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## What must I do to succeed?: Narratives from the US Premedical Experience

Katherine Y. Lin<sup>a</sup>, Renee R. Anspach<sup>a</sup>, Brett Crawford<sup>b</sup>, Sonali Parnami<sup>c</sup>, Andrea Fuhrel-Forbis<sup>c</sup>, and Raymond G. De Vries<sup>a,c,d</sup>

<sup>a</sup> University of Michigan, Department of Sociology LSA Building, Rm #3001 500 S. State St. Ann Arbor, MI 48109-1382 <sup>b</sup> University of Pittsburgh, Katz Graduate School of Business 312 Mervis Hall Pittsburgh, PA 15620 <sup>c</sup> Center for Bioethics and Social Sciences in Medicine, University of Michigan North Campus Research Complex 2800 Plymouth Road, Bldg. 16 Rm. 430W, Ann Arbor, MI 48109-2800 <sup>d</sup> University of Michigan School of Medicine, Department of Medical Education, Department of Obstetrics & Gynecology North Campus Research Complex 2800 Plymouth Road, Bldg. 16 Rm. 430W, Ann Arbor, MI 48109-2800 <sup>e</sup> Maastricht University/CAPHRI School for Public Health and Primary Care Postbus 1256 6201 BG MAASTRICHT The Netherlands

### Abstract

Medical sociologists have long been fascinated with the process through which laypersons are transformed into physicians, uncovering the ways in which one learns, not just the facts of medical science, but also how to *be* a physician. Despite this abiding focus on socialization, nearly all of the literature on this process in the US is informed by studies of the medical school and residency years, with almost no empirical attention paid to the premedical years. Our study addresses this gap in knowledge. To better understand the premedical years we conducted 49 in-depth interviews with premedical students at a selective, public Midwestern university. We found that students understand and explain decisions made during the premedical years with narratives that emphasize the qualities of achievement-orientation, perseverance, and individualism. We also find that these qualities are also emphasized in narratives employed to account for the choice to collaborate with, or compete against, premedical peers. Examination of premedical narratives, and the qualities they emphasize, enriches our understanding of how premedical education shapes a physician's moral development, and underscores the need to include the premedical years in our accounts of “becoming a doctor.”

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Direct correspondence to Katherine Y. Lin by email at linkathy@umich.edu, by phone at 734-763-4589, by post at Department of Sociology, Literature Sciences and the Arts Building, Rm #3001, 500 S. State Street Ann Arbor, MI 48109-1382, or by fax at 734-763-6887.

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## Keywords

US; premedical education; moral education; professionalization; qualitative; hidden curriculum; medical socialization

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Medical sociologists have long been interested in the process of medical socialization – the process through which laypersons are transformed into physicians – uncovering the ways in which one learns not just the facts of medical science, but how to *be* a physician (Becker et al., 1961; Bosk, 2003; Hafferty, 2000; Merton et al., 1957; Mizrahi, 1984). Using observations of medical students and residents, researchers have documented how medical schools and residency programs impart not only technical knowledge, but also enable individuals to “learn the norms, values, language, skills, beliefs, and other patterns of thought and action” essential to being a doctor, preparing individuals to don the white coat and take responsibility for the lives of their patients (Robertson, 1981, pg. 105).

Oddly, few empirical sociological studies of medical socialization consider the premedical years. This is despite the fact that for more than 100 years medical educators have understood the importance of premedical education. When Abraham Flexner (1910) defined the proper curriculum for medical education and the preparation needed to enter medical school, he began the debate about how to best select and prepare future medical students. Thus among medical educators, it is widely agreed that the process of becoming a physician begins “long before medical school, since a student's success at learning medicine depended heavily on the aptitude, characteristics, and educational background that person brought to medical school in the first place” (Ludmerer, 1999, p. 59). The conversation about how to prepare would-be medical students remains lively (Coombs & Paulson, 1990; Fishbein, 1999; Gunderman & Kanter, 2008): What is the appropriate mix of (mainly science and math) courses (Brieger, 1999; Coombs & Paulson, 1990; Dienstag, 2008; Emanuel, 2006; Gunderman & Kanter, 2008)? What should be included on the Medical College Admission Test (MCAT), and what is its value in selecting strong candidates for medical school (Anderson, 1984; Dienstag, 2011; Kaplan et al., 2012; McGaghie, 2002; Powers, 1984)? However, this debate consists almost exclusively of editorials and commentaries focusing on the formal premedical curriculum (Gross et al., 2008; Thomas, 1978) and has not generated systematic empirical study of other facets of the premedical years. Thus there is a thin understanding as to how the premedical years contribute to the socialization processes that shape the character of the physician workforce (Conrad, 1986; Larson et al., 2012; Lin et al., 2013).

The few existing empirical premedical studies focus on the premedical *academic* experience. These studies examine issues such as: whether premedical academic performance is a good predictor of medical school performance (Caplan et al., 1996; Mitchell, 1990); how premedical students select courses; whether these decisions affect their chances of admission to medical school (Creditor & Creditor, 1982; Dornbush et al., 1987; Maguire, 1999); and how negative academic experiences, particularly performance in difficult “weeder” courses, can lead underrepresented minority and women students to leave the premedical track (Barr et al., 2008; Barr et al., 2010; Lin et al., 2013). A few

foundational studies look beyond the academic experience of the premedical years to document and explain the utility of a “cutthroat” premedical stereotype (Conrad, 1986; Hackman et al., 1979; Sade et al., 1984). Unfortunately, this work was done in the late 70s and early 80s. The changes in healthcare delivery *and* in medical education that have occurred during the past two decades suggest a need for more recent studies of the premedical experience (Ludmerer, 1999).

