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RESEARCH ARTICLE

Influence of Role Models and Unstructured Relationship on Changes in Medical Student Character, Medical-Specific Empathy, and General Empathy

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ABSTRACT

Purpose: Medical student empathy and character changes are of great interest with clear implications for patient interactions. With much focus on deleterious education culture, this study focuses more on what may bolster empathy and character. Building from interventions highlighting role models, the authors hypothesize the importance of informal relational connections within medical school may promote both modest empathy and character development.

Materials and Method: This study uses unique secondary data that follows a cohort of medical students over time, with two surveys about a year apart. The data is unique not only in the inclusion of time, but also in various relational measures and both a medical-specific empathy as well as a general empathy measure. This allows for modeling change in medical student empathy.

Results and Conclusion: First, general and medical-specific empathy appear to function different. At baseline, receiving positive character feedback from an attending/resident is positively related to medical empathy while negative feedback is inversely related to medical empathy and burnout is related only to general empathy. Over the next year, being around an admirable physician increased both types of empathy, seeing burnt out specialists increased medical empathy, and a sense of calling generally bolsters empathy. Second, exposure to morally admirable role models is broadly, although modestly, related to character development. It is positively associated with expectations for faculty to teach, shape, and train character, and with an increased sense that bad people may not make good physicians. Finally, exposure to these role models tends to increase one's sense of calling to the profession. While not dramatic, informal relationships can be an important part of professionalization and may affect general and medical-specific empathy differently, and shift changes in student character.

Keywords: Empathy; character; moral elevation; role models

Introduction

For about two decades research has shown concerning trends within medical education regarding a gradual loss of empathy within physicians-to-be.¹ From early on the structure of medical education itself was a key connection to changes in character and empathy. Many of the moral and character lessons that students learn are encapsulated within the so-called hidden curriculum,² which is the culture and “undercurrent of norms and values” embedded within medical education.^{3(p391)} This is an important influence upon students’ budding professional identity.^{4,5} Understandings of who we are and what is expected of us flow from an identity created within a narrative context,⁶ so the contents of the absorbed ‘medical narrative’ are significant⁷ and could be helpful in understanding what leads to desirable outcomes instead of only those undesirable outcomes. Experiences with both structured relationships (such as mentors) or informal relationships (such as exposure to role models) could be a way to capture the influence of positive exposures throughout medical education. The present study applies this in two specific ways.

We first focus on the relationship between exposure to role models and students’ empathy through time. With very high numbers of medical students reporting that they have a role model,⁸ both the purposeful and happenstance influence of them can be important. Role models can have a powerful effect on medical student character development and professionalization⁹ and can often be a key source for students to learn humanistic care.¹⁰ One reason there should be more focus on admirable physicians or role models within medical education is that these relationships can fall anywhere on a continuum from admiration from a distance with no substantive relationship all the way to structured relationships facilitated by the medical school.

Second, we introduce the concept of moral elevation and show how it relates to character. This relationship to character could be important as character seems to be then related to empathy variation. Moral elevation is the idea that individuals exposed to others who display commitment to the common good and who treat others “in an exceptionally fair manner” are likely to experience an emotional response as a result.¹¹ Vianello et al.¹² connected moral elevation to organizational leadership, with the idea that individuals around organizational leaders who display morally admirable behavior are more likely to experience moral elevation. This elicited emotional response from these exposures tends to

increase altruism, courtesy, and even organizational commitment. Moral elevation could be important for medical education as these are traits often seen as desirable in medical practitioners. We argue that moral elevation is related to a desire to be a better person and physician, to an increased professional attachment through a sense of calling, and heightened meaning in life.

Medical Student Empathy and Role Models

A significant number of studies show that empathy within medical student populations is often highest at the start of medical schools and decreases from there.^{13–17} These shifts of empathy are not, however, equally distributed throughout student populations. For example, there are racial and gender differences present that function through various social pathways.¹⁸ Additionally, individual differences in students’ loss of empathy are related to one’s undergraduate major, with students majoring in social sciences or humanities in undergraduate tending to avoid empathy loss more than others.¹⁹ Empathy also tends to remain higher for those students who score higher on mental well-being,²⁰ which is often inversely related to negative experiences in the learning environment, bad culture within the institution or medical education more broadly, or negative effects of various pressures such as increased cynicism.^{18,21–23}

Interventions and Role Models in Medical Education

Role models are one of the important influences within medical education for the formation of empathy within students.^{10,24,25} A large number of interventions have implemented either updated attempts at formalized role models and mentors or adding some overt reflective dimension to the course of studies. For example, implementing a reflective practice attached to structured service learning projects can develop empathy,^{26,27} and adding support for students to reflect on behaviors and experiences with patients²⁵ can be effective empathy interventions.

