Dimensions of Diversity and Perception of Having Learned From Individuals From Different Backgrounds: The Particular Importance of Racial Diversity

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Abstract

Purpose
Selective higher education institutions that take race into account in admissions decisions must be able to demonstrate that their policy is justified by a compelling governmental interest, is narrowly tailored, and is the least restrictive means for achieving that interest. The authors thus investigate whether, among medical students, the association between racial diversity (as distinct from other forms of diversity) and learning from individuals from different backgrounds is unique.

Method
The authors examined six dimensions of diversity, including racial/ethnic diversity, among the 2010, 2011, and 2012 cohorts of fourth-year medical students in the United States. They also examined students' responses to two Medical Student Graduation Questionnaire items pertaining to learning from individuals from different backgrounds. They modeled the association between each of the school-level dimensions of diversity and the student-level responses to having learned from others with different backgrounds, and they assessed whether associations vary across different groups of students.

Results
Racial/ethnic diversity is unique in its very strong association with student perceptions of having learned from others who are different. The association between racial/ethnic diversity and student perceptions of having learned from others who are different is especially strong for members of historically underrepresented minority groups.

Conclusions
Compared with other forms of diversity, racial/ethnic diversity has a unique association with students' perceptions of learning from others who are different. This association is of particular relevance to admissions and diversity policies in an era of strict scrutiny of these policies.

The recent Fisher v. University of Texas at Austin case[1] was the fourth[1–4] since 1975 to be heard before the U.S. Supreme Court wherein a white plaintiff, claiming discrimination in admissions based on race, sued an institution of higher education. Through these cases, the Supreme Court has established that race-conscious admissions practices can be legal *if* they are narrowly tailored and can withstand strict scrutiny. If close scrutiny reveals that the policy is necessary to achieve legitimate educational benefits and that the benefits outweigh any burdens that the policy engenders, then the policy can stand. Thus, selective institutions of higher education, including medical schools and other professional schools, must be prepared not only to justify the benefits of race-conscious admissions policies (should they employ such policies) but also to demonstrate that alternative policies would not suffice to achieve the same ends. (In this context, selective institutions are those with competitive admissions processes in which some applicants are not accepted.) A body of cross-institutional research has already established that institutional differences in racial/ethnic diversity is positively associated with educational benefits including students' capacity to learn from others who are different from themselves.[5–11] However, this literature does not address whether forms of diversity other than racial/ethnic diversity provide the same benefits.

Current literature also does not specify which students benefit from more diverse environments; thus, it is important to determine whether benefits accrue to a broad array of students, especially in light of at least one suggestion that benefits accrue specifically (or only) to students of majority status.[2(Opinion of Thomas, Part IV B 1: pp364–366)] Cross-institutional studies show that campuses with more racially and ethnically diverse student bodies tend to have higher levels and better quality of cross-group interactions which tend, in turn, to promote educational outcomes.[5–11] The theory in which these studies are embedded is explicitly articulated by Gurin and colleagues[12] (see Figure 1). According to their model, demographic compositional diversity (or "structural diversity") provides benefits by enabling the interaction of people from different backgrounds (or "interactional diversity"), which, in turn, is associated with the educational benefits of learning from others who are different from oneself.

The authors of the cross-institutional studies that are organized around this theory have observed student racial/ethnic diversity and have related this diversity to various outcomes, including the likelihood of interacting with students of different races,[5,6,8,9] student perceptions of the campus environment,[8,11] and student gains in the following: general education,[12] intellectual development[11] or intellectual

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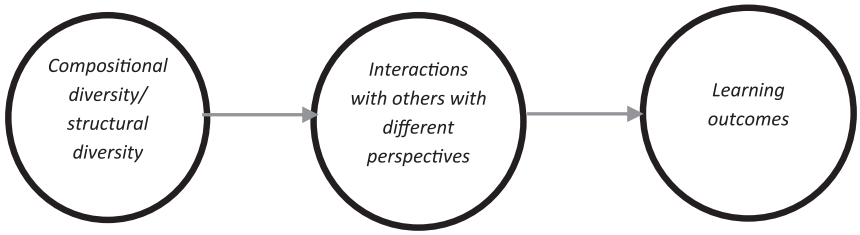

Figure 1 Theoretical model of associations between dimensions of compositional diversity and outcomes within higher education institutions, as described by Gurin and colleagues.[12]

self-confidence,[6] cognitive development,[7] and their understanding of people from different backgrounds.[9] We should note that in each of these large-scale, national survey-based studies, the outcomes noted (the dependent variables) were based on students' self-report.

