

# Factors That Influence Dental Students' Attitudes About Older Adults

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*Abstract:* Our study considered dental students' general attitudes towards older persons using the Aging Semantic Differential. The influence of age, gender, cohort, education, and academic exposure on general attitudes towards older adults was evaluated using a total of 328 dental students across all four years of academic standing. Students were assessed in the fall and spring semesters. The results showed differential responding on the four subscales, with slight positive ratings on the autonomy, acceptability, and integrity subscales and a slight negative rating for instrumentality. Females expressed more negative attitudes than their male counterparts, with no age differences. There was also no significant impact from a specific, didactic educational component offered to the fourth-year students. However, the fourth-year students were the only group to show positive changes across the full academic year. The results suggest that general attitudes can be changed, but didactic (classroom) forms of education alone are insufficient to meaningfully modify students' perceptions of the elderly. Exposure to older adults in a clinical setting appears to be a critical element, as the fourth-year students received much greater exposure to older patients and more intensified interface with their mentors.

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Ageism is a prejudice or a negative bias against people based solely on chronological age.<sup>1</sup> The existence of ageism in health care settings has been found to contribute to substandard health care.<sup>2-4</sup> In addition, ageism in health care has been linked to inadequate attention to pain, management of acute conditions, and self-determination.<sup>5-7</sup> Carmona<sup>8</sup> gives recognition to the importance of oral health care for the general well-being and health of older adults. Furthermore, Harrell<sup>9</sup> talks of the educational elements for dentists and raises concerns that they are insufficient to handle the growing need for oral care of older adults. While "older" adults are typically considered to be age sixty-five or above in the United States, primarily because this age is linked to the beginning of Social Security payments, perceptions of older adults are key factors in how they are approached and treated.<sup>2</sup> Given the link between oral health care and general well-being and the noted importance of how older adults are perceived, it is

important that the educational process for dental students includes specific interventions found to successfully build positive perceptions of individuals considered to be older adults.

Increased knowledge of aging has previously been found to have only a modest effect on improving attitudes toward older people.<sup>10</sup> Using a self-assessment of dental students' comfort levels, we previously investigated their knowledge of aging and their feelings about and approaches to working with diverse groups of patients and found that although information is easily learned by dental students, the link between knowledge gain and attitude shift has not been made.<sup>11,12</sup>

Dentists make significant contributions to the overall health and well-being of older individuals; however, dental students' attitudes about working with older adults and educational interventions that can be effective in positively influencing students' perceptions of older patients have largely been unex-

plored. The purpose of this study was to assess dental students' attitudes about working with older patients; to investigate whether there are differences in these attitudes by cohort, age, and gender; and to determine if an educational intervention influences attitudes. We aim, first, to deepen and advance our understanding about the perspectives that dental students bring to the educational process and ultimately to their work with older people and, secondly, to develop effective mechanisms for shaping positive attitudes about older adult patients.

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## The Development of Attitudes, Beliefs, and Behaviors

Fishbein and Ajzen<sup>13</sup> have defined attitudes as “learned predispositions to respond in a consistently favorable or unfavorable manner with respect to a given object” (p. 6). Objects that can be targets for attitudes include individuals, groups of people, institutions, behaviors, policies, and events. Attitudes are considered as general predispositions that do not necessarily directly lead to specific behaviors; however, they do influence intentions that are linked with affect toward the object under consideration. Behavioral intention is a function of two factors: attitude towards the target, and beliefs concerning the target.

Attitude formation is part of a conceptual framework that reflects a feedback loop including beliefs, attitudes, intentions, and behaviors: attitudes may influence the formation of new beliefs and the performance of particular behaviors, which may lead to new beliefs about the object, which may in turn influence the attitudes. In sum, attitudes and beliefs have a reciprocal interaction, and both shape intentions and behaviors. The formation of attitudes about older adults—specifically, older dental patients—can be a key component in the development of professional behaviors and practice patterns of dental students.