Some of the work highlighting the importance of reflective time also includes the need for role modeling. Some consider reflection and role models as somewhat independent interventions,^{28,29} but others show that role models show students good examples of professional practice that are then internalized and actualized through a reflective process.^{30,31} This process makes sense as Murinson et al.²² show that emotional development within medical training depends on formative experiences, and finding a

role model is a potent formative experience for students.

This developmental process may largely be linked to the values communicated by role models through their actions, but this process is not always positive as bad role models are also influential in a negative direction.^{24,32,33} Inversely, the experience of mistreatment is not uncommon,³⁴ and this could contribute to increased distress within medical students which in turn shifts one's ability to connect with others.^{21,35,36} In contrast, this study is an attempt to uncover some of the positive but passive ways that role models influence students.

Medical Student Moral Elevation

Some of what happens when one is exposed to a role model is not explicitly a cognitive experience, but an emotional one and this is an important insight in thinking about student development. For example, Vianello et al.^{12(p404)} claim that "fair and self-sacrificial leaders cannot expect prosocial and virtuous behaviors from their followers if they do not make them feel morally elevated." A number of studies show that moral reasoning of medical students stops while in medical school and in some cases erodes.^{35,37} If moral elevation is linked to exposure to moral behavior and elicits shifted moral orientations, emotional experiences around role models could be a subtle but important factor for character development. As such, we expect that as students report increased experiences of moral elevation there will be a corresponding increase in a desire for and expectation of personal character development.

Additionally, we expect moral elevation to be related to a sense of calling to the medical profession. In some ways, burnout can be seen as a loss of meaning in one's profession, as emotional exhaustion is lost enthusiasm for work and a low sense of personal accomplishment manifests as an absence of finding meaning in the work.³⁸ As such, it would be helpful to know various ways in which one can find greater meaning. A heightened sense of purpose and satisfaction in life and work is connected to decreased rates of burnout in clinical settings.³⁹⁻⁴¹ Within organizations, moral elevation is connected to increased levels of attachment to the organization,¹² which could be perceived as calling and commitment to a profession.⁴² Moral elevation is connected to a sense of purpose and satisfaction in life,^{43,44} and so we would expect that medical students reporting greater experiences of elevation may also report a greater sense of meaning in and calling to the profession.

Data and Methods

The present data come from the Project on the Good Physician, a two-wave cohort study.⁴⁵ The sample consists of a two-stage stratified cluster sample of students within 24 allopathic medical schools across the United States. To create a nationally representative sample, all 133 U.S. allopathic medical schools were sorted by census region and other characteristics.⁴⁶ Based on the projected response rate and incentives budget, 24 schools were then randomly selected. Finally, 40 students per school were selected using simple random sampling. The project follows the selected medical students over roughly a one-year period with the first data-collection point in their third year of medical school ($n=564$) and the second data-collection point in their fourth year ($n=474$, retention rate=84%), with the study concluding in 2011. These data are ideal for the present study due to the unique measures captured regarding medical students' empathy, experiences of moral elevation, and students' role models within a nationally representative sample of medical students. These data are unique in that they provide the opportunity to observe short-term changes in medical students' empathy and the influence of their role models. All models include sampling weights and account for the stratified sampling design.

Dependent Variables

Empathy. Following prior work, we include both a general and a clinical-specific empathic concern measure.^{45,47} General empathic concern was measured with the shortened empathic concern subscale from the IRI⁴⁸ and clinical empathy was measured using an adapted form for the Toronto Empathy Questionnaire⁴⁹ that used patient-centered phrasing such as, "I get a strong urge to help when I see a patient who is upset."