This literature has yet to specify how different ways in which an institution that is compositionally diverse might vary in its capacity to produce educational benefits. Heretofore, diversity has been examined only in terms of race. However, we recognize that diversity at institutions of higher education is multifaceted and that there are many ways in which a cohort can be compositionally diverse, including not only its members' race/ethnicity, but also their socioeconomic status (SES), language, nationality, sex, gender identity, sexual orientation, religion, geography, disability, and age.[13] Current theory does not establish expectations about which of these dimensions (if any) is most associated with learning outcomes.

Additionally, the studies referenced above do not report relationships separately by racial/ethnic group. Specifically, they do not answer the question of whether structural diversity is related to learning from dissimilar others differently for historically disadvantaged groups as compared with groups with high representation.

The issue of the relationship between diversity and learning is particularly important for medical schools. U.S. medical schools must train future physicians to have the capacity to serve the diverse communities that constitute this country and to address the current disparities in health and health care experienced by underrepresented minorities. For physicians to gain this capacity, they must develop the cultural competencies necessary to effectively communicate with patients from many different backgrounds, and they must be sensitive to the unique needs and issues that members of different communities face (see Liaison Committee on Medical Education [LCME] standards IS-16, ED-21, and ED-22).[14]

The importance of student body racial and ethnic diversity to the mission of educating physicians is well recognized by the students themselves. In one study, students responding to a questionnaire reported that diversity enhanced classroom discussions and improved their understanding of medical conditions and treatments; however, the authors of this two-institution study did not consider the extent of student body diversity as an independent variable.[15] Saha and colleagues[10] conducted an analysis of 118 U.S. MD-granting medical schools and observed that, indeed, student body diversity *is* a key independent variable. They found that, for students completing their final year of medical school, the percentage of underrepresented minority students at their institution was related to their self-rated cultural competence, their attitudes about access to care, and, for nonwhites only, their plans to serve the underserved.

This current study follows from Saha and colleagues' work[10] and uses data from the same sources. It addresses two questions: (1) How does racial diversity compare with other forms of diversity in its association with student self-perception of having learned from others who are different from themselves? and (2) Do these associations vary across racial groups?

Method

Data

This study is based on the observations of 33,510 medical students who graduated from one of the 111 U.S. medical schools that made use of the American Medical College Application Service (AMCAS) between spring 2010 and spring 2012, inclusive. These students constitute 65% of the total number of graduates (n = 51,572) from U.S. MD-granting medical schools during this period. We excluded just over 10% of the total graduates (n = 5,572) from this analysis because they graduated from one of the 14 schools ineligible for this analysis. These 14 schools were ineligible because either they did not use AMCAS or they had maintained specialized missions to serve students who have been historically excluded from and/or underrepresented in careers in medicine.

The dependent variable in this analysis is the extent to which respondents perceived that they had, during medical school, learned from others who were dissimilar to themselves. We measured this construct through the aggregated level of agreement with two statements from the Medical School Graduation Questionnaire (GQ), which is administered to medical students during their final semester in medical school, just prior to graduation. In 2010, 2011, and 2012, the two statements read as follows: (1) "My knowledge or opinion was influenced or changed by becoming more aware of the perspectives of individuals from different backgrounds," and (2) "The diversity within my medical school class enhanced my training and skills to work with individuals from different backgrounds."[16] For each of these statements, survey respondents had the opportunity to select from a range of responses, from 1 ("strongly disagree") to 5 ("strongly agree").[16]

The key independent variables in this analysis were indicators of distinct dimensions of demographic diversity among the cohort of students within the student's institution and graduating year. We aggregated data for each graduating class for each school from student-level information collected through AMCAS. AMCAS collects student information on race/ethnicity, parental educational attainment (an indicator of the SES of the family of origin[17]), undergraduate college major, age of applicant at matriculation (from which age at graduation can be derived), geographic region of the student's high school, and MCAT exam score (an indicator of academic preparedness). Thus, we were able to examine within-year institutional-level

student diversity with respect to each of these six dimensions.