In order to better understand how one becomes a physician, investigation of how students experience, understand, and interpret the requirements of the premedical years is needed. Very little is known about how premedical students think about their studies, plan their premedical experiences, and develop strategies to deal with medical school admissions requirements. While the role of the medical school and residency years in teaching not only the technical skills required for the practice of medicine, but also instilling a sense of moral responsibility and a code of conduct necessary for practicing medicine is known (Anspach, 1988; Bosk, 2003; Fox 1959; Parsons, 1951; Zussman, 1992), far less is understood about how ways of thinking and strategies enacted during the premedical years shape the character of students who walk through the doors of medical schools and emerge as physicians.

The premedical years represent an important stage in the process of becoming a physician. It is the first time that a student with an interest in medicine must actively fulfill a list of requirements for admission into medical school. Premedical students must score well on the MCAT, do well in large “weeder” courses (most notably, organic chemistry), carefully plan extracurricular activities, balance academic, social, and personal lives, and repeatedly re-examine their ambitions for a medical career. Moreover, while a student's decision to become a physician could have been made at any point in their lives prior to admission into medical school, declaring premedical status during the undergraduate years serves as a crucial *social* acknowledgement of one's career interests. It is one of the first moments in which would-be physicians encounter others who share similar aspirations, and the competitive admissions game for medical school becomes a tangible, visible reality.

Furthermore, while there is a general understanding of the requirements for medical school admission, the everyday decisions a premedical student must make in order to fulfill such requirements are threaded with ambiguity. No one is guaranteed a position in medical school, even if every formal requirement is fulfilled. Indeed, advice on how to gain admission into medical school found on websites and in books suggest a wide range of strategies (Gross et al., 2008; Kansagra et al., 2006). Sources of information claim that there are “no particular set of guidelines that gets a person into medical school” and no “one particular path that guarantees acceptance.” (Kansagra et al., 2006, p. 5, p. 1) Thus, while the decision to declare “premed” status is relatively easy, underlying every decision about one's academic and personal life is a pervasive question, “How will this affect my chances of getting into medical school?” Consequently, the premedical years are ripe with important decisions and turning points, all tinged with risk and uncertainty. Examining how students think about their experience of the premedical years can provide an important window into the development of the character of those who are intent on becoming our healthcare providers.

To this end, we conducted a qualitative interview study of premedical students at a large, Midwestern university. Our data allow us to document narratives crafted by premedical students when describing the decisions they must make throughout the premedical years, including particularly difficult decisions about whether to work with, or to withhold help from, other premedical students. Moreover, we show that these narratives highlight specific personal qualities that are perceived to be associated with success as a premedical student. Examining premedical narratives provides a window into understanding how this stage of the medical training process may influence the development of character over the course of the medical socialization process. Thus, our study contributes to the medical socialization literature by bringing focus to a key stage of the medical training process: the premedical years.

## DATA AND METHODS

We conducted a total of 49 in-depth, semi-structured interviews with premedical students across all four years of undergraduate education (36), students in their first year of medical school (6), and undergraduate students who were formerly on the premedical track (7). Our goal was to obtain a more complete picture of the premedical experience by interviewing those who have successfully completed the requirements, those who are still in the midst of completing their requirements, and those who have opted out of the entire experience. By obtaining accounts of the premedical experience across these different samples, we can draw conclusions about the premedical experience that are not unique to one stage of the process or unique to students who were successful in their efforts to matriculate into medical school. While respondents at different stages in the process offer slightly different views on the premedical experience, there were high levels of corroboration in the narratives we collected. Triangulating our observations across several moments in the premedical career improves our ability to generalize about the premedical experience.

Our data collection took place at the University of Michigan, a selective public university with an incoming undergraduate class of approximately 6,000 students. Pre-professional programs are highly visible on campus: based on an internal advising report for the liberal arts college, between 800-1000 students indicate premedical interest every year in an incoming freshman survey, with about 700-800 students applying to allopathic (MD) medical schools and 200-300 students applying to osteopathic (DO) medical schools every year. Over 50 percent of the MD applicants are accepted, with a similar acceptance rate for osteopathic schools. By comparison, national acceptance rates hover around 45 percent for MD schools and 34 percent for DO schools (“Medical School Application Statistics”, 2013).

Students were recruited through email notifications sent to three listservs: a university-sponsored premedical listserv, the Medical Sociology class listserv, and the first-year medical student listserv. Snowball sampling methods were also employed as interviewees referred other students to our study. Data collection took place between Winter 2009 and Spring 2011. Interviews lasted about an hour, and focused on interviewees’ reflections about their premedical experiences. Ethical approval was obtained from the Institutional Review Board at the authors’ institution. Transcribed interviews were coded with NVivo software. The interview guide is available in an online appendix.