Professional education programs in medicine, nursing, and other allied health fields have utilized established measures of students' attitudes about working with older adults, and many have developed discipline-specific interventions aimed at shaping, changing, and positively influencing attitudes. Interventions have included aging-awareness training,<sup>14</sup> multi-modal interventions (e.g., didactic lectures,

group activities, simulations, and mentorship),<sup>15,16</sup> clinical geriatric rotations,<sup>17,18</sup> a senior mentoring program,<sup>19</sup> and the infusion of content on aging throughout the curriculum.<sup>20</sup>

A systematic review demonstrates that the four main instruments utilized in measuring attitudes have been the Palmore's Facts on Aging Quiz, the Aging Semantic Differential, Kogan's Attitude Scale, and the Maxwell Sullivan Attitude Scale.<sup>21</sup> There has been some criticism of these measures, with a specific focus on the instructions for generating attitude ratings.<sup>22-24</sup> The argument has been that, by using terms like “older” or “elderly” in the instructions, the negative aspects are more salient and may result in more negative ratings. However, if the focus is on how attitudes may influence initial interactions with patients, then allowing an individual to define “older” in his or her own way is more appropriate. In this latter case, the intent is to assess how the attitudes may influence interactions with older individuals, based on the hypothesis that the more positive the attitude, the more positive the interactions. As such, the person's salient beliefs and feelings concerning “older persons” are what might be better predictors of initial behaviors towards these individuals than any knowledge they may hold concerning older adults. The nature of an older adult's initial interactions with an oral health care provider may be critical for getting these patients to engage in dental care; any negative behaviors towards these individuals may result in decreased likelihood of engagement.

Dental students' attitudes have been assessed before and after geriatric rotations,<sup>25</sup> with exposure to pictures of oral health in older adults<sup>26</sup> (one group saw poor health and the other saw restored health), and by multimodal educational interventions.<sup>11,12</sup> Overall, the educational interventions used for nursing, medical, dental, and allied health students to date have had little to no effect on improving their general attitudes towards older adults.<sup>27-29</sup>

Several investigations have studied the pre-existing attitudes and beliefs that students may bring with them to school. Incoming students in both medicine and nursing have been surveyed to measure their knowledge and attitudes about older people. Study findings indicate that many students entered the program with negative impressions of older persons; these negative attitudes were more prevalent in younger students.<sup>30,31</sup> Lovell<sup>21</sup> suggests that students' attitudes about older people may mirror those found in the general population, which reflects

how the pervasive ageism and stereotyping of older adults that are present in society influence students in professional programs and underscores the importance of identifying effective methods of shaping both the attitudes and behaviors of dentists who will be seeing growing numbers of older people.

Our study assessed dental students' general attitudes towards older adults across two points in time: the beginning of the fall semester and the end of the spring semester during one academic year. The study was guided by four research questions: 1) how do age and gender influence dental students' general attitudes towards older adults? 2) are there differences in dental students' general attitudes towards older adults as a function of cohort (year in the program)? 3) can a focused educational intervention influence dental students' general attitudes towards older adults? and 4) are dental students' general attitudes towards older adults influenced by a full year of academic exposure, and do age, gender, or cohort moderate this influence?

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## Methods

The study employed a longitudinal survey design involving comparison of students in years one through four of the curriculum at one U.S. dental school, on the same assessment items. Students in each year were assessed at the beginning of the fall semester (August 2003) and at the end of the spring semester (May 2004). Surveys were distributed and collected during the same course session. The purpose for administering the instruments twice was to investigate whether dental students' attitudes about older adults were influenced by their academic and clinical experience. Between the assessments, students in all four cohorts were provided with in-class content on aging, and students in cohorts 1–3 worked in the dental clinic where they provided oral health care for older adults.