Following Chang,[6] we measured each of the dimensions that were categorical—race/ethnicity, college major, and geographic region—as the probability that two randomly selected students from the same school and graduating year would be different from each other with respect to that dimension. As a probability, values on these indicators range between 0 and 1; a value of 0 indicates that there is no chance that two randomly selected students would be different, and values increasingly closer to 1 indicate increasingly higher chances that any two randomly selected students would be different. Status with respect to each of the three categorical indictors is observed in terms of five or six potential classifications (see List 1 for classifications).

We measured each of the two dimensions that are observed along interval scales—age and MCAT exam scores—in terms of the standard deviation (SD) within the students of the graduating class of the institution. In other words, a school with greater age diversity will, by definition, have a greater variation in the ages of its students; the extent of variation in the age of the students in a school is most simply measured by the SD on the age of the students.

We measured parental educational attainment on an ordinal scale from 1 to 4: 1 = no four-year college degree, 2 = a baccalaureate degree, 3 = a master's degree, and 4 = a professional degree (e.g., DVM, MD) or a PhD. We measured diversity along this dimension through an index of dissimilarity (i.e., the same methodology we used to measure diversity in race/ethnicity, region, and undergraduate major); however, because this dimension was ordinal, we also applied a second measure of diversity using the SD, as in the case of the two dimensions observed on an interval-level scale. We conducted all analyses presented in this report twice: once for each of these measures for diversity in parents' educational attainment.

Before including them in the analysis, we converted each of the six diversity scores into *z* score scales with a mean of 0 and an SD of 1, allowing us to compare the strength of relationships across each of the six dimensions along a common scale.

We examined each of the six diversity variables within a cohort. We also examined the status of each individual within the cohort. For example, in addition to observing the racial/ethnic diversity of each class from each school, we noted the race/ethnicity for each individual within that cohort. We also examined two additional variables for each individual in the analysis: a respondent's gender and the year of graduation. Gender, however, is not included as an institutional-level diversity variable for two reasons. First, the institutional-level variation in gender diversity is relatively low; many schools are substantively close to parity. Second, were gender to be included, it would be the only variable in which increases in a historically underrepresented group (women) could lead to declines in diversity. If, for example, a school with a cohort of 50% women in a given year were to enroll a cohort that was 55% women in the next year, the gender diversity in this school would decline as a result.

Finally, we examined one other institutional-level variable: whether each institution was under public or private control (or "ownership").

This research, exempt from the requirements of internal or institutional review board review, is in accordance with 45 CFR 46.101(b)(4); that is, it involves the collection or study of existing data and records, and we have recorded our information in such a manner that human participants cannot be identified, either directly or through identifiers linked to them.

Analysis

Using medical students as the unit of analysis, we estimated the association of each of the six cohort-level dimensions of diversity with the student's self-perception of having learned from others who are different from themselves. The estimations control for individual-level characteristics associated with each of the dimensions of diversity including the student's race, parents' level of education, undergraduate major, region of high school, and MCAT exam scores. The estimates also adjust for the students' sex and the ownership of the school (public/private). We have reported associations based on an ordinal logistic regression (OLR) model. We replicated our analyses through another OLR model with a Heckman correction[18] to address potential nonresponse bias (see Results for analysis of nonresponse). Finally, we conducted further replications through a generalized OLR model to address patterns of heterogeneity in our data. We conducted all analyses with routines embedded in STATA 12 (College Station, Texas).[19,20]

We tested subgroup differences in strength of effects by specifying interaction terms for each dimension of diversity with the individual-level categories that constitute the possible range of diversity; for example, Model 3 tested whether

List 1

Categorical Classifications Within Race/Ethnicity, College Major, and Geographic Region Used in a Study of the Associations Between Six Markers of Diversity[a] and Students' Likelihood of Agreeing That They Had Learned From Others From Different Backgrounds During Medical School, 2010–2012

- *Race/ethnicity*
  - White
  - Asian
  - Black
  - Hispanic
  - Native American
  - "Other"[b]
- *College major*[c]
  - Life science/biology
  - Physical science
  - Social science
  - Liberal arts
  - Professional
  - Other
- *Geographic region of high school attended*
  - Central
  - West
  - South
  - Northeast
  - Non-U.S. and "other"

[a]The markers of diversity were race/ethnicity, college major, geographic region of high school attended, highest level of education attained by parents, MCAT exam score, and age at matriculation into medical school. Race/ethnicity, geographic region of high school attended, highest level of education attained by parents, and age are all self-reported on medical school applications. MCAT exam score and college major are collected through administrative documents.

