

BMJ Open Motivation of Dutch high school students from various backgrounds for applying to study medicine: a qualitative study

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ABSTRACT

Objective To explore high school students' motivation for applying to study medicine and the factors that influence this. To find explanations for under-representation of minority students in medical education, descriptions of motivation of students with different background characteristics were compared.

Design Qualitative phenomenological study using semistructured one-on-one interviews.

Setting One predominantly white and one mixed high school in a large multicultural city in the Netherlands. The study was conducted in March–December 2015.

Participants Twenty-four high school students, purposively sampled for demographic characteristics.

Methods The analysis consisted of the coding of data using a template based on the motivation types (autonomous and controlled motivation) described by self-determination theory and open coding for factors that influence motivation.

Results The main reasons for pursuing a medical career pertained to autonomous motivation (interest in science and helping people), but controlled motivation (eg, parental pressure, prestige) was also mentioned. Experiences with healthcare and patients positively influenced students' autonomous motivation and served as a reality check for students' expectations. Having to go through a selection process was an important demotivating factor, but did not prevent most students from applying. Having medical professionals in their network also sparked students' interest, while facilitating easier access to healthcare experiences.

Conclusions The findings showed a complex interplay between healthcare experiences, growing up in a medical family, selection processes and motivation. Healthcare experiences, often one of the selection criteria, help students to form autonomous motivation for studying medicine. However, such experiences as well as support in the selection process seem unequally accessible to students. As a result, under-represented students' motivation decreases. Medical schools should be aware of this and could create opportunities to acquire healthcare experiences. High schools could incorporate internships as part of their study counselling programmes and offer tailor-made guidance to each individual student.

INTRODUCTION

Concerns exist that the medical profession insufficiently reflects the society it serves.¹

Strengths and limitations of this study

- This study is one of the few that investigates motivation for studying medicine among those who are still in the process of making a study choice.
- The qualitative design and the use of self-determination theory as a theoretical framework yielded a rich data collection and allowed for exploration of the complex mechanism underlying motivation for the medical study, including the role of selection processes.
- Having members with various backgrounds in the research team strengthened the validity and reliability of the data analysis.
- Because the current study included students from urban high schools only, factors which are specific for students from more rural areas may not have been identified.
- Parents were not included in this study; therefore, their influence on students' motivation for studying medicine remains to be investigated.

Debates increasingly focus on the disadvantage of under-represented socio-demographic groups due to the use of selection processes to decide who gets admitted to medical programmes. Under-representation of ethnic minority students,^{2 3} students without a medical family background,^{4–6} students who are the first in their family to go to a university,^{5 7 8} lower socioeconomic status (SES) students^{3 5 9} and males^{9 10} in the medical student population can, to some extent, be ascribed to biased selection processes.^{11–24} However, under-representation is not always due to a bias in selection processes^{4 6 14 16 21 25–27} and widening-access efforts targeting selection bias have been till date only moderately successful in resolving disparities.^{15 21 22 24 28} This stresses the need for other measures. A self-selection effect, which refers to students deciding whether to apply based on the information they have, for example, about the selection process,^{16 29} has been suggested

as another possible reason for under-representation. Indeed, certain groups of students are under-represented in the medical applicant pool, such as males,^{9 21} lower SES applicants,^{9 11 23} applicants from lower educational backgrounds¹¹ and ethnic minority students.^{9 30} Various reasons have been suggested for self-selection by under-represented groups. These entail lower awareness about selection processes as a result of attending a less well-informed school,^{2 31} a lack of parental and peer support owing to negative views on academic excellence^{2 32} and a lack of access to the preparatory activities for selection processes (such as healthcare experiences).^{2 31} As a result, students' motivation for studying medicine is likely to be negatively affected. The current study is an attempt to shed light on how high school students, that is, the medical school applicant pool, decide whether to apply to study medicine and whether the presence of selection processes influences their motivation. The findings may provide clues to whether the under-representation of certain students is a result of students refraining from applying because of reduced motivation induced by the presence of selection processes.

In line with Deci and Ryan's self-determination theory (SDT),^{33 34} students' motivation for applying to medical school can be based on genuine interest (intrinsic motivation) and positive valuation of the medical profession (identified regulation), which together are defined as autonomous motivation. The choice can also be driven by internal pressures, such as feelings of guilt (introjected regulation), or external pressures or rewards (external regulation), which together are defined as controlled motivation. Research has indicated that autonomous motivation is the most desirable type of motivation and important for students' achievement outcomes and positive well-being of students.³⁵⁻⁴⁰ Moreover, students with autonomous motivation are more likely to deliver autonomy-supportive and better patient care.⁴¹ The fulfilment of three basic psychological needs—autonomy (making one's own choices), competence (feeling capable of doing something) and relatedness (sense of belonging to others)—fosters autonomous motivation.^{34 40}