Data analyses commenced shortly after interviews began and continued concurrently. We began with a close reading of the transcripts, looking for themes and patterns in the data. Then, we began coding the interviews, generating codes for basic categories and themes. Here we generated broad codes such as “reasons for medicine”, “atmosphere/culture”, “obstacles encountered”, “strategy for survival”, and so on. Within these basic code categories we searched for patterns to further break down the data. For example, within the larger category of “atmosphere” we saw numerous mentions of both “competition” and “cooperation” and thus began coding for mentions of both concepts. We then moved to axial coding, putting data back together in large categories and making connections across concepts. For example, at this stage of analysis we began to note whether mentions of “competition” and “cooperation” were seen as being in tension with each other, resulting in further sub-codes that related the notions of competition and cooperation to each other. Finally, we transitioned to selective coding, where core categories are selected and systematically related to other categories (Strauss and Corbin, 1990). At this stage we went back through the data and selectively coded for specific themes that had emerged in the earlier coding process, such as more mentions of competition and cooperation being in tension with each other.

During this process we generated analytic memos as well as a codebook to organize the emergent themes in the data. The first, second, and third authors worked together to develop the coding scheme and coded the majority of the interviews. The other authors tested the coding scheme by coding a few interviews. No author coded an interview that they themselves conducted. To maintain inter-coder reliability, the first, second, and third authors also coded a few of each other's interviews to ensure that passages were being coded similarly. Passages that were coded differently were brought to regular research group meetings and disputes were resolved through group discussion. Modifications to the coding scheme also emerged from research group discussions. Thus our main findings are the result of an iterative analytic process that combined group discussion and thorough collective analysis and coding.

Our sample allowed us to examine students across different stages of the premedical experience, representing a diverse set of academic majors, and coming from both physician and non-physician families. We used data from 36 premedical students across all four years of undergraduate education (five freshmen, ten sophomores, eleven juniors, and ten seniors), seven recent graduates (all had recently graduated and were in an interim year, applying to medical school and working), six medical students in their first year of medical school, and seven students who left the premedical track (most were still pursuing health careers such as dentistry, public health, physical therapy). About 40 percent of the sample was male (n=19). The majority were majors in the biological sciences (n=23), such as cellular and molecular biology, biochemistry, and kinesiology and movement science. Seven students were majoring in other natural sciences (including engineering (n=6, mostly biomedical engineering) and physical sciences (n=1)). The second most popular majors were in the social sciences (n=15), such as sociology, psychology, and anthropology. The remaining students were majoring in humanities (n=9, predominantly language majors) and business (n=1). A majority of the students did not have a physician in the family (n=33).

## RESULTS

### What must I do to succeed? Narratives emphasizing personal qualities

To understand how premedical students think about the premedical years, we asked our interviewees two questions – What could a premedical student do to improve his or her chances of getting into medical school? and What strategies do you use to cope with the pressures (of the premedical years)? While we found general consensus around specific requirements, such as maintaining a high GPA, cultivating a set of extra-curricular activities with a focus on volunteer and clinical work, and signing up for an MCAT preparatory course, we noted considerable variation in *how* students explained accomplishing these goals. The stories students told about negotiating the premedical years emphasized three different personal qualities: *achievement*, *perseverance*, and *individualism*. In telling these stories, students presented coherent narratives of the choices they made as premeds, narratives that explained their behavior and demonstrated that they possessed the characteristics valued by admission committees.

The narratives offered by students provide a window into their perceptions of a successful medical school applicant. While all of our interviewees acknowledged the need to have good academic standing and diverse interests, the personal qualities highlighted in their narratives reveal students' understanding of the particular attributes that medical schools are seeking. Narratives that emphasize achievement, for example, note that medical schools want applicants with the strongest academic and extracurricular records. Narratives that emphasize perseverance include mentions that medical schools want hard workers who can demonstrate their willingness to be a physician, despite the odds. And finally, narratives that emphasize individual expression are coupled with mentions that medical schools want individuals who pursue their passions. These qualities are not mutually exclusive: emphasizing one quality does not preclude focusing on another. Moreover, the narratives do not serve to categorize students and differentiate medical school applicants. Instead, while some students may emphasize one quality more frequently than the other, others crafted narratives emphasizing multiple characteristics depending on which decision they were describing. For instance, a student may describe a list of activities they need to accomplish and focus on the actual process of achievement, but emphasize perseverance when they describe obtaining good grades in required courses. We consider these narratives in more detail below.

**Achievement**—Student narratives that emphasize achievement focus on the value of personal success and accomplishing specified goals. These narratives correspond with previous studies of premedical students that describe the existence of a “cutthroat” premedical student stereotype— students who aggressively pursue the goal of medical school admission (Conrad, 1986; Hackman et al., 1979; Sade et al., 1984). This response below is typical of this narrative, illustrating the orientation toward achieving goals:

I love things being competitive. Like on that Jamaica trip, it was with other classmates, and we were competing over stupid things like who had the lowest blood glucose....It was, like, because if you don't make it into a game, it's not fun.  
(Male, medical student)



In describing his study abroad experience, this student frames the challenges he encounters as a “game”. Using an achievement-oriented narrative allows students to convert even the smallest events of premedical life into challenges to be met and goals to be achieved, preferably in manner that is quicker, more intelligent, and better than one's peers.

