 119$). An independent-samples $t$ test revealed the mean total percent correct scores to be significantly different, $t(144) = 3.104, p = .002$. This finding does not support Palmore’s contention that the two quizzes are similar enough to be used as alternate versions. Therefore, I examined the FAQ1 and FAQ2 results separately.

The average total percent incorrect score for the FAQ1 was differentiated by 35.00% ($SD = 19.19$) due to misconception and 27.43% ($SD = 24.84$) due to ignorance. The average total incorrect score for the FAQ2 was differentiated by 35.29% ($SD = 14.83$) due to misconception and 34.19% ($SD = 19.96$) due to ignorance. Average ProAged (positive bias) incorrect answers chosen scores were 16.21% ($SD = 10.95$) for FAQ1 and 22.99% ($SD = 15.15$) for FAQ2. Average AntiAged (negative bias) incorrect answers chosen scores were 25.85% ($SD = 20.18$) for FAQ1 and 35.91% ($SD = 16.26$) for FAQ2. The difference between the two bias scores yielded average NetBias scores of $-9.64$ ($SD = 22.33$) for FAQ1 and $-12.81$ ($SD = 19.54$) for FAQ2. An independent-samples $t$
test revealed no significant differences between the two NetBias scores, $t(9144) = .751, p = .454$.

**PATES**

Total PATES scores can range from a minimum of 24 points to a maximum of 168, with a midpoint or neutral score of 96 points. A total score that is lower than the neutral score indicates a positive attitude; a total score that is higher than the neutral score indicates a negative attitude. Study participants had an average total PATES score of 87.95 ($SD = 18.76$) for a male target and 75.18 ($SD = 15.31$) for a female target. A related-samples $t$ test revealed a statistically significant difference for elderly female and elderly male targets, $t(145) = 8.289, p = .000$.

**Bivariate and Multiple Regression Analysis**

I investigated the students’ knowledge about aging and the elderly by examining the bivariate relationships of the following study variables: (a) student age, (b) number of non-CSD major courses taken with geriatric content, (c) number of CSD-major courses taken with geriatric content, (d) level of knowledge about aging and older adults, (e) level of knowledge about communication disorders in older adults, (f) general experience working with older adults, (g) amount of nonwork-related interaction with older adults, and (h) FAQ2 percent correct score. The correlation matrix for the eight variables is presented in Table 1; significant correlations are in bold.

The Pearson product–moment correlation coefficient indicated a moderate positive association between students’ knowledge level about aging and older adults and their knowledge level of communication disorders in older adults ($r = .429, p = .000$). Positive but weak relationships were also found for students’ level of knowledge about aging and older adults and the number of non-CSD major courses they had taken with geriatric content ($r = .277, p = .000$), number of CSD-major courses taken ($r = .166, p = .026$), work-related interactions with older adults ($r = .191, p = .011$), general nonwork-related interactions with older adults ($r = .227, p = .003$), and student age ($r = .190, p = .011$). Weak, positive relationships were also found for the amount of nonwork-related interaction with older adults and level of knowledge about communication disorders in older adults ($r = .289, p = .000$) and for age with general working experience with older adults ($r = .214, p = .005$). A weak but positive relationship was also found for the number of non-CSD major courses taken with geriatric content and general working experience with older adults ($r = .139, p = .049$).

Variables significantly associated with the students’ level of knowledge about aging and older adults, at $p < .05$ and $p < .01$ levels, were entered

| Table 1. Pearson product–moment correlation coefficient matrix. |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                  | Age\(^a\) | Non-CSD\(^b\) | CSD\(^c\) | Knowledge of aging\(^d\) | Knowledge of comm disorders\(^e\) | Work\(^f\) | Nonwork\(^g\) | FAQ2\(^h\) |
| Age              |          |              |          |                             |                             |            |              |          |
| Non-CSD          | 0.017    |              |          |                             |                             |            |              |          |
| CSD              | 0.085    | 0.114        |          |                             |                             |            |              |          |
| Knowledge of aging | **0.190** | **0.277** | **0.166** |                             |                             |            |              |          |
| Knowledge of comm disorders | 0.099 | 0.004 | **0.355** | **0.429** |                             |            |              |          |
| Work             | **0.214** | **0.139** | 0.133    | 0.191*                       |                             |            |              |          |
| Nonwork          | 0.107    | 0.033        | **0.143** | **0.227**                    | **0.289**                    | 0.075      |              |          |
| FAQ2             | 0.045    | 0.058        | 0.113    | 0.025                        | -0.013                       | -0.024     | -0.022       |          |