[b]Other includes Hawaiian and Pacific Islanders, any combination of multiracial responses, and nonresponse.

[c]The authors determined college major by rolling up the 106 classifications of majors that are stored in the electronic records of American Medical College Application Service (AMCAS) into six general designations (see authors for further details).

Table 1

Specification of Six Distinct Interaction Models Tested in Addition to the Additive Ordinal Logistic Regression Model and to the Heckman Ordinal Logistic Regression Correction Model (2013)[a]

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Cohort-level diversity variable	Race/ethnicity	Level of parental education	College major	Age	Region of high school	MCAT exam score
Individual-level variable	• Asian • Black • Hispanic • Native American • "Other"	• No college • Master's degree • Doctorate • Missing data	• Physical science • Social science • Humanities • Professional • "Other"	• Young (< 26) • Older (> 27)	• Northeast • South • West • Non-U.S./other	• Low (< 26) • High (> 34)
Reference individual variable	White	Bachelor's degree	Life science/biology	Ages 26 and 27	Central	26–34

[a]See Table 3 for full specifications of baseline models.

associations with undergraduate major diversity varied across categories of undergraduate majors (see Table 1). We illustrated only the statistically and substantively significant interactions from these analyses. Interactions are specified only across levels of analysis (i.e., a cohort-level diversity characteristic by an individual-level status characteristic).

Results

Of the 46,000 graduating medical school students who were eligible for this analysis, 12,449 (27%) could not be measured on the dependent variable because they did not respond to the two questions in the GQ on learning from others. The demographic profile among the 73% of individuals in the sample who did respond to the two GQ prompts differed somewhat from the 27% who did not respond to both items and were thus excluded from the analysis (see Table 2). Respondents and nonrespondents did not differ in terms of the level of diversity of the schools that they attended. Women, students who were white, physics majors, those who would earn their MDs prior to their 27th birthdays (as determined by their age at matriculation), those with average MCAT exam scores (26–34), and those who went to high school in one of the 50 U.S. states all had higher representation among the respondents than they did among the nonrespondents. While nonresponse was related to demographic characteristics, factors that more directly influence propensity to respond (i.e., within-school cohort-level response rates and previous survey response history) were also both observable for our sample; that is, both the school-level response rate and whether an individual responded to the Matriculating Student Questionnaire four years earlier very strongly related to the propensity to respond to the two GQ prompts (see Table 2). Because neither of these two factors had any causal association with student perceptions of learning from others, they made excellent instruments to include in a Heckman correction model,[18] which can adjust coefficients to minimize potential nonresponse bias. We present coefficients from the selection component of the Heckman selection model in Column 3 of Table 2.

The dependent variable in the analysis is an index that combines Likert scale responses to two prompts from the GQ. Chart 1 presents the distribution of responses to both of these prompts, which were summed to provide a dependent variable, ranging from 2 (strongly disagreeing with both statements) to 10 (strongly agreeing with both statements). The correlation between the two items is 0.76 (gamma statistic = 0.72).

We have reported exponentiated coefficients from the OLR analysis and the Heckman correction model (Table 3); significant coefficients above 1 indicate a positive association, and significant coefficients below 1 indicate a negative association.

The dependent variable—student perceptions of learning from others who are different from themselves—is strongly associated with racial and ethnic diversity (see Table 3). Among the six coefficients estimating the association between the observed dimensions of diversity and perceptions of learning from dissimilar others, only the coefficient for racial and ethnic diversity is positive and significant. Empirically, students within cohorts with greater levels of racial/ethnic diversity have a much higher propensity to agree, and to agree more strongly, that they have learned from dissimilar others than do students in cohorts with lower levels of racial/ethnic diversity. The coefficient of 1.48 indicates an expectation that if a randomly selected student from a medical school with an average level of racial/ethnic diversity were to move to a school that was identical in every way except that it had a higher level (by 1 SD) of racial/ethnic diversity, then the likelihood of that student reporting agreement to the statements about learning from dissimilar others would increase by 48%. The Heckman correction model produces substantively very similar findings (see Table 3) as do the results from the generalized OLR model (results available on request from the authors).

The coefficients for the remaining dimensions of diversity are not substantively significant. The one other statistically significant coefficient, for parental education, is suggestive of a small negative association between diversity of SES and self-report of having learned from others who are different from oneself. However, this association fully attenuates to zero if racial/ethnic diversity is removed from the model.