However, not all achievement-oriented narratives are laced with aggression and gusto. In fact, this ambitious-to-the-point-of-aggression premedical narrative was expressed by only a minority in our sample, corroborating previous research that found the stereotype of the “cutthroat” premedical student to be largely a myth (Conrad, 1986). Most achievement-oriented narratives in our data instead focused on completing a list of requirements for admission into medical school. These narratives allow students to downplay naked ambition, emphasizing instead accomplishing a list of goals believed to be key to success as a medical school applicant:

What I've been doing is really just taking the things and pulling them up and being like, “ok, I should do some community service, I should...get some involvement...” (A)pplying for medical school is very competitive and they do want you to be involved. And I know that... there's not really a list of things that will get you in to medical school...but...I think there's... some minor minimum-level of involvement in general...And getting myself above that

minimum level has been a really fun experience. (Female, sophomore premedical student) In describing her extracurricular involvement, this student noted that she was not involved in activities in high school, but developed this strategy once she declared her premedical status. While she notes that there isn't an explicit “list” per se of requirements, she does recognize a “minimum-level of involvement in general” necessary in order to be competitive for medical school. In an effort to meet this “minimum level”, she has joined numerous community service organizations and has been involved with tutoring services on campus. Furthermore, similar to other achievement-oriented narratives, she describes this experience of completing items on the checklist as enjoyable, exposing her to new experiences.

Others acknowledged the need to set and accomplish certain goals, but are less sanguine about the process of engaging in extracurricular activities:

(T)hink about what looks good on paper, I know that sounds really bad, but, you have to do things that you like but also do things that med school likes that you may or may not be totally gung-ho to do...I just can't do bench top experiments...so I forced myself to do a little bit of that and I can't say I enjoyed the experience very much. (Female, medical student)

This student believed that having natural science lab experience would “look good on paper” and was expected by medical schools, and thus added it to her list of activities—a decision made by many other premedical students—but it was not an activity that she enjoyed.

**Perseverance**—A second characteristic highlighted in premedical student narratives is perseverance. These narratives frame the struggle through the premedical years as a dogged push through required classes and activities, believing that hard and consistent work will ultimately win in the end. In contrast to narratives that emphasize achievement, narratives of

perseverance do not focus on the achievements that are being accomplished (although students who use this narrative do value accomplishments) as much as they focus on the *process* through which students achieve those goals. The emphasis here is on the level of personal sacrifice and exertion needed to accomplish even the smallest of achievements. These narratives generally note that “working hard”, “sucking it up” and “powering through it” are necessary for succeeding:

My whole philosophy was like if I want to do this, if I want to end up going into medicine, I just have to jump through the hoops, like it ends up just being whoever doesn't quit, so if I just don't quit, and I apply 25 times, eventually they're probably gonna take me, they're just gonna get sick of reading my application and someone will finally take me... (Female, medical student)

This student described herself as a poor test taker and a slow reader but repeatedly emphasized that it was her perseverance, determination, and strong desire to practice medicine that gained her admission to a school of osteopathy.

Rather than depicting accomplishments as ends in themselves, narratives of perseverance focus on the applicants' personal qualities as the key to success. More than an impressive resume or good grades, it was an applicant's tenacity, grit, and determination that led to medical school admission, and eventual success in medical training. Demonstrating good academic achievement, for example, was not taken to mean that an applicant was well-prepared for the rigorous material in medical school but rather that the applicant has the determination needed to survive medical school and a true drive to be a physician, as the following passage suggests:

And I think that says more about you...I think if you do well in orgo I and II [organic chemistry], personally, I feel like you have put a lot of time and effort... you've gone above and beyond and...if you're putting that much effort into the science course you're probably a more driven person and you have a true interest in science and that might be important for becoming a physician. (Male, freshman premedical student)

Rather than perceiving good performance in organic chemistry as indicative of having the scientific knowledge required for the practice of medicine, this student instead believes that getting a good grade demonstrates a “driven” quality and a “true interest in science that might be important for becoming a physician”, signaling to medical schools that one would not only be a successful applicant, but also a successful physician.

**Individualism**—A third theme highlighted in student narratives is individualism. Narratives of individualism assert that the decisions students made during their premedical years are ones they would have made regardless of their eventual career aspirations. For example, a number of respondents justified their list of extracurricular activities or choice of major by noting that they had a previous keen interest in these activities, and thus were pursuing them regardless of the benefits it provided to a medical school application. These narratives emphasize individual passion and interest as motivating factors behind student decisions:



I remember learning that day that it's not about a checklist. It's about doing what you love and having something to talk about, you know, that you're really passionate about because those interviewers are going to know if you did research to check it off or if you spent your time doing something else that you really loved. (Female, junior premedical student)

This student acknowledges that freshman year she had a “checklist”, but after attending a health conference she learned that success could come from following her interests. As a result, she redirected focus from research, which she did not enjoy, and instead spent more time volunteering. Like narratives that emphasize achievement, this quotation explicitly acknowledges the existence of a “checklist” and certain goals that must be accomplished in order to be a successful premedical student. However, in contrast to both achievement-oriented and perseverance-based narratives, this narrative frames the student's actions as the result of doing something they are “really passionate about”. This quotation stresses the value of authenticity, noting that students who do not demonstrate a real passion for what they do would receive negative reviews during medical school interviews, compromising their chances of admission into medical school.