Character Formation. In this study, we also aim to predict medical students' views regarding medical educators' role in character formation and the character of a good physician. Respondents were asked a series of four questions about character formation in medical school (affirmation = 1): 1) medical educators should teach the science of medicine and try to shape students' character; 2) medical educators are responsible for training students to have good character; 3) medical educators should make judgments about student character; 4) one cannot be a good doctor if they are not a good person. Each of these measures is coded as a binary variable.

Calling, Meaning, Satisfaction. A third set of dependent variables measures respondents' sense

of calling to the profession and meaning in life. First is the Brief Calling Scale,⁵⁰ which explicitly gauges one's sense of 'calling' to the profession. A second dependent variable asked whether 'a deep sense of calling' influenced their choice of a medical specialty (little to no influence (1) - the most possible influence (4)). Meaning in life was assessed with Steger et al.'s Meaning in Life Questionnaire.⁵¹

Independent Variables

Moral Elevation. To address our research question on moral elevation, we utilize the moral elevation scale¹² to predict various outcomes. Respondents are asked to think about a physician that they admire and whether they have worked with them. They are also asked how often they have felt the following from working with or observing this physician (never (1) - always (5)): admiration for the physician, feelings of generosity, feelings of openness towards others, the desire to do something good for others, the desire to be like the physician, and the desire to be a better person ($\alpha = 0.84$). **Experiences in medical school.** We also included measures of positive or negative experiences during medical school in order to assess their impact on views regarding character formation, changes in empathy, and sense of meaning and purpose. At Wave 1 students were asked how often (never=0 – “numerous times”=4) they had been 1) mistreated by an attending, 2) mistreated by an intern or resident, 3) received positive feedback regarding character traits from an attending, and 4) received negative feedback regarding character traits from an attending.

The last measure assessing various ways role models could formally or informally influence medical students focused more on the example of those physicians. At Wave 2 they were asked to think about the one physician they admire the most and whether each of the following applied: 1) tries to slow down and give patients the time and help they need, 2) Makes time to pay extra careful attention to patients' problems, and 3) Goes the extra mile to help take care of patients. All were measured on a scale from “never” (1) to “very often or nearly always” (4).

Additionally, they were asked whether their choice of specialty was influenced by 1) a desire to follow in the footsteps of a physician they admire, and 2) the extent to which physicians in different specialties seemed to be burned out by their work. Both were measured from “little to no influence” (1) to “the most possible influence” (4). Finally, from Wave 1, they were asked whether or not they had a parent or a grandparent who is a physician.

We also control for a host of variables that could confound the associations of interest. Previous studies investigate the relationship between medical students' religiosity and empathy in addition to their sense of calling.^{52,53} Medical students' beliefs and religious/spiritual orientation were measured with four variables. They were asked how important religion was in their life on a 5-point scale (“The most important part of my life” – “not applicable. I have no religion”) and to what extent they consider their self a spiritual person on a 4-point scale (“very spiritual” – “not spiritual at all”). Congregational attendance was measured on a 9-point scale from “never” to “several time a week.” They were also asked to what extent “a deep sense of calling to a particular specialty” guided their selection of medical specialization (Wave 2).

In order to control for possible negative influences on students' empathy, burnout⁵⁴ and an adapted psychological entitlement scale⁵⁵ are included. The former is measured at both waves, and the latter is only at wave 2 and taps into a decreased tendency to legitimate another's perspective. For example, one question reads, “As a physician, I deserve an extra break now and then.” This scale has been tied to increased selfishness and in some ways aggression.⁵⁵ Finally, we control for demographic characteristics in all models including respondent's sex and race/ethnicity.

Results

Table 1 presents weighted descriptive statistics on all variables of interest. Table 2 shows the results predicting general empathy and clinical empathy from Wave 1 of the survey, establishing baseline relationships with empathy. A 1-unit increase in positive faculty feedback is associated with a 0.42-unit increase in medical empathy, but there was no effect on general empathy. Conversely, negative faculty feedback had a negative effect on medical empathy, although less potent ($b = 0.23$), and still no effect on general empathy. Sense of calling to a specialty is significantly associated with higher levels of both medical and general empathy. Furthermore, male medical students have significantly lower scores of empathy compared to females. These results seem to indicate that clinical and general empathy do not work in the same ways. Specifically, the positive and negative feedback from attendings regarding character traits only has a significant effect on clinical empathy and not general empathy. Beyond this, the student's sense of calling, sense of entitlement, and gender have a

similar effect on both types of empathy. The student's reported burnout is marginally and inversely related to clinical empathy ($p < 0.1$) and

not general empathy, but having seen burnout in physicians in different specialties is positively related to general empathy.