Models with interactions reproduce the patterns for main effects that have been reported above. Only one model (Model 1) produces significant interaction effects

Table 2

Descriptive Comparison Between Respondents and Nonrespondents, and Results From the Selection Component of the Heckman Correction Model Describing Variable Association With Likelihood of Inclusion in the Analysis of How Race/Ethnicity Associates With Students' Perceptions of Learning From Others Who Are Different From Themselves (2013)

Level of variable	Variables[a]	Selected, % or mean[b] (n = 33,510)	Unselected, % or mean[b] (n = 12,449)	Selection model	
				Odds ratio	*t Score*
School-level	Dimensions of diversity				
	Race/ethnicity	0.52	0.52	1.02	1.48
	Level of parental education	0.72	0.72	1.01	0.68
	College major	0.64	0.64	1.00	0.06
	Age	2.80	2.82	1.02	2.28
	Region of high school attended	0.46	0.43	0.98	–1.47
	MCAT exam score	3.40	3.41	1.02	1.83
	School control: private	58.08	61.83	0.95	–1.58
Individual-level	Sex				
	Men	50.68	57.52	—	—
	Women	49.32	42.48	1.16[c]	9.81
	Race				
	White	65.10	55.73	—	—
	Asian	19.68	24.13	0.76[c]	–11.69
	Black	5.29	8.26	0.68[c]	–11.88
	Hispanic	4.92	5.91	0.84[c]	–5.82
	Native American	0.30	0.55	0.61[c]	–5.12
	"Other"	4.69	5.42	0.83[c]	–5.26
	Socioeconomic status				
	No bachelor's degree	12.90	14.01	0.96	–1.79
	College (bachelor's degree)	25.58	23.81	—	—
	Master's	25.42	23.75	0.97	–1.58
	PhD/professional	29.67	27.89	0.96	–2.12
	Missing data	6.43	10.54	0.79[c]	–7.54
	College major				
	Biology	54.14	53.27	—	—
	Physical science	13.06	12.55	1.04[d]	2.08
	Social science	10.26	10.22	1.02	0.68
	Liberal arts	6.26	5.58	1.00	–0.14
	Professional	3.66	4.22	0.97	–0.88
	Other	12.61	14.16	1.01	0.27
	Age				
	Below 26	3.71	3.71	1.07	2.08
	26–27	50.36	45.30	—	—
	Above 27	45.93	51.00	0.89[c]	–7.24
	Region of high school attended				
	Central	25.23	23.46	—	—
	Non-U.S., other	7.38	10.26	0.89[c]	–3.53
	West	20.04	17.68	0.99	–0.33
	South	26.05	28.81	0.96	–1.38
	Northeast	21.31	19.79	0.99	–0.35
	MCAT exam score				
	Low (below 26)	7.39	9.73	0.99	–0.42
	Middle (26–34)	70.42	71.45	—	—
	High (above 34)	18.41	13.67	1.08[c]	3.53
	No data	3.77	5.15	0.96	–0.97

(*Table continues*)

Table 2
(Continued)

Level of variable	Variables[a]	Selected, % or mean[b] (n = 33,510)	Unselected, % or mean[b] (n = 12,449)	Selection model	
				Odds ratio	*t* Score
	Year				
	2010	33.69	28.92	—	—
	2011	32.59	37.61	0.87[c]	–7.25
	2012	33.72	33.47	0.83[c]	–10.16
	Selection variables				
	School GQ response rate	81.94	77.25	36.01[c]	36.09
	Responded to MSQ	73.01	57.32	1.39[c]	17.01

Abbreviations: MSQ indicates Matriculating Student Questionnaire; GQ indicates Graduating Student Questionnaire.
[a]See List 1 for further information about the variables. Italicized variables indicate the reference categories in the Heckman correction model.
[b]Unstandardized means.
[c]$P < .001$.
[d]$P < .01$.

(see Table 1 for interaction models). The patterns of association based on the significant interactions between individual-level racial/ethnic status and cohort-level racial diversity are illustrated in Figure 2. The positive relationship between the level of racial and ethnic diversity and student self-perceptions of having learned from others exists for all racial groups, but the slopes are strongest for underrepresented minorities. (Full model output is available for all interaction model specifications on request from the authors).