These narratives also highlight the value of individualism in the face of institutional messages or constraints, demonstrating that individualism existed in spite of, or even in reaction to, the premedical institutional requirements. For example, the following student, when asked how a candidate could improve their chances of admission to medical school, emphasized that every candidate should “play up” their unique strengths, whether it be their strong interest in helping people, in working with science, or their ability to work very hard. However, when asked what her particular strategy or niche was in the premedical community, she responded:

I don't have a niche. I'm like the niche buster... I think overall I'm just (in a) class by myself...like the rebirth renaissance woman... (Female, senior premedical student)

Both her earlier responses and this quotation demonstrate a view of the premedical years as an expression of self. Even in the face of medical schools' efforts to classify actions into a “niche”, one can be a “renaissance woman” and transcend such confining categories.

Additionally, while efforts to frame one's own actions as a reaction against institutional expectations can serve as merely a re-validation of self as seen above, it can also serve as a real defense mechanism in the face of uncertainty and an intensely competitive atmosphere:

Like I said before, there's a lot of like fear that they try to use, and then it forces you to like really fight back against institutions and to like make your own way (Female, senior premedical student)

In summarizing what she found most rewarding about her premedical experience, this student describes developing self-confidence and the ability to “make your own way”, even in the face of fear and uncertainty, to be one of the most valuable lessons of the premedical experience.

Implicit in many narratives is a tension between intrinsic motivation (e.g., engaging in extracurricular activities because they are rewarding and enjoyable) and extrinsic motivation (e.g., engaging in extracurricular activities to complete a “checklist” of informal requirements). It would be tempting to view students as displaying one type of motivation over the other. Indeed, the student who disliked extracurricular activities but engaged in them to gain admission to medical school clearly demonstrates extrinsic motivation. However, we find that intrinsic and extrinsic motivations were inextricably intertwined. A closer examination of student narratives reveals a more complicated picture in which students described *both* intrinsic rewards *and* the more instrumental goal of admission to medical school. Some students initially participated in extracurricular activities to complete a “checklist”, but came to appreciate the value of their experiences. In such cases, intrinsic motivation developed over time. Whereas, even narratives of individualism, where students focused on the pursuit of their own passions, noted that medical schools would value such authenticity. Gross et al. have noted such a similar tension in describing a “continuum of advice” premedical students receive: “On one end of this continuum is the strategic—“you must do this to satisfy the admission committee”—and on the other end there is advice on creating character—“do this to develop the kind of character that will make a good physician” (2008, p. 518). Thus it is apparent from the premedical student narratives that premedical students are called upon to not only develop character appropriate for becoming a physician-in-training (intrinsically motivated behavior), but also to aptly demonstrate such character to medical school admissions boards (extrinsically motivated behavior).

Premedical student narratives do more than emphasize the qualities they view as important for success as medical school applicants: they also provide a way to explain various difficult decisions a premed must make. Achievement, perseverance, and individualism are also qualities that are highlighted when students describe their interactions with other premedical students and, in particular, are used to explain their efforts to balance competition and cooperation with their peers. First, we detail the competitive atmosphere students describe, and how students talk about the dilemma to cooperate or compete with their peers. Then we demonstrate how the narratives surrounding this decision highlight the qualities of achievement, perseverance, and individualism.

### **Compete or cooperate? The ethical dilemma of the premedical years**

When students reported that the premedical experience was “stressful”, they most commonly attributed this stress to a pervasive competitive atmosphere. The stress of completing required courses was accompanied by the fear that others would prove more successful than oneself in these courses. Nearly all of our interviewees remarked that the premedical experience was not *overtly* competitive. Rather, the competition was *tacit*:

Sometimes there's an inherent mentality that you're competing against your peers for the potential to become... a doctor, and that's what creates the competitiveness in the class. (Male, senior former premedical student)

This student, who opted out of applying for medical school to pursue dentistry, noted that the “competitiveness” is an “inherent mentality” that students adopt when they perceive their peers to be preventing them from becoming a doctor. This mentality did not necessarily

translate into competitive or aggressive behavior, although a minority of students reported aggressive behavior on the part of others in the classroom, such as refusing to share notes or even distributing false information. Instead, the idea of competition permeated everyday interactions between students due to a keen awareness that medical school admission is a zero sum game. The success of your classmate reduces the number of available places for yourself:

It's unspoken, it's just there. And you know it and they know it...sometimes when people end up talking about medical school...you can feel that tension between the people a little bit, you can see it. (Female, sophomore premedical student)

At the same time students mentioned the utility of cooperating with other students. One common success strategy mentioned was participating in study groups to understand the complex material in their required science courses. Group work was often encouraged and reinforced by professors and teaching assistants who provided academic resources to study groups. Many students reported a cooperative environment in their own immediate study groups, noting the individual benefit in understanding complex material that could come out of helping fellow students:

People are willing to help you out. Everyone's in the same position; everyone knows how stressful it is, and we're all working together for a common goal...so I feel like if one person understands the material, they're more willing to help students who don't understand the material also, because that helps them... review the material and actually study themselves. So it's really not hurting anyone by helping other students...and I feel like it's a good support system. We all motivate each other. (Female, junior premedical student)

Although students frequently described their personal experiences as cooperative, they were quick to note that the reports of other premedical students, or their own observations of premedical culture, suggested that their group was exceptional and most students were less willing to work with other premedical students. In spite of her statement that people were willing to “help you out” and “everyone's in the same position,” the same student continues:

(I: Sounds pretty cooperative.) Yeah, it is, actually. Well, my group, at least. I don't know about most.