Table 1: Unweighted Descriptive Statistics. Project on the Good Physician, 2011.

	Mean/Prop.	Std.	Range
<i>Empathy</i>			
Medical Empathy W1	20.74	2.62	11 - 25
Medical Empathy W2	20.92	2.75	10 - 25
General Empathy W1	20.41	3.14	8 - 25
General Empathy W2	20.14	3.18	9 - 25
<i>Character Formation</i>			
Shape Character	0.61	0.49	0,1
Train Character	0.73	0.45	0,1
Judge Character	0.65	0.48	0,1
Good Dr/Bad Person	0.71	0.45	0,1
<i>Calling, Meaning, Satisfaction</i>			
Professional Calling	7.83	1.74	2 - 10
Calling Influenced Specialty	2.89	0.97	1 - 4
Meaning in Life	17.06	3.11	3 - 21
Satisfaction with Life	26.75	5.59	7 - 35
<i>Moral Elevation & Independent Variables</i>			
Moral Elevation	26.06	2.95	0 - 30
Admirable Dr Example	11.20	1.27	6 - 12
Mistreated by Faculty	1.03	1.04	0 - 4
Mistreated by Resident	1.29	1.06	0 - 4
Faculty Positive Feedback	3.02	0.98	0 - 4
Faculty Negative Feedback	0.78	0.94	0 - 4
Desire to Emulate Specialty Dr	1.71	0.87	1 - 4
Seen Burnout in a Specialty	2.48	0.82	1 - 4
Dr in Family	1.78	0.41	0,1
Religiosity	2.93	1.30	1 - 5
Spirituality	2.69	0.94	1 - 4
Congregational Attendance	4.16	2.44	1 - 9
Self-Importance	4.34	1.67	0 - 15
Burnout W1	4.67	2.66	0 - 12
Burnout W2	4.43	2.60	0 - 12
Male	0.53	0.50	0,1
<i>Race</i>			
White	0.36	0.48	0,1
Black	0.06	0.24	0,1
Asian	0.14	0.35	0,1
Hispanic	0.03	0.18	0,1
Other Race	0.03	0.17	0,1

Note: Measured at Wave 1 unless specified.

Table 2: Linear Regression Predicting Baseline Empathy at Wave 1.

	Medical Empathy		General Empathy	
	b	Std. Err.	b	Std. Err.
Mistreated by Faculty	0.085	0.125	-0.139	0.150
Mistreated by Resident	-0.063	0.112	-0.028	0.138
Faculty Positive Feedback	0.421 ***	0.114	0.111	0.138
Faculty Negative Feedback	-0.234 **	0.083	-0.129	0.116
Desire to Emulate Specialty Dr	-0.024	0.106	0.059	0.143
Seen Burnout in a Specialty	0.153	0.128	0.499 **	0.151
Dr in Family	-0.248	0.239	0.166	0.248
Sense of Calling to Specialty	0.515 ***	0.123	0.846 ***	0.125
Self-Importance	-0.089 +	0.049	-0.139 *	0.064
Burnout	-0.076 +	0.041	-0.011	0.052
Male	-0.818 ***	0.208	-1.585 ***	0.217
Black ^a	0.545	0.422	0.579	0.487
Asian ^a	-0.581 +	0.293	0.115	0.335
Hispanic ^a	0.239	0.434	-0.068	0.598
Other Race ^a	-0.054	0.520	0.043	0.473
Intercept	19.929 ***	1.181	18.348 ***	1.049
R ²	0.18		0.19	
N	482		483	