The University at Buffalo School of Dental Medicine (UBSDM) admits between eighty-five and 100 students each year into the four-year program. The age of entering dental students ranges between twenty-four and twenty-six, and the percentages of students by gender averages 38 percent female and 62 percent male. The UBSDM Clinic regularly has a patient population of over 24,000. Approximately one-quarter (24 percent) of the UBSDM clinic population is over age sixty-five. Students begin working in the university dental clinic during the second se-

mester of their second year, and their clinical hours steadily increase for the remainder of the program in which they interact with older patients.

Because dental education is a four-year program that involves a standard series of courses that all students complete, purposeful sampling was used to include all students in each of the four years of the program. Four cohorts (corresponding to students in Years 1–4 of the program) completed the instrument. For purposes of comparison, each class cohort was considered as a separate group. Student groups will be referred to as Cohort 1 (Class of 2004), Cohort 2 (Class of 2005), Cohort 3 (Class of 2006), and Cohort 4 (Class of 2007) throughout this article. The assessment was administered during one class with each cohort.

Students in their fourth year (Cohort 1) take an eight-week course, Dental Management of Special Needs Patients, which has one hour of contact per week and includes specific, focused content on the aging process. The goal of this course is to introduce dental students to the effects of physical, medical, and mental disabilities on the treatment planning and delivery of dental care. Material is presented regarding the dental management of a diverse patient population characterized by social, economic, and age-related differences and the influence of psychosocial issues on an individual's ability to receive proper oral health care. The course includes specific content on the psychosocial issues in later life and on geriatric medicine.

Completion of the written assessment instrument was voluntary and was considered equivalent to written consent. Students were asked to provide their student identification number to facilitate matching of pre- and posttests. The protocol was approved by the University at Buffalo Social and Behavioral Sciences Institutional Review Board.

## Measures

Students' age, gender, marital status, and year in the program were recorded. In addition, the students were asked to indicate the age at which they considered someone to be old.

The Aging Semantic Differential (ASD) is a thirty-two-item scale developed by Rosencranz and McNevin<sup>32</sup> to measure the attitudes or perceptual predisposition of respondents towards older adults across several dimensions. While reviewing the literature on attitudes towards older adults, we noticed that this was the measure most used by the studies

being reviewed. As such, we felt it provided a solid basis for using it with dental students.

Originally, a three-factor solution was presented, with these dimensions: Instrumental-Ineffective, Autonomous-Dependent, and Personal Acceptability-Unacceptability. Subsequent research has yielded a four-factor solution, with the dimensions of Acceptability, Instrumentality, Autonomy, and Integrity.<sup>33,34</sup> Acceptability reflects the extent to which one is socially at ease and pleasing to others. Instrumentality is a measure of adaptability, vitality, or the active pursuit of goals. Autonomy is a measure of self-sufficiency and active participation in social life. Integrity reflects a sense of personal satisfaction or peacefulness with oneself. The four dimensions of the ASD identified by Intrieri et al.<sup>34</sup> were used in this study for purposes of exploring characteristics that might influence dental students' general attitudes towards older adults. The individual items within each subscale are presented in Table 1. The term "older adults" was used to elicit the ratings.

## Analyses

After calculating demographics to describe the overall sample and each cohort, the overall analysis was completed in four steps that addressed each research question. For questions 1 and 2, analyses focused on the fall assessment only. Question 3 focused on the beginning fall semester and a post-test following completion of the Dental Management of Special Needs Patients course.

Multivariate analysis of variance (MANOVA) was used to assess differences in the mean item scores for the subscales as a function of gender, age, and cohort (class year). This allowed for assessment of main effects and interactions. Significant effects were then probed using simple effects tests and specific contrasts with Bonferoni adjustments.