Discussion and Conclusions

The analysis presented in this report suggests that, at least for medical students, in terms of student perceptions of having learned from dissimilar others, racial/ethnic diversity is a unique dimension of diversity. This dimension of diversity is associated with students' perceptions of having learned from dissimilar others to an extent that other dimensions of diversity are not. Our analysis also shows that compared with students from other racial/ethnic groups, white students alone are not more apt to report learning from others of dissimilar backgrounds in racially and ethnically diverse environments; rather, importantly, that associations between diversity and learning *are even greater* for students from historically disadvantaged racial/ethnic groups (e.g., black and Hispanic students).

Many stakeholders in medical education have formed a strong consensus about the need to train physicians with high levels of cultural competence. Student body diversity is recognized as an essential tool that enables institutions to fulfill their missions relating to preparing the future physician workforce with cultural competence sufficient to serve a diverse patient population.[21] This broad-based consensus recognizes that student body diversity is necessary for students to be able to learn from others with dissimilar backgrounds, experiences, and perspectives. In turn, this recognition has been encoded into the LCME standards for medical school accreditation (IS-16, ED-21, and ED-22).[14]

Despite the consensus across the academic medicine community that student diversity is beneficial and necessary, a number of very practical questions remain about how to achieve the types of student body diversity that best foster the development of cultural competencies. Some medical educators suggest that the

Chart 1
Distribution of Scores for Level of Agreement[a] With Two Statements About Learning From Dissimilar Others During Medical School Among 33,510 Students Graduating From U.S. MD-Granting Medical Schools, 2010–2012

		The diversity within my medical school class enhanced my training and skills to work with individuals from different backgrounds.				
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
My knowledge or opinion was influenced or changed by becoming aware of the perspectives of individuals from different backgrounds.	Strongly disagree	**2** (287) [0.9]	**3** (19) [0.1]	**4** (26) [0.1]	**5** (19) [0.1]	**6** (7) [0]
	Disagree	**3** (214) [0.6]	**4** (741) [2.2]	**5** (227) [0.7]	**6** (192) [0.6]	**7** (28) [0.1]
	Neutral	**4** (253) [0.8]	**5** (828) [2.5]	**6** (3,768) [11.2]	**7** (1,130) [3.4]	**8** (213) [0.6]
	Agree	**5** (377) [1.1]	**6** (1,507) [4.5]	**7** (2,964) [8.9]	**8** (12,407) [37.0]	**9** (1,915) [5.7]
	Strongly agree	**6** (96) [0.3]	**7** (214) [0.6]	**8** (529) [1.6]	**9** (1,084) [3.2]	**10** (4,465) [19.8]

[a]For each prompt, respondents were asked to reply on a five-point Likert scale where 1 = "strongly disagree" and 5 = "strongly agree." Distribution is reported as summed score, from 2 to 10, for the response to the two prompts **in bold**; followed by number of respondents (in parentheses); followed by percentage of total respondents [in brackets]. The correlation between the two statements is 0.76 (gamma statistic = 0.72).

Table 3

Ordinal Logistic Regression (OLR) Models Predicting Level of Agreement With "My Knowledge or Opinion Was Influenced or Changed by Becoming Aware of the Perspectives of Individuals From Different Backgrounds" and "The Diversity Within My Medical School Class Enhanced My Training and Skills to Work With Individuals From Different Backgrounds": Exponentiated Coefficients and *t*-Test Statistics