Note: $p < .001$ ***; $p < .01$ **; $p < .05$ *; $p < .1$ +

^aComparison category=white

Table 3 shows coefficients from linear regression models predicting medical and general empathy at Wave 2 while controlling for W1 empathy. These results demonstrate how empathy changed between the first and second waves of the survey. The example of the admirable physician had a strong positive effect on students' change in empathy through time, as each increase in example of admirable physician is related to about a 0.4-point increase in both forms of empathy. Reports of receiving positive or negative character feedback from attendings at Wave 1 do not have a lingering effect on the change in empathy between waves. Spirituality is significantly associated with an increase over time in medical empathy and marginally related to a positive change in general empathy. Sense of calling to a specialty is associated with an increase in empathy between Waves 1 and 2 (though only marginally for medical empathy). Burn out was not associated with a change in medical empathy between waves. Burnout at Wave 1 was associated with an increase in general empathy at Wave 2 however, but burnout at Wave 2 was not associated with changes in either type of empathy.

Table 4 shows the cross-sectional results (Wave 2) from logistic regressions predicting the four measures of character formation while in medical school regarding medical educators' role in character formation and the character of a good physician. Moral elevation is positively associated with thinking faculty should shape students' character as well as teach science and medicine (OR= 1.09), agreeing that medical educators are responsible for training students to have good character (OR=1.11), and disagreeing that bad people could still be a good physician (OR=1.09). Beyond the effect of moral elevation, the significance of other variables do not have a clear pattern. Congregational attendance increases the expectation for faculty to both teach content and train character, being mistreated by faculty decreases agreement that one must be a good person to be a good doctor, and getting positive character feedback increases the odds a student expects faculty to train their character while in school.

Table 3: Linear Regression Showing Change in Empathy from Wave 1 to Wave 2.

	Medical Empathy			General Empathy		
	b		Std. Err.	b		Std. Err.
W1 Medical Empathy	0.589	***	0.043			
W1 General Empathy				0.584	***	0.038
Admirable Dr Example	0.416	***	0.095	0.352	***	0.066
Mistreated by Faculty	0.014		0.108	-0.135		0.088
Mistreated by Resident	0.137		0.091	0.024		0.190
Faculty Positive Feedback	0.172		0.111	0.075		0.112
Faculty Negative Feedback	-0.026		0.111	-0.108		0.084
Desire to Emulate Specialty Dr	-0.010		0.099	-0.136		0.113
Seen Burnout in a Specialty	0.329	*	0.141	-0.125		0.147
Religiosity	-0.206		0.128	0.052		0.144
Spirituality	0.402	**	0.127	0.245	+	0.190
Congregational Attendance	-0.037		0.048	-0.053		0.071
Sense of Calling to Specialty	0.196	+	0.121	0.335	***	0.120
Self-Importance	0.050		0.041	-0.015		0.039
Burnout W1	0.040		0.041	0.124	**	0.050
Burnout W2	-0.046		0.041	-0.058		0.052
Male	-0.184		0.230	-0.758	**	0.294
Black ^a	0.138		0.209	-0.378		0.276
Asian ^a	-0.146		0.246	-0.211		0.298
Hispanic ^a	-0.119		0.396	-0.003		0.534
Other Race ^a	-0.054		0.540	0.361		0.316
Intercept	1.335		1.703	3.429	**	1.469
R ²			0.50			0.54
N			466			467

Note: $p < .001$ ***; $p < .01$ **; $p < .05$ *; $p < .1$ +

^aComparison category=white

Table 5 demonstrates results from linear regression models using moral elevation to predict professional calling, specialty calling, meaning in life, and satisfaction in life. Moral elevation has a consistent, although modest, positive influence on respondents' sense of calling and meaning in life (see Table 5). Beyond moral elevation, respondents' report of being a spiritual person is also consistently related to both professional and specialty calling as well as meaning in life. Religiosity also marginally predicts meaning in life, while positive trait feedback predicts both meaning in life and professional calling (although again with marginal significance).

Discussion

This study shows that loose and informal relational connections within medical school are influential on

future physicians' character development. These relationships may not be the most dominant force in shaping students' professional character, but they appear to be one importance piece of a larger professionalization puzzle. As most of our variables are not explicitly formal relationships, we show a relationship between unstructured role model-medical student relationships and empathy. Additionally, these effects are not the same for general and medical-specific empathy. Our baseline model for empathy (Table 2) shows that positive and negative character feedback are influential for only medical empathy, but that positive seems more potent. Others measures affect both types of empathy in positive ways (sense of calling) and negative ways (self-importance).