Repeated measures analysis of variance (ANOVA) was used to assess whether the mean item scores for the respective subscales significantly differed from one another. We used simple contrasts with a Bonferoni adjustment for the alpha level, comparing the mean item scores for the Acceptability, Autonomy, and Integrity subscales against the Instrumental subscale. Repeated measures ANOVA was also used to evaluate the influence of a short course (Dental Management of the Special Needs Patient), with age and gender as between-subject factors and the two administrations of the ASD subscales as the within-subject measures. Between-subjects effects were of no interest to the current study and were ignored. Of specific interest was whether the subscales showed changes across time as a function of the educational intervention and if these changes were a function of age or gender or whether the influence of age was moderated by gender.

Finally, to evaluate the impact of academic exposure on attitudes towards older adults, we again used repeated measures ANOVA, with age, gender, and cohort as the between-subject factors and the two administrations of the ASD subscales as the within-subjects factors. The main focus of these analyses was to identify differences in how attitudes changed across time. Simple effects tests were conducted to evaluate any significant findings. For the cohort factors, we used a set of contrasts in which each cohort was compared against Cohort 1, the fourth-year students.

## Results

Participants in the study were 355 dental students from all four classes during the 2003–04 academic year (eighty-four to ninety-two students per class). Students were surveyed at the beginning of the

**Table 1. Aging Semantic Differential (ASD) subscale items**

Instrumentality	Autonomy	Acceptability	Integrity
Busy-Idle	Independent-Dependent	Generous-Selfish	Secure-Insecure
Healthy-Unhealthy	Productive-Unproductive	Friendly-Unfriendly	Optimistic-Pessimistic
Active-Passive	Strong-Weak	Trustful-Suspicious	Satisfied-Dissatisfied
Handsome-Ugly	Organized-Disorganized	Tolerant-Intolerant	Hopeful-Dejected
Exciting-Dull	Neat-Untidy	Pleasant-Unpleasant	Happy-Sad
	Self-Reliant-Dependent	Ordinary-Eccentric	
	Certain-Uncertain		
	Decisive-Indecisive		

academic year (Time 1) and again near the end of the academic year (Time 2). In addition, the members of Cohort 1 (seniors) were surveyed immediately following a one-credit-hour, eight-week course, Dental Management of the Special Needs Patient.

A total of 329 students completed the fall semester survey; however, one form was incomplete, leaving a total of 328 useable surveys divided as follows: Cohort 1, N=89; Cohort 2, N=75; Cohort 3, N=78; and Cohort 4, N=86, for an overall response rate of 93 percent. There was no difference across the class years in the distribution of gender (36 percent female) or marital status (79 percent single). However, there was a significant difference for age ( $F[3,328]=9.774, p<.001, \text{adjusted R-Square}=.074$ ). As might be expected, Cohorts 1 ( $M_{\text{age}}=26.80, SD=3.20$ ) and 2 ( $M_{\text{age}}=26.49, SD=3.58$ ) were older than Cohorts 3 ( $M_{\text{age}}=24.91, SD=3.74$ ) and 4 ( $M_{\text{age}}=24.31, SD=3.65$ ). The mean overall age when a person was considered old was 63.6 (11.22), ranging from 62.7 through 64.7 across the four cohorts, with no significant differences between cohorts.

The mean item score for the total of all items used in the subscales was 3.74 ( $SD=0.678$ ), with a range from 1.93 to 5.76 and an alpha coefficient of .894. Results for the Acceptability subscale showed a mean item score of 3.32 ( $SD=0.773$ ), with a range from 1.57 to 5.43 and an alpha coefficient of .707. The Instrumental subscale had a mean item score of 4.22 ( $SD=0.829$ ), with a range from 1.83 to 6.20 and an alpha coefficient of .738. For the Autonomy subscale, the mean item score was 3.66 ( $SD=0.798$ ), with a range from 1.25 to 5.63, while the mean item score for the Integrity subscale was 3.76 ( $SD=0.920$ ), with a range from 1.60 to 6.20 and an alpha coefficient of .796.