\(^a\)Student age, \(^b\)Number of non-CSD major courses taken with geriatric content, \(^c\)Number of CSD-major courses taken with geriatric content, \(^d\)Level of knowledge about aging and older adults, \(^e\)Level of knowledge about communication disorders in older adults, \(^f\)General experience working with older adults, \(^g\)Amount of nonwork-related interaction with older adults, \(^h\)Facts on Aging Quiz 2 percent correct score.

\*Correlation is significant at the 0.05 level (1-tailed). **Correlation is significant at the 0.01 level (1-tailed).
into a forward multiple regression analysis. Regression results indicated an overall model of three predictors (i.e., level of knowledge about communication disorders in older adults, number of non CSD-major courses taken in gerontology, and student age) that significantly predict for level of knowledge about aging and older adults, $F(3, 127) = 14.318$, $p < .001$; $R^2 = .253$. Although the regression model was statistically significant and the effect size of changes in predictor variables (as estimated by $R^2$ values), was found to be large, this model accounted for only 25.3% of variance. This low percentage suggests that there are other variables that were not measured in this study that have an effect on an individual’s level of knowledge about aging and older adults.

**Student-Generated Drawings**

The coding of student-generated drawings can be biased by raters’ knowledge levels, perspectives, and attitudes about aging and older adults as well as by differences in the raters’ ages, race, ethnicity, and experiences with older adults. Consistency estimates of interrater reliability with multiple raters is most often determined by Cronbach’s alpha, and values of .70 or greater are generally considered to be adequate (Multon, 2012; Stemler, 2004). Cronbach’s alpha calculated for the four raters across the five coding categories and two types of student-generated drawings were all .88 or greater. Categories that yielded the lowest Cronbach’s alpha consistency estimates were facial expression (elderly = .90; self = .90) and gender (elderly = .94; self = .88).

I combined the coded data across the four raters for further data analysis. Instances where all four raters did not agree were adjudicated by assigning the code reported by the majority. The code that I assigned was used in those instances where none of the raters agreed. The majority of older adult and self-drawings depicted females (50.0% older adult, 69.9% self). Smile was the facial expression most frequently depicted but was less likely to occur for the older adult drawings than for the self-drawings (56.8% older adult, 80.8% self). Frowns occurred only minimally in both types of drawings (7.5% older adult, 0.7% self). The use of various types and combinations of motility, physical, and sensory aids was drawn but was more likely to occur for the older adult drawings than for the self-drawings (72.6% elderly, 43.2% self). Most drawings, but especially the drawings of the older adult, depicted no other persons (85.6% older adult, 61.0% self). Depiction of locale more frequently fell into other/indeterminate (31.5% older adult, 49.3% self) or none (56.2% older adult, 35.6% self). However, there was a greater number of older adults shown in a care facility (2.7% older adult, 0.7% self) and less at home (9.6% older adult, 14.4% self). Wilcoxon signed-ranks tests ascertained statistically significant differences ($p < .01$) for four picture-coding categories of gender, facial expression, social interaction, and locale.

The students were instructed to define the age “when a person is considered elderly” or “when you will be an elderly person” in the legend that accompanied each type of illustration. The age reported was approximately 70 years for both the older adult ($M = 71.64$, $SD = 6.79$) and the older self ($M = 71.48$, $SD = 7.45$).

The students’ perspectives regarding older adults and aging were quantified by analyzing numeric data (percentages) generated by the LIWC2007 program for words used to describe the drawings. Statistically significant differences were found for words describing an older adult versus self-drawings in three of the seven default word categories selected for analysis: (a) positive emotion, $t(145) = –9.668$, $p = .000$; (b) cognitive process, $t(145) = –2.910$, $p = .004$; and (c) social process, $t(145) = 13.378$, $p = .000$. Positive emotion, conveyed by words such as love, nice, and sweet, was expressed in 1.83% ($SD = 2.09$) of the legends attached to the older adult drawings and in 5.11% ($SD = 3.54$) of the legends attached to the self-drawings. Cognitive process, conveyed by words such as think, know, and cause, accounted for 4.55% ($SD = 2.89$) of the legends for the older adult drawings and 5.49% ($SD = 3.24$) of the legends used to describe the self-drawings. Social process, conveyed by words such as mate, neighbor, and friend, was expressed in 11.91% ($SD = 4.48$) of the legends associated with the older adult drawings and in 5.28% ($SD = 4.12$) of the legends associated with the self-drawings.