Table 4: Logistic Regressions Predicting Views Regarding Character Formation in Medical School. Project on the Good Physician, 2011.

	Teach and Shape (N=435)		Train Character (N=436)		Judge Character (N=436)		Good Person, Good Dr (N=435)	
	OR	St. Error	OR	St. Error	OR	St. Error	OR	St. Error
Moral Elevation	1.09 **	0.04	1.11 *	0.05	1.00	0.03	1.09 **	0.03
Religious	0.78	0.13	1.00	0.16	1.08	0.16	1.07	0.18
Spiritual	1.09	0.21	1.17	0.20	1.04	0.21	1.01	0.14
Attendance	1.19 **	0.08	0.95	0.07	0.99	0.07	0.93	0.08
Faculty Mistreatment	0.98	0.11	0.97	0.14	0.94	0.15	0.78 **	0.09
Intern Mistreatment	0.84	0.10	0.96	0.13	0.80 +	0.10	1.11	0.13
Pos. Trait Feedback	1.07	0.13	1.24 **	0.12	1.02	0.13	1.11	0.14
Neg. Trait Feedback	0.86	0.11	0.96	0.09	1.04	0.14	0.97	0.11
Male	0.48 **	0.12	0.89	0.19	0.91	0.23	0.79	0.24
Race/Ethnicity ^a								
Black	0.80	0.25	0.55	0.20	0.64	0.29	0.44 **	0.14
Asian	0.71	0.18	1.21	0.38	0.44 **	0.11	0.55 **	0.13
Hispanic	0.55	0.34	0.52	0.27	0.23 **	0.13	2.43	2.43
Other	1.34	0.87	1.02	0.58	0.72	0.31	1.22	0.78
Intercept	0.27	0.30	0.1 +	0.14	2.90	2.87	0.4	0.36

Note: $p < .001$ ***; $p < .01$ **; $p < .05$ *; $p < .1$ +

^aComparison
category=white

Table 5: Linear Regression of Moral Elevation on Calling and Sense of Meaning. Project on the Good Physician, 2011.

	Professional Calling (N=437)		Specialty Calling (N=437)		Meaning (N=436)	
	b	St. Error	b	St. Error	b	St. Error
Moral Elevation	0.15 ***	0.03	0.05 **	0.01	0.17 ***	0.04
Religious	0.20	0.13	0.03	0.07	0.43 +	0.22
Spiritual	0.46 ***	0.13	0.20 **	0.07	0.64 **	0.20
Attendance	-	0.09	-0.03	0.03	0.00	0.10
Faculty Mistreatment	-	0.02	0.03	0.05	-0.03	0.15
Intern Mistreatment	-	0.04	0.06	0.05	-0.18	0.15
Pos. Trait Feedback	0.15 +	0.08	0.06	0.04	0.38 **	0.13
Neg. Trait Feedback	-	0.03	0.00	0.05	-0.23	0.17
Male	0.03	0.18	-0.05	0.11	-0.43	0.35
Race/Ethnicity ^a	-					
Black	0.06	0.28	0.07	0.18	-0.16	0.67
Asian	0.36	0.22	-0.19	0.16	-0.61	0.40
Hispanic	0.05	0.36	-0.18	0.22	-0.15	0.56
Other Race/Ethnicity	0.27	0.34	-0.21	0.18	-0.85	0.82
Intercept	2.16 **	0.80	0.89 *	0.43	9.29 ***	1.13
R ²	0.20		0.10		0.23	

Note: p<.001 ***; p<.01 **; p<.05 *; p<.1 +

^aComparison category is white

Leffell et al.⁵⁶ argue that the character of physicians is shaped within a context of clinical practice combined with emotion-related social skills, and as a result the culture within the medical school can be important as negative exposures could numb student moral sensitivity. It is notable that modeling change in empathy from this baseline (Table 3) shows that the effects of negative character feedback seem short-lived, but marginally significant lingering effects of positive feedback remain over time. While being exposed to admirable physicians positively affects both types of empathy, seeing burnout in a physician affects only medical empathy while experiencing burnout affects only general empathy.