The conflict between working with and competing against one's fellow peers was inherent not only in how students characterized the premedical environment, but also in how they discussed their own behavior. For example:

I think there's this sense of, you know, we're all going through it together, so... why wouldn't we help each other out? ... You can't figure it out on your own. You need somebody else...but then there's also this sense that when I'm sitting down to this...I may have been studying for the past...two weeks straight with him—I also...I hope he fails his test so that I can do better than him. (Male, recent grad)

This student, who recently finished his undergraduate studies and was taking a gap year before medical school, describes how the obvious utility of working with other students to gain mastery of material can eventually be overshadowed by a secret hope that his peers do worse than he does. Similarly, when asked what sorts of “ethical dilemmas” premedical

students face, one student promptly identified this tension between cooperation and competition:

Definitely who to help and who not to help I think ... like I said, I don't want to be competing with them but is it fair that they just sort of ... like, take my stuff and leave, like I don't know if I really want to be used that way... And, I mean it always pops in your head, like is this going to make the curve go up if I help them...it's just not cool to think that way, you know... so, it's ethical, yeah, definitely. (Female, junior premedical student)

This student describes a decision that many premedical students need to make – how does one balance the benefit of working through complicated material in a group without compromising one's own competitive edge?

Student narratives about the efforts to solve the competition/collaboration dilemma highlight the characteristics described above: achievement, perseverance, and individuality. This student, for example, highlights perseverance when she explains that as long as she worked hard and understood the material herself, it did not matter whether she gained or lost a competitive edge:

I just try to remember that if I'm prepared for it, that's all that matters, like wherever the curve is, if I'm prepared, then I'm going to do well, and if I help other people do it well, it doesn't affect how well I'm gonna do. (Female, junior premedical student)

By comparison, this narrative shows how an emphasis on achievement can help balance between competition and collaboration:

Yeah, I feel like within my lab group we were all working together obviously. I always kind of felt like it was like we were cooperating with each other to compete against the other groups I guess. (Female, junior former premedical student)

Here we see that an achievement-orientation does not preclude cooperation. Indeed, cooperation is used as a strategy to compete with other premedical student groups and achieve one's goals.

An achievement-orientation was also emphasized when premedical students spoke about the time it would take to help their peers, and the costs and benefits of such time spent. For example:

It'll be someone completely random asking me this super detailed question and I'll be like, "I don't really know you that well, this is going to take a lot of time to answer this—do I want to tell you?" (Female, sophomore premedical student)

This student describes a calculus focused on the time required to help someone else, and the possible costs of expending time on another student to the time available for her own studying and, by implication, to her performance. Whether one helps another student is determined by how much such an action may detract from one's own achievements. When asked why students might not help each other, the student quoted above said:

People get very caught up in that checklist again...and it's like, "Oh, I can't help other people, like, add to their checklist, because then what about my checklist?"

For this student, a focus on achievement helps explain whether or not to help other premedical students – does furthering another person's checklist interfere with one's own checklist? Rather than thinking of the question of helping others as irrelevant due to the hard work one has put into studying, the decision to cooperate with or compete against one's fellow peers is understood as a tradeoff in accomplishments and time spent.

However, students most often highlighted their individual personality or passion when explaining how they navigated the competitive/cooperative environment. For example, this student downplays competition by referring to her interests and innate ability, holding her outside of the compete-or-cooperate dilemma:

I don't feel it as much 'cause I like really like my classes and don't find them that challenging so like, I don't have a huge problem with it, but I see how it's like really bad for other people (Female, junior premedical student)

When asked to comment on the stresses associated with competition from other students, she agrees that it may be “really bad” for others, but that she, individually, didn't have a “huge problem” with it because of her interest in the coursework.

Students also referred to aspects of their personality explain their *perception* of competition among peers:

Sometimes I've felt like there's a little bit of competition there, but I think that just may be me perceiving it—uh, incorrectly, or something. Maybe someone isn't as friendly as I am, because I know I'm, like, a really outgoing and friendly person, not everyone is like that. (Female, sophomore premedical student)

This student suggests that her perception of competition may be the result of her “friendly” personality, a matter of her mistaking less friendly colleagues for competitive peers.

## DISCUSSION AND CONCLUSIONS

Our study fills a gap in the medical socialization literature by examining how premedical students think about and understand the experience of preparing for admission into medical school. We argue that premedical students make a wide variety of decisions, most of which are tinged with uncertainty, as they navigate the premedical years. These decisions range from the tangible – decisions about how to manage a long list of academically rigorous science classes or how to allocate time between academics and extracurricular activities – to the abstract – decisions regarding their relationships with their peers. In explaining these decisions, students emphasize an orientation towards achievement, perseverance in spite of numerous obstacles, and individual passion in the face of institutional constraints.

It is important to re-emphasize that while the three qualities highlighted in the narratives are distinct, they are not mutually exclusive. A student may have an achievement-oriented narrative about coursework, for example, and but adopt a persevering attitude about extracurricular activities. Additionally, these narratives do not dictate specific outcomes of premedical students. For example, getting a high score on the MCAT could be understood as an ambition fulfilled, as the result of hard work, or as a product of genuine interest in the academic subject. Rather than distinct identities, we have identified characteristics that

premedical students themselves understand to be important qualities for being a successful premedical student, and eventually a successful medical student and physician.

