Exploring Dental Student Performance in Moral Reasoning Using the Defining Issues Test 2

Linda S. Behar-Horenstein, Lissette A. Tolentino

Abstract: The aim of this study was to assess the initial levels of moral reasoning among four cohorts of dental students in the first semester of their first year of study. All 332 students at one U.S. dental school were invited to take the Defining Issues Test 2 (DIT2) during the first semester of their first year while enrolled in a mandatory ethics course in 2015-18. Students' mean scores on the DIT2 subscales were compared to their gender, underrepresented minority (URM) status, citizenship, English as primary language, and single status. The four subscales were personal interests (PI), in which self-motivated interests are the main focus; maintaining norms (MN), which takes into consideration what is expected from society; post-conventional (PC), which upholds ethical principles that promote the good of society; and N2 index, which indicates one's ability to discriminate between lower stage and higher stage items. A total of 245 students participated (74% response rate). The results showed no differences between gender, URM status, citizenship, or English as primary language and any of the DIT2 subscales. Single participants scored significantly higher on the PC and N2 subscales and significantly lower on the MN subscale. There was a significant correlation between humanitarian liberalism (HL) and all four subscales. Religious (Christian) orthodoxy (RO) was significantly correlated with MN, PC, and N2. The DIT2 subscale scores were not impacted by various exploratory variables, with the exception of relationship status, which had significantly higher MN and N2 scores. Participants with higher scores on HL and RO had higher moral reasoning scores, and females had higher levels of moral reasoning than males on their PC and N2 scores. These findings have implications for implementing educational activities that may help develop students' moral reasoning abilities over the course of dental school.

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The Defining Issues Test 2 (DIT2) is frequently used to assess individuals' moral judgment or reasoning based on their responses to dilemmas regarding ethical issues. Based on Kohlberg's theory of assessing moral judgment, this paper and pencil test presents five situations with moral issues to participants, followed by 12 questions about a variety of moral dilemmas in those issues.[1] The test asks respondents to read a brief paragraph, select a decision from a list provided, and then rate the moral dilemmas surrounding the issues. Respondents are asked to rank and rate each issue based on what they presume to be important; there are no right or wrong answers. The DIT2's predecessor, the DIT, was based on research that measured moral judgment as an alternative to the interview process used by Lawrence Kohlberg, in which ranking and rating issue statements were used to define the main features of his moral stages.[2,3] Previously, the DIT was used to assess moral development in both adult and adolescent populations.[3] More recently, it has been used to assess moral development among graduate and professional students in many fields including dentistry, law, and medicine.[4] While Kohlberg asserted that participant morality manifests in specific stages, the DIT2 represents an interesting contrast.[2,3] The DIT2 aligns an individual's thought process with stages of thinking, so that moral development is seen as a continuum on which participants may reach higher or lower stages of morality.[2] This continuum contrasts with Kohlberg's perspective, which viewed assessment of development as entering or exiting various stages.

Scores on the DIT2 suggest that an individual has more or less of the characteristics that represent a particular schema.[2] Participants' responses based on their rating and ranking of issues fall into three moral schemas: personal interests (PI), in which self-motivated interests are the main focus; maintaining norms (MN), which takes into consideration what is expected from society; and post-conventional (PC), which upholds ethical principles that promote the good of society (Table 1).[5,6]

The original DIT included the P schema, or index, which represented the extent to which a participant rated the importance of moral considerations in making morally sound decisions.[2] However, the N2 index was created as a way to re-examine earlier studies that showed significant increases in P scores and significant decreases in PI scores.[7] Viewed as a modified P score, the N2 index indicates a participant's ability to distinguish between lower stage (PI) and higher stage items (PC).[3] Thus, it measures the extent to which a participant scores PC items, as well as the extent to which lower stage items (PI items) are given lower scores in comparison to higher stage items (PC items).[7] A positive increase in N2 scores indicates higher levels of discrimination between lower and higher level items, and a decrease occurs if a participant has little discrimination between PC and PI.[3] Given this information, it is important to understand that the N2 seeks to measure increases in higher stage items (PC) rather than lower stage items (PI).[7] Broadly, it is considered more desirable to acquire higher levels of mature moral thought process as reflected by PC and to inherit a better understanding of morally unsound solutions that should be rejected. Thus, the N2 and the PC index have been shown to perform better than the original P index, and the N2 is considered the better of the two indices because the N2 scoring schema uses more data in calculating the score (by combining participants' rankings of PC and PI items) than the P scoring schema.[2,7] According to Thoma and Dong, the best practice is to use the N2 index in studies of populations at the graduate and professional levels.[3]

The DIT2 also includes a proxy variable for religious orthodoxy (RO), which measures an individual's affinity towards Christianity, and a proxy for measuring perspectives on what the test calls "humanitarian liberal perspective on moral issues," known as humanitarian liberalism (HL).[7] The goal of the HL index is to use it as an anchor in comparing P scores, in which higher P scores indicate higher HL scores. The HL index is calculated by counting of the number of times a participant's choice matches the high P scores, on which scores can range from zero to five matches.