		OLR[a]		OLR: Heckman selection[b]	
Level of variable	**Variables**	**Odds ratio**	***t* Score**	**Odds ratio**	***t* Score**
School-level	Dimensions of diversity				
	Race/ethnicity	1.48[c]	11.11	1.38[c]	10.70
	Level of parental education	0.90[d]	–2.78	0.92[d]	–2.63
	College major	1.03	0.87	1.02	0.81
	Age	0.98	–0.93	0.98	–0.91
	Region of high school attended	0.99	–0.27	0.99	–0.29
	MCAT score variability	1.06	2.34	1.05	2.28
	School control: Private = 1	1.02	0.26	1.00	0.04
Individual-level	Sex				
	Men (ref)				
	Women	1.09[c]	3.65	1.11[c]	5.43
	Race				
	White (ref)				
	Asian	1.08	2.44	1.08[d]	2.66
	Black	0.76[c]	–4.44	0.78[c]	–4.24
	Hispanic	1.08	1.17	1.05	0.81
	Native American	0.98	–0.07	0.92	–0.39
	"Other"	0.89	–2.14	0.90[d]	–2.33
	Socioeconomic status				
	No bachelor's degree	1.00	0.02	0.99	–0.33
	Bachelor's degree (ref)				
	Master's	1.05	2.26	1.05[d]	2.43
	PhD/professional	0.99	–0.24	0.99	–0.36
	Missing data	0.89	–2.08	0.91	–1.92
	Major				
	Life science/biology (ref)				
	Physical science	0.88[c]	–3.57	0.90[c]	–3.50
	Social science	0.88[c]	–3.31	0.90[c]	–3.28
	Liberal arts	0.89	–2.54	0.90[d]	–2.61
	Professional	0.96	–0.73	0.97	–0.59
	Other	0.93	–2.10	0.93	–2.32
	Age				
	Below 26	0.93	–1.24	0.93	–1.69
	26–27 (ref)				
	Above 27	0.97	–1.04	0.97	–1.40
	Region of high school				
	Central (ref)				
	Non-U.S., other	1.09	1.78	1.10	2.05
	West	0.84[b]	–2.67	0.87	–2.53
	South	0.95	–1.03	0.95	–1.22
	Northeast	0.99	–0.15	1.00	0.09

(*Table continues*)

Table 3
(Continued)

Level of variable	Variables	OLR[a] Odds ratio	OLR[a] *t* Score	OLR: Heckman selection[b] Odds ratio	OLR: Heckman selection[b] *t* Score
	MCAT exam score				
	Below 26	1.02	0.50	1.02	0.59
	26–34 (ref)				
	Above 34	0.98	–0.44	0.97	–0.73
	Missing	0.90	–1.28	0.92	–1.28

[a]Sample size = 33,510; log pseudo-likelihood = –57,189.8.
[b]Sample size = 45,959; log pseudo-likelihood = –85,971.5.
[c]$P < .001$.
[d]$P < .01$.

benefits associated with racial diversity could be otherwise achieved by a policy of pursuing diversity based on SES. Kahlenberg,[22] for example, writes:

> There is a strong argument that class is at least as important as racial diversity from a pedagogical standpoint. Bringing together people of genuinely different social classes can strengthen an institution's diversity even more than a cosmetic diversity that congregates similar upper middle class people of different races.

Additionally, Justice Powell, in his precedent-establishing, much cited opinion in the Regents of the University of California v. Bakke case, equates racial diversity with regional diversity as factors that can potentially equally contribute to benefits that derive from diversity.[4]

The unique association between racial diversity and perceived learning that our study has uncovered is of particular importance because, unlike region or social class, race is a protected status on the Equal Protection Clause of the Fourteenth Amendment, and as such, the U.S. Supreme Court has ruled that use of race in admissions is permissible only if other factors cannot achieve the same compelling interests. If the educational benefits that accrue to racial diversity could be achieved by selecting on other nonprotected factors (e.g., zip code of high school attended), then admission plans that take race into account may not pass the strict scrutiny standard that the courts have established.