The initial analyses considered differences between the subscales identified by Intrieri et al.<sup>34</sup> A repeated measures ANOVA indicated a significant overall effect,  $F(3, 932)=154.14, p<.001, \text{partial eta-squared}=.320$  (Greenhouse-Geisser adjustment to degrees of freedom). Comparisons across all scores, using a Bonferoni adjustment for the alpha level, showed that the Instrumental subscale ( $M=4.23, SE=.043$ ) had significantly more negative ratings than did the Autonomy ( $M=3.66, SE=.044$ ), Acceptability ( $M=3.32, SE=.043$ ), and Integrity ( $M=3.76, SE=.051$ ) subscales (all  $ps<.001$ ). In contrast, the Acceptability score showed significantly more positive scores than all other subscales (all  $ps<.001$ ), while the Autonomy and Integrity subscales did not differ from one another. The results support use of the subscales with

dental students for purposes of evaluating attitudes towards older persons.

The four subscales also did not show any relationship with the variable measuring the age at which the individual considered a person old. All correlations were minimal, ranging in magnitude from .002 to .076.

The results are presented as they answer each of the four research questions.

*1. How do age and gender influence dental students' general attitudes towards older adults?* We focused on whether there were differences in the attitude subscales as a function of gender, age, and cohort. The MANOVA showed no significant interactions, indicating that the main effects model was appropriate for this sample. There was a significant main effect for gender, Pillais (4, 309)=4.36,  $p=.002, \text{partial eta-squared}=.053$ , which indicated that, in general, the female students tended to have more negative attitudes towards older adults than the males. Specifically, females scored significantly higher than the males on the Autonomy (Females=3.81,  $SE=.080$  vs Males=3.57,  $SE=.059$ ),  $F(1, 312)=5.69, p=.018, \text{partial eta-squared}=.018$ , and Integrity subscales (Females=3.96,  $SE=.093$  vs Males=3.66,  $SE=.068$ ),  $F(1, 312)=6.81, p=.010, \text{partial eta-squared}=.021$ . While the results do not support age differences, there is support for differences based on gender for dental students' general attitudes concerning older persons.

*2. Are there differences in dental students' general attitudes towards older adults as a function of cohort (year in the program)?* The MANOVA showed a significant main effect for cohort, Pillais (12, 933)=3.40,  $p<.001, \text{partial eta-squared}=.041$ . Further inspection of this effect indicated that the Autonomy subscale showed significant differences,  $F(3,312)=4.37, p=.005, \text{partial eta-squared}=.040$ , with Cohort 3 showing lower scores than Cohorts 1, 2, and 4. However, the means shown in Table 2 demonstrate that the cohorts all had similar attitudes coming into the semester.

*3. Can a focused educational intervention influence dental students' general attitudes towards older adults?* Only Cohort 1 completed the eight-week, one-hour-per-week didactic educational intervention (Dental Management of Special Needs Patients course). Of the eighty-nine students who completed the pretest assessment, eighty-four (94 percent) had matching posttest assessments. Comparison between the group who completed both assessments and those who missed the posttest showed no significant differ-

**Table 2. Fall semester ASD dimension scores by cohort**

Subscale	Cohort 1 (n=89)	Cohort 2 (n=75)	Cohort 3 (n=78)	Cohort 4 (n=86)	Total (n=328)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Instrumentality	4.31 (0.830)	4.34 (0.789)	4.02 (0.915)	4.20 (0.757)	4.22 (0.829)
Autonomy*	3.83 (0.774)	3.68 (0.805)	3.42 (0.819)	3.71 (0.757)	3.66 (0.798)
Acceptability	3.25 (0.761)	3.34 (0.827)	3.48 (0.790)	3.25 (0.712)	3.32 (0.773)
Integrity	3.89 (0.929)	3.73 (0.910)	3.79 (0.927)	3.62 (0.909)	3.76 (0.920)
Total	3.82 (0.652)	3.77 (0.696)	3.68 (0.728)	3.69 (0.646)	3.74 (0.678)

\* $p < .01$

ences for any of the subscale scores on the pretest. A double repeated measures ANOVA was utilized with age and gender as the between-subjects factors, and the pre- and post-course (time) mean item subscale scores (type) as the repeated measures. There were no significant effects for gender or age and no significant changes across time for any of the subscales. Thus, while prior work<sup>11,12</sup> shows that knowledge can be gained as a result of the didactic education course, the data for Cohort 1 demonstrate that this didactic educational intervention did not influence dental students' general attitudes toward older adults.