Overall scores on the DIT2 represent the participants' solutions to schema categories, with higher scores representing stronger beliefs aligned with one of the schemas. Since its inception, the DIT2 has been used to assess the variety of ways in which moral development is expressed. Previous research with the DIT2 focused on the impact of moral judgment and subsequent changes among students in the health professions.[8] Other studies explored how learning and teaching strategies in health professions programs increased students' morality and competence and decreased biases in these future professionals.[6,9]

Recent curriculum changes in health professions such as dentistry and nursing have focused on increasing students' cultural competence and decreasing biases in the provision of care.[5,10] When clinicians function at the highest level of moral reasoning, they are likely to provide altruistic care.[1] Two studies used the DIT2 to assess if certain teaching and learning practices led to an increase in students' scores.[6,9] Swisher et al. found that, after physical therapy

Table 1. Definitions of Defining Issues Test 2 subscales

Subscale	Definition
PI: personal interest	Self-motivated interests are the main focus
MN: maintaining norms	Takes into consideration what is expected from society
PC: post-conventional	Upholds ethical principles that promote the good of society
N2 index	Includes both how the PC items are prioritized and which PI items are ranked lower than the PC items
RO: religious orthodoxy	Measures an individual's affinity towards Christianity
HL: humanitarian liberalism	Proxy for measuring perspectives on "humanitarian liberal perspective on moral issues"

Sources of definitions: For PI, MN, and PC: Thoma SJ, Narvaez D, Muriel JB. Alchemy and beyond: indexing the defining issues test. J Educ Psychol 1997;89(3):498-507, and Thoma SJ, Dong Y. The defining issues test of moral judgment development. Behav Devel Bull 2014;19(3):55-61. For N2 index: Bebeau M. The defining issues test and the four-component model: contributions to professional education. J Moral Educ 2002;31(3):271-95. For RO and HL: Rest J, Narvaez D. A guide for using the defining issues test version 2 and the scoring. Tuscaloosa: University of Alabama Center for the Study of Ethical Development, 2003.

students completed a course on ethics, N2 and PC schemas increased significantly among females.[6] In that study, males also showed an increase in these schemas, but it was far less than for females and was statistically insignificant. Latif's longitudinal study in pharmacy found that when students were given opportunities to immerse themselves in ethical moral dilemmas as part of the curriculum, there was an increase in the N2 and PC schemas.[9] That study found an increase in the N2 schema (distinguishing PC from PI thinking) from the beginning to end of the program. In a study of orthopedic medical students, similar results were found in a baseline study and were used to guide development of a new ethics initiative.[11] Respondents in that study scored higher in N2 and PC schemas, and the authors recommended maximizing instructional time designed to increase student moral reasoning scores.

Several studies with health professions students have found that curriculum changes or the addition of an intervention resulted in increases in PC and N2 scores, indicating improved morally correct decision making, professional development, and self-reflections.[4,8,9,11,12] A study of reflective portfolios, for example, found that when pharmacy students reflected on their growth and "looked back" through portfolio documentation, it served as a guide to improving and monitoring their professional growth.[12] Students who participated in that self-reflective assessment had higher scores on the N2 scale than those who did not. In another longitudinal pharmacy school study, students required to participate in an ethics course demonstrated a significant amount of moral growth; that course consisted of small group discussions and problem-based learning and required development of an ethics portfolio.[9] That study found that dialogue regarding moral dilemmas promoted growth in PC and N2 because it allowed students to engage in a critical thought process about issues, while practicing their moral problem-solving skills. In that study, while practicing those skills with peers, students engaged in thoughtful conceptualization about possible alternatives and were better able to rationalize their decisions.

Several studies have reported on the benefits of small-group discussions and recommended that these discussions should be a total of at least 20 hours.[6,9,11-13] Mercuri et al. suggested that discussions include exercises in which students participate in self-reflective writing after completing a case study on moral dilemmas.[11] Other research found that small-group discussion had a positive impact on enhancing and cultivating moral reasoning skills.[6,9,11,13] That is not to say that the small group discussions were directly related to enhanced moral reasoning skills since other named and unnamed factors may have influenced those results.