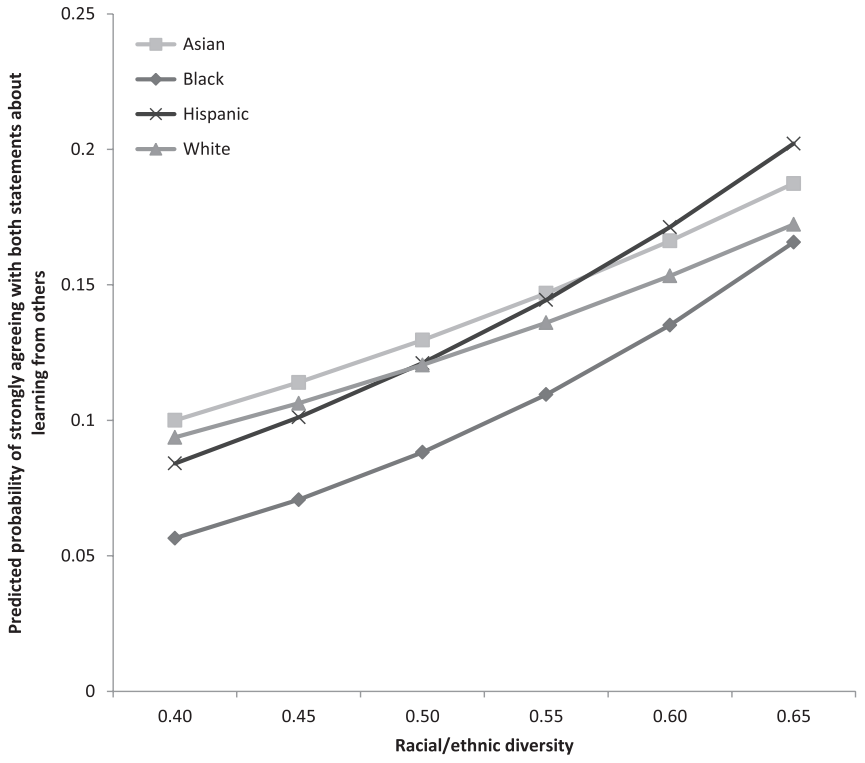

Figure 2 The predicted probability, for the four largest racial/ethnic groups, of strongly agreeing with statements on the Medical Student Graduation Questionnaire about learning from dissimilar others.

The findings presented herein may be considered in light of several selections of text from Supreme Court decisions regarding race-conscious admissions. First, this finding has bearing on the statement of Justice Powell in the Bakke case: "[T]he diversity that furthers a compelling state interest encompasses a far broader array of qualifications and characteristics, of which racial or ethnic origin is but a single, though important, element."[4(Opinion of Powell, Part V A)] The findings from this study in no way contradict Powell's statement; rather, they highlight that Powell could have asserted the importance of race/ethnicity even more strongly. According to our analysis, racial/ethnic diversity is more than a single, important element. It is far more strongly associated with students' perceptions of learning from dissimilar others than are the other dimensions of diversity. The bivariate association between racial diversity and school-level variation in students' perceptions about having learned from dissimilar others is extremely high.[23]

The finding that associations are stronger for disadvantaged groups is particularly notable in light of arguments that suggest that the benefits of racial/ethnic diversity accrue only to people who are white at the expense of minorities.[2(Opinion of Thomas, Part IV B 1:pp 364–366)] Our work indicates that benefits pertaining to learning from others of different backgrounds accrue to everyone, and to students from underrepresented minority groups as much as—or more so than—to people who are white.

The findings from this work may be of particular importance to medical schools as they establish, revise, and implement their admissions policies. Subsequent to the Supreme Court ruling on the Fisher v. University of Texas at Austin case, schools' admissions policies must be able to withstand strict scrutiny by the courts. The findings from this study may be useful in demonstrating the unique value of race as a factor in student diversity in medical schools.

Inferring substantive conclusions from the findings reported here should be tempered in light of several limitations. First, we cannot conclude whether or not the findings are generalizable to the larger population of higher education institutions because the analysis is limited to MD-granting medical schools. Second, we conclude that racial/ethnic diversity is singularly important as compared with other dimensions of diversity in predicting a benefit of diversity. However, readers should note that our analysis specified only five other dimensions of diversity (based on availability) among a multitude of other potential dimensions. Other salient dimensions could include (but would not be limited to) sexual orientation, religion, political outlook, and disability.

Another limitation of this analysis is related to the fact that we focus on student self-perception of having learned from others of different backgrounds, instead of other learning outcomes. Self-perception is a less reliable indicator of a learning outcome than other more objective learning outcome measures. Furthermore, self-perception of having learned does not necessarily indicate the value of what has been learned. Saha and colleagues[10] modeled a number of other outcomes, such as interest in serving underserved communities, as a function of racial/ethnic diversity. Future research should investigate other outcomes.

Finally, self-perception of learning from others who are of a different background depends on awareness that the individuals with whom one is interacting are indeed from different backgrounds. The extent that survey respondents are more aware that they are interacting with individuals from different backgrounds when these individuals cross racial and ethnic boundaries than when these individual cross regional, age, SES, or other boundaries has the potential to explain some of the differences in respondents' propensity to agree with a prompt about having learned from others with a different background. The future development of new measures of learning (such as gains in cultural competencies) will allow tests of this "visibility hypothesis."

While future research will address limitations within this analysis, this report demonstrates that racial/ethnic diversity is strongly associated with student perceptions of learning from others who are dissimilar to oneself.

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Previous presentations: Results from this analysis were presented at the 2013 Annual Meeting of the Association for Studies in Higher Education; St. Louis, Missouri; November 2013.

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