*4. Are dental students' general attitudes towards older adults influenced by a full year of academic exposure, and do age, gender, or cohort moderate this influence?* The next set of analyses considered the influence of the full academic year on general attitudes towards older adults. Of the 328 individuals who completed the fall assessment, 282 (86 percent) completed the spring assessment. Of the forty-seven individuals who did not complete the spring assessment, thirty were from Cohort 1 (64 percent). In order to evaluate whether those who completed both assessments differed from those who completed only the first assessment, we compared within cohort. There were no differences for any of the subscales within any of the cohorts, suggesting that those who missed the spring assessment were similar to those who completed both fall and spring assessments.

A double repeated measures ANOVA was utilized, with age, gender, and cohort as the between-subjects factors and the fall and spring (time) assessments of the four subscales (type) as the within-subject measures. Of specific interest was whether there were any significant interactions involving the time by type factors. Results showed a significant cohort by time by type interaction,  $F(8, 718)=2.75, p=.005$ , partial eta-squared=.030. The means and standard

deviations are portrayed in Table 3. Further probing within cohort and subscale type showed significant time effects for Cohort 1 on the Instrumental,  $F(1, 278)=4.40, p=.037$ , partial eta-squared=.016, and Integrity subscales,  $F(1, 278)=6.00, p=.015$ , partial eta-squared=.021, with a marginal effect for the Autonomy subscale,  $F(1, 278)=3.71$ , partial eta-squared=.013. There were no significant changes across the semester for any other cohorts. The results show that the influence of dental students' year-long academic experience on general attitudes towards older persons was a function of the cohort. In summary, the analyses indicate that academic experience may influence dental students' general attitudes towards older persons.

## Discussion

As future dentists, dental students engage in a four-year process designed to provide education and socialization into the profession. As part of this process, the dental educational experience has the inherent potential for influencing the existing attitudes students have towards groups that have been stereotyped in our society. One such group is the growing number of older patients with whom these students will have contact as they move into their profession. This study was designed to begin exploring dental students' general attitudes about older people on four specific dimensions (Integrity, Autonomy, Acceptability, and Instrumentality). We also explored how age, gender, and the academic experience of dental students influenced their general attitudes towards older adults. Furthermore, given our belief that attitudes can be influenced in a desirable direction, we also evaluated the impact of each academic year across all students, as well as the outcomes of a short,

**Table 3. Mean item scores as a function of cohort, time, and subscale (higher scores indicate more negative attitudes)**

	Cohort 1 (n=60)	Cohort 2 (n=68)	Cohort 3 (n=74)	Cohort 4 (n=80)
<b>Instrumental</b>				
Fall	4.22 (0.833)	4.38 (0.796)	3.99 (0.932)	4.19 (0.751)
Spring	4.01 (0.801)	4.26 (0.749)	4.09 (0.747)	4.06 (0.758)
<b>Autonomy</b>				
Fall	3.80 (0.812)	3.67 (0.834)	3.39 (0.830)	3.69 (0.726)
Spring	3.62 (0.753)	3.79 (0.824)	3.49 (0.684)	3.67 (0.674)
<b>Acceptability</b>				
Fall	3.20 (0.757)	3.34 (0.843)	3.44 (0.795)	3.22 (0.678)
Spring	3.21 (0.813)	3.47 (0.809)	3.41 (0.801)	3.38 (0.738)
<b>Integrity</b>				
Fall	3.88 (0.993)	3.73 (0.952)	3.77 (0.943)	3.57 (0.859)
Spring	3.59 (0.908)	3.77 (1.010)	3.69 (0.973)	3.72 (0.795)

focused educational intervention on the attitudes of fourth-year students.