In addition to exploring medical students' empathy, this study introduces the organizational application of moral elevation as described by Vianello et al.¹² to highlighting desirable effects of medical school hidden curriculum. Specifically, when medical students are around morally admirable superiors during their medical

education, they may have an internal emotional response eliciting the desire to also be morally admirable. This response is associated with increased altruism, organizational commitment, and general courtesy. While moral elevation may not be the sole or strongest building block for these traits in training, it is helpful to begin to better understand desirable byproducts of medical training. As such, we have tested if medical students' experiences of moral elevation are associated with the desire and expectation for character changes during medical school, shifts in empathy, and a sense of calling to the profession and sense of meaning.

Results generally support our expectation that positive interactions with admirable physicians or faculty would impact empathy in medical students. This finding corroborates previous studies that find interactions with colleagues within the medical setting can impact empathy in both positive and negative ways through role modeling.²⁶ Experiences of moral elevation are

related to the expectation of character: that educators will shape character, train for good character, and questioning whether bad people can be good physicians. However, experiences of moral elevation are not related to the expectation that educators will judge their character. This could be because the former are primarily about becoming or being a better person while the latter is more about judging others. It could be that experiences of moral elevation may inspire individual students to be better practitioners but may not lead to the expectation that they should be judged.

The results of this study should be kept in perspective as while we do find statistical significance, the effects indicate that there are additional mechanisms at play. We do not claim that role models are the strongest predictor of medical students' empathy or their changes in empathy over time. Rather, role models are an important influence on the development of empathy throughout schooling. Similarly, moral elevation is not the only positive dimension of medical student socialization, but it is one facet of medical education that has a positive influence on future medical professionals. It is important to consider the role of these mechanisms in the development of a physician, as empathy development and character formation in medical school are complex processes impacted by many factors.²⁵ Future research should consider other positive dimensions of medical school socialization alongside role models that work together to produce empathetic, passionate, and patient-centered physicians.

There are a few limitations for this study. First, these data are from 2011. However, curricular changes are not likely to significantly alter the key relationships here as they are not necessarily structured pieces of medical education. Therefore, the Project on the Good Physician remains the ideal dataset for this project as it includes specific questions on character formation in medical school, the role of role models, experiences of moral elevation, and longitudinal measures of both medical and general empathy. Future research should collect data on medical students' character formation, empathy, and experiences of moral elevation over longer periods of time using consistent measures.

Conclusion

This study carries clear implications for those serving as role models or mentors to medical students, but it also carries implications for the overall culture of medical socialization. The

measures used here only ask respondents to think about a physician they admire and does not assume any formal relationship. As such, the impact any given educator could have in shaping the replication of professional norms could be important and should be a focus of continued investigation. This highlights the importance of the overall culture of the program, as Thomson et al.⁵⁷ show that experiences of moral elevation also increase the interest in becoming a mentor to others, and empathy amongst colleagues tends to beget empathy, as seen in a study by Ahrweiler and colleagues²⁶. Future research should also work to assess under what circumstances interactions with role models have the strongest effect on empathy and when experiences of moral elevation are most influential, as a student may expect a mentor to be admirable, but admirable behavior in the context of unstructured relationships may be more influential as the expectation of admiration may also not be present.

While it is important to understand the social dynamics that pose challenges to the health and professionalism of medical students, this study highlights the need to also focus on those medical education dynamics with desirable effects, such as one's interactions with role models that could also provide opportunities for experiences of moral elevation or observations of medical empathy. This is especially true as there are high rates of depression and burnout within medical student populations,^{58,59} and as moral elevation is still experienced in the midst of depression⁶⁰ it may rekindle students' idealism,⁶¹ and could also provide the motivation to act on one's moral values.⁶² In addition, previous qualitative work shows that an emphasis on role-modeling during medical school improves medical students' empathy.⁶³ Our findings support this claim, demonstrating that students who had an admirable role model grew in their empathy over time. The challenge is that many students report a lack of good role models during their medical training.⁶⁴ Taken together, it is clear that medical education that focuses on interactions with practicing physicians and mentorship can have a positive impact on medical students' empathy, character formation, and calling to their work.

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