Cole et al. reported that medical residents who had higher ethical reasoning scores (higher PC) were more likely to admit that they made an error and that they held strong feelings regarding the responsibility for the error.[13] Those researchers concluded that ethical training may be useful in improving PC scores and lead to overall better communication and improved patient safety. Both Latif's and Cole et al.'s studies used residents' responses to a specific scenario and found that training and more educational experiences led to increases in moral reasoning.[9,13] While Hren et al. reported similar findings, they also noted that significant developments in moral reasoning typically occurred with students who were studying for a professional degree.[14]

Several studies have reported favorable results when portfolios and group discussions of ethical dilemmas were incorporated into the course.[6,9,15-17] Two studies reported an increase in N2 and PC scores and a decrease in PI and MN scores following introduction of learning strategies that included discussions and self-reflections based on a moral/ethical point of view.[6,17] Self et al.'s study that used small-group case study discussions in teaching medical ethics rather than traditional lecture and films resulted in a large increase in DIT scores.[15] A meta-analysis of educational interventions found similar results for students who participated in discussions.[16]

The aim of our study was to assess the initial levels of moral reasoning among four cohorts of dental students in the first semester of their first year of study. Participant scores were examined for group differences by gender, underrepresented minority (URM) status, citizenship, English as primary language, single status, age, religious (Christian) orthodoxy (RO), and humanitarian liberalism (HL) on the four DIT2 subscales.

Methods

This study was approved by the University of Florida Institutional Review Board (IRB# 2010-U-1071). All 332 first-year dental students were invited to take the DIT2 during the first semester of their first year at the University of Florida while enrolled in a mandatory ethics course in 2015-18.

All DIT2 submissions completed in their entirety were included in the dataset. To compare groups on mean DIT2 subscales, we conducted independent t-tests assuming unequal group variances. DIT2 subscales were compared by gender, URM status, citizenship, English as a primary language, and single status. The relationship between numeric and ordinal variables was tested using Spearman correlation. All data were analyzed using SAS version 9.4 (SAS Institute, Cary, NC, USA). The level of significance was set at 0.05. Two-sided hypothesis testing was used for all tests.

Results

A total of 245 students participated (74% response rate). Of those, 41% (n=87) were male, 39% (n=96) were in URM groups, and 80% (n=190) were single (Table 2). There were no significant differences between gender, URM status, citizenship, or English as primary language and any of the DIT2 subscales. Single participants scored significantly higher than other students on the PC and N2 subscales and significantly lower on the MN subscale (Table 3).

We tested correlations between each of the subscales as well as between the subscales and the numeric variables of age, religious (Christian) orthodoxy (RO), and humanitarian liberalism (HL) (Table 4 and Table 5). There was a significant correlation between HL and all four subscales of DIT2. Those who scored higher on HL had higher scores across all the subscales, with the exception of MN, which had a negative correlation. RO was significantly correlated with MN, PC, and N2. Those who scored higher on RO had lower scores on PC, PI, and N2 and higher scores on MN subscales than other students. There were significant correlations between PI and MN; between PC and N2; among MN, PC, and N2; and between PC and N2.

Table 2. Participant demographics by percentage and number of respondents

Variable	Percentage (N)
Single	
No	19.8% (47)
Yes	80.2% (190)
Gender	
Female	59.1% (126)
Male	40.9% (87)
Underrepresented minority	
No	60.8% (149)
Yes	39.2% (96)
U.S. citizen	
No	6.1% (13)
Yes	93.9% (200)
English as primary language	
No	16.8% (36)
Yes	83.2% (178)
Age: mean (SD)	24.0 (3.2)

Note: Total respondents were 245, but some students skipped items so numbers on those items total less than 245.

Table 3. Correlations between students' demographic variables and Defining Issues Test 2 subscale scores