The results demonstrated that, in general, dental students displayed a modestly positive attitude about older adults on three of the four scales (Integrity, Autonomy, Acceptability) and a relatively more negative attitude on the fourth (Instrumentality). In addition, these attitudes did not appear to be related to the actual age at which these students considered someone to be old. These results suggest the importance of evaluating the different aspects of general attitudes. Given the lack of a correlation between the age when someone is considered old and the general attitudes, it can be speculated that “older adult” may be more expansive than is generally perceived and it may be necessary to broaden the scope of the criteria for determining who is an older adult, especially if the desired outcome is for better dentist-patient relationships.

The subscale scores indicate that, of the four attitude dimensions, dental students, regardless of year or gender, consistently rank older adults most positively on Acceptability, while they are most negative on items addressing Instrumentality. Ajzen<sup>35</sup> discusses the issue of negativity bias and reports that negative information concerning the targets for attitudes tends to have a greater impact on overall attitude toward the target. Thus, even though the dental students’ attitudes are positive on Acceptability, the negative bias may weigh more heavily in determining their overall behavior towards older patients. If this is the case, it could be speculated that these biases may result in negative interactions with the patient,

which may lead to adverse effects on the delivery of oral health care to older adults. Of course, this association would have to be investigated.

While the negative information may be more influential on subsequent judgment of individuals, the salience or importance of the attributes also plays a role.<sup>36</sup> The more important an attribute is to the individual, the more influential it will be in determining how the individual will interact with the target of the attitude. Thus, if more importance is placed on the positive aspects of target objects, the resulting behavior may reflect that positive element rather than the more negative but less important elements of the attitude object. The implications for dental education are to emphasize the more positive elements and reduce the importance of the more negative elements. However, standard didactic approaches do not seem to influence these factors, as evidenced by the results in the current study, showing no change after a short course for Cohort 1. The results were consistent with other research that found didactic courses can influence knowledge but show little impact on general attitudes.<sup>15,17,18</sup> Nonetheless, it has been reported that integrating aging education throughout the curriculum, rather than a focus on specific courses, has increased positive attitudes towards the elderly.<sup>21</sup>

A major finding of the current study was that dental students, over the course of the fourth year (Cohort 1), demonstrated significant modification in their attitudes toward older adults. Their attitudes toward older adults as measured by Instrumentality, Integrity, and Autonomy became significantly more positive. No such changes were observed over

the course of an academic year in any other cohort. However, analysis of pre- and posttest assessments of an educational intervention provided for Cohort 1 demonstrated little impact of that intervention on subsequent attitudes. If the knowledge gained during that course had been the impetus for the change, we would have expected to see shifts in the subscale scores on the post-course assessment, yet the data showed stable scores for the pre- and post-course attitude assessments.

Lovell<sup>21</sup> suggests that personal experience and societal influence can be significant factors in predicting attitudes towards older adults. Exposure to older adults and positive experience with this group lead to more positive attitudes towards older adults.<sup>37-39</sup> Furthermore, exposure to faculty members who hold positive attitudes towards older adults seems to result in more positive attitudes, suggesting that professional socialization can play an important role in forming or changing attitudes towards older adults, provided the experience socialization allows for positive experiences.<sup>40,41</sup> Fowler<sup>42</sup> points towards the professional socialization of students as an important component in developing or altering attitudes towards older adults.

While our study found no evidence within the first three years of the program that the academic experience played a role in attitude formation for older adults, the results for Cohort 1 (fourth-year students) suggest that something during that academic year influenced their general attitudes towards older adults. Given the more intense clinical exposure and more intense contact with clinical professors, it may be that the greater exposure to older adults and the modeling of positive approaches to older adults by the clinical faculty led to positive changes in attitudes. Research has shown that positive experiences with faculty members<sup>9</sup> and positive experiences with older adults<sup>7</sup> have influenced subsequent attitudes of the students. As such, the positive role modeling can be construed as part of the professional socialization process.