We are not arguing that medical schools should be admitting more students who aim to persevere, or fewer students who are individualists. Rather, we note that characteristics demonstrated during the premedical years will likely reverberate throughout medical school and residency, influencing how physicians-in-training think about and explain their decisions as students (and eventually as practitioners). For example, physicians-in-training who understand their actions to be the product of individual passion may not see the benefit of working in teams; those who persist despite the odds may not heed advice against going into a more competitive specialty. Recognition that lessons learned in the premedical years continue into the remaining years of medical training can be found in the adoption of a pass/fail grading systems in the pre-clinical years at several medical schools, an effort to dial down competition and generate more collaborative opportunities. Moreover, as students continue to not only develop, but also demonstrate to their colleagues and peers, the character deemed appropriate for physicians, the qualities of achievement, perseverance and individualism may persist into narratives surrounding decisions made in medical school and residency. It is important to recognize that these characteristics are cultivated long before entrance into medical school and can have potential influence on how physicians-in-training think about or explain their decisions in the future.

In response to widely publicized calls for change, medical schools throughout the U.S. have undertaken major curricular reform. Medical educators have also begun to reconsider the coursework required during the premedical years and the subjects emphasized in the MCAT. These changes are necessary if medical education is to keep pace with advances in the biological and social sciences, but they are, ultimately, insufficient. As our findings suggest, these modifications will do little to change the uncertain atmosphere and the tension between cooperation and competition faced by premedical students. Reform efforts directed at the formal curriculum serve only to change the *number* of requirements for medical school, not the qualities perceived to be valuable for success in the practice of medicine. If the goal of premedical reform is to select for humanistic, ethical, and compassionate doctors, it is not enough to alter formal curricular requirements. Efforts to reform the premedical curriculum need to also take into account the informal culture created in the competitive/collaborative environment of the premedical years (Hafferty, 1998).

While we present novel information about the premedical years, findings should be interpreted with a few limitations in mind. First, though word of mouth and varied location of recruitment ensures that we sampled widely from our population of interest, those who agreed to be interviewed could be a self-selected group of individuals with particularly different experiences. Additionally, our data collection took place at one university. Thus, our portrait of the premedical years may be particular to the institution from which we sampled, or particular to the select group of participants that chose to be interviewed. Generalizability notwithstanding, our methods do allow us to develop a particularly rich description of the American premedical years. Future work on the premedical years should move beyond the accounts of students to the use of participant observation, observing premedical classes and the study habits and study locales of premedical students. Such a



design would allow a researcher to observe how student understandings and narratives map onto actual context and behavior, giving us fuller understanding of the premedical years. It would also be ideal to follow cohorts of premedical students beyond the premedical years, observing how these narratives evolve as students graduate and enter medical school.

Our study is among the first to describe how premedical students understand the premedical experience, showing that certain valued characteristics are emphasized in student narratives of the premedical years. A thorough understanding of how physicians acquire their education – both technical and moral – requires systematic study of the premedical years. To more fully understand the medical socialization process, we need to continue to focus not only on the training that can produce the most competent physicians, but also on the processes that shape a physician's moral character. Because these processes include the premedical years, it is important that we understand how this crucial stage affects the doctors of the future.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## REFERENCES

- [May 1, 2014] 2013 Medical School Application Statistics. 2013. from <http://careercenter.umich.edu/article/med/2013-medical-school-application-statistics>
- Anspach RR. Notes on the sociology of medical discourse: The language of case presentation. *Journal of Health and Social Behavior*. 1988; 29:357–375. [PubMed: 3253326]
- Anderson ND. The MCAT Malady. *The New England Journal of Medicine*. 1984; 310:396–398. [PubMed: 6690979]
- Barr DA, Gonzalez ME, Wanat SF. The leaky pipeline: Factors associated with early decline in interest in premedical studies among underrepresented minority undergraduate students. *Academic Medicine*. 2008; 83:503–511. [PubMed: 18448909]
- Barr DA, Matsui J, Wanat SF, Gonzalez ME. Chemistry courses as the turning point for premedical students. *Advances in Health Science Education*. 2010; 15:45–54.
- Becker, HS.; Geer, B.; Hughes, EC.; Strauss, AL. *Boys in white: Student culture in medical school*. The University of Chicago Press; Chicago, IL: 1961.
- Bosk, CL. *Forgive and remember: Managing medical failure*. 2nd ed. The University of Chicago Press; Chicago, IL: 2003.
- Brieger GH. The plight of premedical education: Myths and misperceptions--part II: Science “versus” the liberal arts. *Academic Medicine*. 1999; 74:1217–1221. [PubMed: 10587684]
- Caplan RM, Kreiter C, Albanese M. Preclinical science course “preludes” taken by premedical students: Do they provide a competitive advantage? *Academic Medicine*. 1996; 71:920–922. [PubMed: 9125972]
- Conrad P. The myth of the cut-throats among premedical students: On the role of stereotypes in justifying failure and success. *Journal of Health and Social Behavior*. 1986; 27:150–160. [PubMed: 3734381]