Variable	PI Mean (SD)	p-value	MN Mean (SD)	p-value	PC Mean (SD)	p-value	N2 Mean (SD)	p-value
Gender								
Male	26.1 (12.4)	0.1665	33.9 (13.7)	0.7624	34.3 (14.8)	0.0751	32.4 (15.0)	0.0566
Female	23.7 (12.7)		33.3 (14.0)		38.0 (15.7)		36.3 (14.5)	
URM								
No	24.0 (13.3)	0.4813	33.7 (14.9)	0.6742	37.4 (15.7)	0.3871	36.1 (15.5)	0.1123
Yes	25.3 (11.6)		33.0 (12.2)		35.5 (15.4)		32.8 (14.2)	
Single								
No	22.6 (11.1)	0.2139	40.7 (13.6)	0.0006**	30.1 (13.1)	0.0023*	30.3 (14.3)	0.0440*
Yes	25.2 (12.9)		31.8 (13.5)		37.8 (15.7)		35.6 (15.0)	
U.S. citizen								
No	29.1 (12.8)	0.2104	32.0 (12.1)	0.8760	29.4 (13.6)	0.8760	27.4 (13.6)	0.0549
Yes	24.3 (12.4)		33.4 (14.1)		37.2 (15.4)		35.6 (14.8)	
English as primary language								
No	22.2 (9.8)	0.1354	37.1 (32.1)	0.1045	34.9 (13.6)	0.4063	32.4 (28.2)	0.2003
Yes	25.1 (12.8)		32.7 (30.7)		37.0 (15.8)		35.5 (33.3)	

PI=personal interests, MN=maintaining norms, PC=post-conventional, N2=ability to distinguish between lower stage (PI) and higher stage (PC) items, URM=underrepresented minority

*p≤0.05, **p≤0.01

Table 4. Correlations between exploratory variables and Defining Issues Test 2 subscales

Variable	PI	MN	PC	N2
Age	0.08093 0.2418 211	0.03784 0.5847 211	-0.08888 0.1985 211	-0.10832 0.1167 211
HL	0.22997 0.0005* 224	-0.44955 <0.0001** 224	0.24905 0.0002* 224	0.18866 0.0046* 224
RO	0.00131 0.9844 224	0.23385 0.0004* 224	-0.16962 0.0110* 224	-0.22030 0.0009* 224

PI=personal interests, MN=maintaining norms, PC=post-conventional, N2=ability to distinguish between lower stage (PI) and higher stage (PC) items, HL=humanitarian liberalism, RO=religious (Christian) orthodoxy

Note: Correlations were determined by Spearman Correlation Coefficients, Prob > |r| under H0: Rho=0 number of observations.

*p≤0.05, **p≤0.01

Table 5. Correlations among students' responses on Defining Issues Test 2 subscales (N=245)

Subscale	PI	MN	PC	N2
PI	1.00000	-0.33959 <0.0001*	-0.40350 <0.0001*	-0.47784 <0.0001
MN	-0.33959 <0.0001		-0.59209	-0.44564 <0.0001*
PC	-0.40350 <0.0001*	-0.59209 <0.0001*	1.00000	0.88856 <0.0001*
N2	-0.47784 <0.0001*	-0.44564 <0.0001*	0.88856	1.00000

PI=personal interests, MN=maintaining norms, PC=post-conventional, N2=ability to distinguish between lower stage (PI)and higher stage (PC) items

Note: Correlations were determined by Spearman Correlation Coefficients, Prob > |r| under H0: Rho=0.

*p≤0.01

Discussion

This study sought to assess the initial levels of moral reasoning among dental students in the first semester of their first year of dental school. The findings suggest that DIT2 subscale scores were not impacted by various exploratory variables, with the exception of relationship status, which was correlated with significantly higher MN, N2, and PC scores. Single students showed an increase in the PC and N2 subscale scores when compared to the non-single group, which had lower scores (Table 3). For the MN subscale, the single students had lower scores than the non-single group. Non-single students made moral decisions that maintained the status quo rather than making more altruistic decisions. Single students demonstrated the opposite, making more altruistic moral decisions. The significant differences seen between single and non-single participants were not comparable with any group by educational level reported in the 2009 norms.[18]

Furthermore, single students reported higher levels of PI and lower levels of MN than non-single students. Non-citizens had higher levels of PI and lower levels of MN than U.S. citizens. Participants whose primary language was English had higher levels of PI but lower levels of MN than those for whom English was not their primary language.

Our results showed that participants who scored higher on RO had higher positive MN scores and lower PI scores. Participants who scored higher on RO tended to use their Christian religion in making ethically based decisions that focused more on non-altruistic elements that are consistent with the PI and MN subscales. The significant positive relationship with RO and MN demonstrated that participants preferred to maintain the status quo and used Christian beliefs when making important ethical decisions. However, RO had a significant negative relationship with the PC and N2 subscales. This finding showed a trend whereby participants who made more altruistic, ethically based decisions did so without the influence of Christian beliefs since higher scores on RO demonstrate a higher propensity towards using Christian beliefs in making ethically based decisions. This finding shows that other factors were important in helping students make moral decisions.