**DISCUSSION**

Results of the formal assessment of CSD students’ knowledge level via the FAQ revealed a wide range of knowledge levels, with percent correct scores ranging from a low score of 8.0% correct obtained by two students to a maximum score of 88.0% correct obtained by one student. According to Palmore (1977, 1998), college or technical school students typically score between 55.0% and 69.0% correct on the FAQ1, and graduate school students typically score between 65.0% and 76.0% correct, whereas the average person with a college-level course in gerontology gets more than 80.0% of the items on the FAQ1 and FAQ2 correct. Mean total percent correct score of 35.0% for FAQ1 and 30.0% for FAQ2 indicate that...
Beliefs and attitudes about aging and older adults were quantified by computerized text analysis of the legends accompanying both types of drawings. In general, the descriptions of the drawings of older adults were more likely to address physical attributes rather than social context. This finding is exemplified by an accompanying legend of an older adult for Figure 1, which stated, “In this picture an elderly woman is pointing her cane at her husband, angry that he has fallen asleep. The woman has grey wispy hair, glasses, and wrinkles. Her husband, the bald man sleeping in the recliner, fell asleep because he wasn’t hearing her very well, and he was uninterested anyway. He also wears glasses because his vision had gotten worse as he aged. The woman and her husband are about 75 years old and have graying, thinning hair.”

The reverse is exemplified by the description for Figure 2, a self-drawing, where physical ability and social engagement were characterized, “I am a Speech Pathologist, the one holding the bucket! My sister is a yoga instructor, life coach and we run our own wellness center, it has laughter and music and is filled to the brim with positive energy. I work with children of all ages as well as adults. The work is challenging but rewarding and oh yeah, did I mention it all takes place in Hawaii!! Aloha! I will be elderly when I am 65 but, I will not be old in spirit. I will continue to enrich my SLP skills by taking classes, attending workshops and seminars and relax with a slower paced life focusing on important issues and not wasting time with social constructions telling me how I should be acting at my age.”

Of the seven LIWC2007 default word categories that were examined for the present study, differences were most notable for words associated with positive emotion and social process. The use of more positive emotional words to describe a self-drawing was consistent with what was drawn. The greater number of “social” words used to describe drawings of older adults appears to contradict illustrations where older adults were more likely to be drawn in isolation. However, although a count of words into psychologically meaningful categories is useful, it must be kept in mind that this analysis did not reveal the context in which the words were used. For example, a legend accompanying a drawing of an older adult stated, “In my picture of an elderly person, I drew a woman wearing several pieces of jewelry, as many of the elderly women I recall interacting with in my life have enjoyed flashing extravagant and bright accessories. I’m not sure why this is. Maybe coincidence or maybe elderly women enjoy wearing many pieces of jewelry because it makes them happy and felt beautiful and young, or distract from the fact
Figure 1. Drawing of an older adult where physical attributes rather than social context are highlighted in the accompanying description.

Figure 2. Drawing of an older self where physical ability and social engagement are highlighted in the accompanying description.
that they may have difficulties from aging. I think a person is considered elderly when they are at least 65 and can no longer happily and successfully maintain their lives independently, and require assistance from others daily." Although this legend contains a number of social words (i.e., many, interacting, enjoy, happy, others), the context really is not related to social engagement.

Limitations

The present study showed that undergraduate CSD students intending to become audiologists and SLPs are generally lacking in knowledge about aging and tend to have ageist attitudes and perceptions about older adults. However, there are some limitations involved with this study. Student-generated drawings depicting an older adult and themselves as an elderly person were coded by raters who did not have access to the legends that described and accompanied each drawing. Therefore, there exists a possibility that the student drawers would not agree with the coder interpretations.