- Coombs RH, Paulson MJ. Is premedical education dehumanizing?: A literature review. *Journal of Medical Humanities*. 1990; 11:13–22.
- Creditor UK, Creditor MC. Curriculum choices of premedical students. *Journal of Medical Education*. 1982; 57:436–441. [PubMed: 7077632]
- Dienstag JL. Relevance and rigor in premedical education. *The New England Journal of Medicine*. 2008; 359:221–224. [PubMed: 18635426]
- Dienstag JL. The medical college admission test — toward a new balance. *New England Journal of Medicine*. 2011; 365:1955–1957. [PubMed: 22111717]
- Dornbush RL, Singer P, Brownstein EJ, Richman S. Academic qualifications and nonacademic characteristics of science and nonscience majors applying to medical school. *Journal of Medical Education*. 1987; 62:850–852. [PubMed: 3656386]
- Emanuel EJ. Changing premed requirements and the medical curriculum. *The Journal of the American Medical Association*. 2006; 296:1128–1131.
- Flexner, A. *Medical education in the United States and Canada* bulletin number four (The Flexner Report). The Carnegie Foundation for the Advancement of Teaching; New York, NY: 1910.
- Fishbein RH. Scholarship, humanism, and the young physician. *Academic Medicine*. 1999; 74:646–651. [PubMed: 10386090]
- Fox, RC. *Experiment perilous: Physicians and patients facing the unknown*. Free Press; Glencoe, IL.: 1959.
- Gross JP, Mommaerts CD, Earl D, De Vries RG. After a century of criticizing premedical education, are we missing the point? *Academic Medicine*. 2008; 83:516–520. [PubMed: 18448911]
- Gunderman RB, Kanter SL. Perspective: “How to fix the premedical curriculum” revisited. *Academic Medicine*. 2008; 83:1158–1161. [PubMed: 19202486]
- Hackman JD, Low-Beer JR, Wugmeister S, Wilhelm RC, Rosenbaum JE. The premed stereotype. *Journal of Medical Education*. 1979; 54:308–313. [PubMed: 430533]
- Hafferty FW. Beyond curriculum reform: Confronting medicine's hidden curriculum. *Academic Medicine*. 1998; 73:403–407. [PubMed: 9580717]
- Hafferty, FW. Reconfiguring the sociology of medical education: Emerging topics and pressing issues.. In: Bird, CE.; Conrad, P.; Fremont, AM., editors. *Handbook of Medical Sociology*. 5th Ed.. Prentice Hall; Upper Saddle River, New Jersey: 2000. p. 238-257.
- Kansagra, S.; Duke Medical School Class of 2006. *Vault Insider Guide to Medical School Admissions: Get the inside scoop on medical school admissions*. Vault, Inc.; New York, New York: 2006.
- Kaplan RM, Satterfield JM, Kington RS. Building a better physician — The case for the new MCAT. *New England Journal of Medicine*. 2012; 366:1265–1268. [PubMed: 22475589]
- Larson LM, Bonitz VS, Werbel JD, Wu TF, Mills LR. Distinguishing beginning premed students from their science peers: The salience of proximal variables. *Journal of Career Assessment*. 2012; 20:208–220.
- Lin KY, Parnami S, Fuhrel-Forbis A, Anspach RR, Crawford B, De Vries RG. The undergraduate premedical experience in the United States: A critical review. *International Journal of Medical Education*. 2013; 4:26–37. [PubMed: 23951400]
- Ludmerer, KM. *Time to heal : American medical education from the turn of the century to the era of managed care*. Oxford University Press; Oxford: 1999.
- Maguire, MA. *Premed: Who makes it and why*. Teachers College Press; New York, New York: 1999.
- McGaghie WC. Assessing readiness for medical education: Evolution of the medical college admission test. *The Journal of the American Medical Association*. 2002; 288:1085–1090.
- Merton, RK.; Reader, GG.; Kendall, PL. *The student-physician: Introductory studies in the sociology of medical education* [Hardcover]. Harvard University Press; Boston: 1957.
- Mitchell KJ. Traditional predictors of performance in medical school. *Academic Medicine*. 1990; 65:149–158. [PubMed: 2407256]
- Mizrahi T. Managing medical mistakes: Ideology, insularity and accountability among internists-in-training. *Social Science and Medicine*. 1984; 19:135–146. [PubMed: 6474229]
- Parsons, T. *The social system*. The Free Press; Glencoe, IL: 1951.

- Powers RD. The MCAT revisited. *New England Journal of Medicine*. 1984; 310:398–401. [PubMed: 6690980]
- Robertson, I. *Sociology*. 2nd ed. Worth Publishers; New York, NY: 1981.
- Sade RM, Fleming GA, Ross GR. A survey on the 'premedical syndrome'. *Journal of Medical Education*. 1984; 59:386–391. [PubMed: 6716428]
- Stern DT, Papadakis M. The developing physician — Becoming a professional. *New England Journal of Medicine*. 2006; 355:1794–1799. [PubMed: 17065641]
- Strauss, A.; Corbin, J. *Basics of qualitative research: Grounded theory procedures and techniques*. Sage; Newbury Park, CA: 1990.
- Thomas L. Notes of a biology watcher: How to fix the premedical curriculum. *The New England Journal of Medicine*. 1978; 298:1180–1181. [PubMed: 651947]
- Zussman, R. *Intensive care: Medical ethics and the medical profession*. The University of Chicago Press; Chicago, IL: 1992.

### Research Highlights

- Studying the premedical years is important for studies of medical socialization
- Premedical narratives emphasize achievement, perseverance, and individuality
- Premedical students face dilemma to work with or compete against other students
- Student narratives about this dilemma focus on the three different qualities
- Findings have implications for the future of premedical education reform