The finding that there was no significant overall improvement in attitude ratings for the remaining cohorts indicates the need for specific educational interventions designed to improve students' attitudes toward older adults. Evidence from this study suggests that didactic approaches are insufficient for this purpose and there is a need to develop more experiential elements of the educational process. Each cohort experiences a structured set of educational experiences as a group, and there are specific pedagogical

reasons to develop group-based interventions aimed at increasing awareness at developmental milestones. Specifically, when second-year students are entering the clinic for their first patient encounters, an attitude exercise could be embedded that focuses on engagement skills with new older patients. Third-year students are seeing increasing numbers of patients and initiating more complex treatment procedures. A focused attitude exercise could be embedded for them to highlight the communication skills necessary to clearly explain procedures to people who may or may not grasp, or respond positively to, the technical nuances of complex dental procedures. First-year students are focused almost entirely in the classroom; this year in the program seems an important one to offer significant factual information about the interrelationship between oral health and the psychosocial issues relevant to older dental patients.

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## Limitations

There were some limitations to this study. First, the results were derived from a university located in an area where the population of older adults is increasing and where cancer and cardiac risks are high. Attitudes from students in locations where older adults have less risk from such problems may differ significantly from those found in our study. However, given that the dental students are generally from outside the area, the general attitudes brought to the university have not necessarily been influenced by any exposure to older adults in the university area. One could also argue that the cultural background of the student might influence attitude ratings. Unfortunately, in this study we had no way of determining what cultural differences existed between students and how these might influence subsequent attitude ratings about older adults. Future research needs to consider this aspect and how culture might also influence the impact of any educational interventions.

A second limitation of the study concerns the lack of information on exposure the students had to older adults. Unfortunately, the study was not designed to explore how the level and type of exposure to older adults influenced attitudes. However, regardless of the level of exposure to older adults prior to the experience in the university, the results showed that the four cohorts were similar in their attitudes at the point of entry into this study. This would suggest that the general experiences of the four cohorts were initially similar coming into the academic year of the

study. Nonetheless, future studies need to explore how the exposure to older adults influences both dental students' general attitudes and interactions with older adults.

A third limitation is related to the lack of data concerning the dose and intensity of exposure to older adult patients and clinical faculty. Although information was available for the general scope of the educational experience in each of the four years, specific intensity information concerning the number and types of older adults encountered and the clinical faculty's attitudes and demeanor during the clinical experience of the students was not available. Future studies need to identify the factors that seem to be critical concerning forming positive attitudes towards older adults. In addition, future research should consider the influence of context on attitude change.

## Conclusions

In summary, the dental students in this study held slightly positive attitudes towards older adults in three of four subscales (Integrity, Autonomy, and Acceptability), with the fourth subscale (Instrumentality) being slightly more negative. These are somewhat consistent with attitudes of medical students, nurses, and college students in general. Differences in the subscale ratings indicate that it is important to evaluate the various dimensions, as there may be differential outcomes for any educational or other forms of interventions. Furthermore, the lack of a correlation between the attitude ratings and the age when a person is considered old suggest that "older" is a relative term and if the focus is on interactions between perceived "older adults" and the dental students, then the more general term will provide better insight into how to produce positive change in the attitudes. The eight-week course completed by fourth-year students was ineffective in producing a change in the ratings of attitudes towards older adults; however, the overall experience of the fourth year did produce a positive impact on students' attitude ratings. The lack of a change for the remaining three cohorts indicates a need for implementing more specific educational and exposure types of interventions earlier in the program. Future research needs to consider how the exposure element and context, as well as general attitude change, influence subsequent behavior in the clinic.

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