Bebeau suggested that ethics training and learning while enrolled in coursework is a way to increase students' moral reasoning.[19] Such training needs to begin early in the program and continue throughout the curriculum in successive years. This practice helps ensure that exposure is not a single event and signals its importance to students. Repeated exposures can lead to increased moral reasoning and cultural competence, thus paving the way for future generations of professionals who embody these characteristics. Hren et al. emphasized the importance of educational interventions during professional training and development, noting that health professions students undergo "significant development of moral functioning" and that these interventions

significantly impact the "shaping of moral reasoning in adult life."[14] One study in medicine found that, overall, students had high moral reasoning and post-conventional scores on the DIT2.[20] Based on their results, the authors suggested having a learning environment where students are willing to seek feedback via conversations about their own professional development is crucial. They added that maintaining a perception of personal interest throughout one's professional future career tends to emphasize a value for one's own needs, rather than a focus on altruism. Other authors have found that a focus on altruistic needs mitigated the effects of negative attitudes, stereotypes, and biases that can have adverse effects on the quality of health care.[5,10]

Having knowledgeable faculty members who are capable of promoting moral, cultural, and ethical responsibility in their profession and the classroom is essential.[5] Ideally, faculty members will teach without any inherit biases. However, one study found that faculty members had higher levels of PI and lower levels of PC and N2 schemas than students.[5] Faculty preparation helps ensure the appropriate implementation of teaching interventions designed to increase students' PC and N2 scores. That study explained that curricular changes should go beyond the inclusion of culturally thoughtful and morally sound content; instead, by focusing on underlying beliefs, support and instruction can be implemented in a way that helps students ultimately increase their cultural competence and moral reasoning. Having faculty members who possess necessary skills to teach students in a way that promotes social responsibility and critical thinking as well as cultural competence and moral reasoning does not start and stop with the curriculum. Instead, students need to be able to see these qualities in practice as faculty model these approaches.

Based on the results of this study, future curricula should include opportunities for students to immerse themselves in scenarios in which they are able to discuss various ethical dilemmas and explain their rationale behind their decision making. Having opportunities to discuss reasoning allows students to practice moral reasoning skills instead of just learning it. Discussion among peers has been found to promote probing alternative assumptions, stating rationales, and appreciating alternative perspectives, while coupling peer discussion with a student ethics portfolio allowed an assessment of ethical dilemmas that required ethical decision making.[9]

Several studies have investigated the effects of length of time of ethics training and placement of training (at beginning of the curriculum, towards the end, etc.) on students' moral development.[6,9,12,16,17] Schlaefli et al. concluded that interventions or programs should range from three to 12 weeks.[16] Swisher et al. found significant increases in moral reasoning after a six-week course, but cautioned that the gains may be attributed to learning that occurred across the curriculum and not merely time spent in the ethics course.[6] Positive results have been reported when ethics training spanned the entire program.[12,20] What these results tell us is that there is not a "one size fits all" approach when it comes to curriculum interventions.

Study limitations included a single administration of the DIT2 and lack of a comparison group. The use of self-report questions with binary responses of yes and no related to citizenship and English as a primary language may need revision. Asking about "place of birth" and "language spoken at home" may be better indicators of cultural influences on morality and behavior standards. Another limitation is that the study was conducted at only one U.S. dental school, so its results may not be generalizable to students at other schools. A major limitation of the DIT2 is that it defines "religious orthodoxy" as Christian only, thus negating our ability to identify any relationships between the studied variables and students who adhere to other religions.

Also, the results showed that single students were more likely to make decisions based on higher levels of moral reasoning; however, that result could be due to the large number of participants who answered "yes" when asked about their relationship status. Therefore, any inferences from these results should be taken as observational only. Given the finding that students who were male, URM, and did not speak English as their primary language had lower PC and N2 scores, future studies could attempt to determine why such differences exist. These findings could then be used to tailor educational experiences to ensure that they are useful to students in all demographic groups. To increase students' moral reasoning, curriculum interventions should include peer discussion of complex, real-world ethical dilemmas and portfolios, which allow for documentation of a student's personal growth. Future studies should also investigate whether increases in moral reasoning were correlated with the number of training hours and type of training.

Conclusion

This study found that students with higher scores on HL had higher PC and N2 scores and lower scores on these subscales as RO increased. The female students had higher levels of moral reasoning than males based on their PC and N2 scores. The results also showed that relationship status was significant for the MN, PC, and N2 subscales, with single students having higher scores on the PC and N2 subscales than students who were not single.

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