Participants in the current study were also primarily Caucasian, female, and traditional college-age students. Results may differ from programs with more diverse student populations in regard to race, ethnicity, culture, age, more life experiences, and more interactions with elders. Findings and conclusions reported were also based on a convenience sample that was limited to a specific program and university and may not be widely generalizable to other programs or in other academic institutions in different locales. Results should be replicated by other CSD programs in other academic institutions so that they can be deemed as appropriate for generalization. Regardless of the limitations, the results described herein are consistent with previous research findings in other fields. Previous findings also indicated that individuals with greater knowledge of aging may hold less ageist attitudes (Boswell, 2012; Eskildsen & Flacker, 2009; Gable, Searl, & Fulks, 2003; Weir, 2004).

Competency-based education and training of graduate audiology and speech-language pathology students focus on the acquisition of effective skills for serving patients of all ages or a “life span” perspective (ASHA, 2012, 2013). The inclusion of discipline-specific courses with geriatric emphasis and greater infusion of geriatric content in existing courses are therefore more likely to occur in graduate rather than undergraduate CSD programs (ASHA, 1988; Bardach & Rowles, 2012; Glista & Shadden, 1998; Nerbonne, Schow, & Hutchinson, 1980). A resurgence of interest on interprofessional education, interprofessional competencies, and calls for accreditation in core competencies for interprofessional collaborative practice may also motivate ASHA-accredited graduate programs to modify their existing curricula (Goldberg, 2015; Goldberg, Koontz, Rogers, & Brickett, 2012; Goldberg, Mosack, & Brickell, 2012; Institute of Medicine, 2008; Interprofessional Education Collaborative Expert Panel, 2011a, 2011b; World Health Organization, 2010). However, current information as to the extent to which geriatric content has been included in ASHA-accredited graduate as well as undergraduate CSD program curricula is lacking.

Conclusion

The unprecedented growth in the number and proportion of older adults in our society will have a significant impact on various health care–related disciplines and professions, including those that deal specifically with communication disorders. Audiologists and SLPs must not only be clinically proficient but must also be knowledgeable and sensitive to biological, psychological, and social concerns that are unique to this group. According to Howe (2014), the earlier that geriatric training and gerontology education begin, the more competent students become and the more likely that they will choose careers in aging or “at the very least be sensitized to the issues facing older adults” (p. 319). Educators must therefore rise to the challenge of providing effective learning, training, and engagement activities not only to graduate CSD students but also to undergraduate CSD students. Recommending gerontology course electives or minor areas of study with geriatric population emphasis are two approaches that may heighten undergraduate CSD students’ sensitivity toward and desires to work with the elderly. In addition, the infusion of greater geriatric content in existing undergraduate CSD-major courses and the inclusion of interprofessional-focused learning experiences may increase undergraduate students’ knowledge of, and influence their attitudes toward, older adults.

REFERENCES


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APPENDIX. PARTICIPANT INFORMATION SURVEY

Last name: _________________________     First Name: __________________     Student #: ________
Birthdate: ____________     Age: ________     Gender: ______     Race/Ethnic Origin: ______________________
Educational status: Freshman, Sophomore, Junior, Senior, other _________________
Number of non-CSD courses taken specifically on geriatrics/aging: ______

Title of course(s):

Topics covered (check all that apply):

- Biology/anatomy
- Cognition
- Language and linguistics
- Neurology/neuroanatomy
- Models of aging (e.g. biological, psychosocial)
- Philosophy of aging (e.g. ethics, euthanasia)
- Sociology
- Hearing
- Physiology
- Attitudes/perception toward aging

Level of knowledge about aging/older adults: none, minimal, some, a lot

Number of CSD courses taken which included information on geriatrics/aging: ______

Title of CSD course(s):

Topics covered (check all that apply):

- Biology/anatomy
- Cognition
- Language and linguistics
- Neurology/neuroanatomy
- Models of aging (e.g. biological, psychosocial)
- Philosophy of aging (e.g. ethics, euthanasia)
- Sociology
- Hearing
- Physiology
- Attitudes/perception toward aging

Level of knowledge about communication disorders in older adults: none, minimal, some, a lot

General experience working with the older adults: none, minimal, some, a lot

Type of work experience (describe):

Amount of non-work related interaction with older adults: none, minimal, some, a lot

Type of interaction (describe):