The motivation for pursuing a medical career is well investigated. Students generally have multiple reasons for pursuing a medical career. The reasons are mainly altruistic (eg, helping patients, serving the society),^{7 8 10 42-55} but also related to interest in science,^{8 10 42 44 45 50 52 54} vocation,^{47 48} career opportunities,^{42 44 45 47 48 52 55} high income,^{78 42 45 47-50 55} prestige^{78 43-45 47 48 55} and family expectations or pressure.^{43 49 53 56} Factors influencing the choice to study medicine are work experience with patients,⁴² having a medical family background,^{45 47 48} experiences with illness in the close environment,^{45 48 49 52} previous school achievements,^{47 49} receiving support,^{49 50} positive role models^{49 50} and TV.⁵⁰ Demotivating factors have also been investigated and are related to financial concerns,^{2 10 30 54 57} characteristics of the profession (eg, lack of independence, work-life balance, unemployment),^{2 30 46 49 54 57 58} discouragement by others,^{2 30 49 57} bad

publicity,⁴⁶ study characteristics (eg, length of study),^{2 10 30 58} the use of selection processes,^{2 10 30 57} interest in other areas of study/careers,^{2 30} a lack of support^{2 49} and a lack of self-confidence.⁴⁹ How these factors influence the different types of motivation and one another is unknown. Knowledge about the mechanisms and the interplay between factors can help study counsellors to stimulate a choice based on autonomous motivation. This can enhance student performance and well-being.

To understand the complex mechanisms, students' background characteristics, such as gender, SES and ethnic and parental background, need to be taken into account as well. For example, female^{7 8 45 47 48 59} and ethnic majority students³² report more altruistic motives, while male^{45 47 48 59} and low SES students³² report more extrinsic motives. This disparity has consequences for study choice counselling and for assessment of motivation during selection processes.

It has been argued that for purposes of widening access, interventions should target under-represented groups to encourage them to apply to medical school.⁹ To be able to do this effectively, there needs to be a greater understanding about the factors that encourage or discourage students to apply to medical school.⁴⁶ Most studies addressing the motivation for studying medicine have gathered information retrospectively from medical students^{5 8 42-45 49 51 52 56} or even physicians.⁴⁷ Only few investigated this among high school students^{2 10 32 46 50 55} or undergraduate students^{55 57} during their study choice or application process. Moreover, a qualitative study can help in understanding the complex interplay between the factors that are involved. We had the opportunity to study this in a setting where admission is changing from lottery-based to selection-based. In the lottery, all applicants had a chance to be admitted and the chances of admission increased parallel to applicants' pre-university grade point average, while in selection only the top-ranked applicants based on academic and non-academic selection criteria are admitted. This policy change has profound consequences for those who are interested in studying medicine, which makes it an interesting context for research.

The following research questions guided our study:

1. What types of motivation do high school students have for applying to medical school and how can these motivations be classified according to SDT?
2. Which factors play a role in reaching these different types of motivation? and
3. Do factors playing a role differ for students with different background characteristics?

METHODS

Because the mechanisms and the interplay between the factors that are involved are unknown, we chose a qualitative design. We drew upon a constructivist point of view, in which knowledge is considered socially constructed by the people involved in the research process and our

reality is viewed as constructed by our social and individual contexts.⁶⁰ We took a phenomenological approach, and the aim was to understand the complex world from the point of view of those who live it, that is, the subjective experiences of high school students during their study choice process.^{60 61} We conducted interviews because interaction between the researcher and the researched is crucial to come to an understanding of meanings.⁶² Multiple perspectives and perceptions of a variety of people were sought to enable better interpretations of the meanings of the phenomenon under study. We used the COnsolidated criteria for REporting Qualitative research (COREQ) checklist for reporting qualitative research for the assurance of good quality (see online supplementary file 1).⁶³

Setting

In the Netherlands, high school students graduating from 6-year pre-university education with science subjects are eligible for entry into medical programmes. Students choose these subjects in the third grade. At the time this study was conducted, March–December 2015, the admissions system was in the process of changing from lottery-based and selection-based admissions to only selection-based admissions from 2017. The lottery procedure was weighted for students' pre-university grade point average, and students' likelihood of admission increased with a higher grade point average. In addition, applicants could participate in a selection process by applying halfway through their final year; for the lottery, students could apply until nearly the end of the final year. The proportion of the students that medical schools were allowed to admit through selection processes increased from 50% to 100% through the years. Annually, nearly 2800 students can enrol in medical programmes in the Netherlands.

Participants

We interviewed a purposive sample of high school students and study counsellors from two schools in Amsterdam (see table 1), as we were interested in a variety of viewpoints and experiences. One school is located in the part of the city with the highest average disposable income per household and predominantly white (school A), while the other school is located in a more ethnically and culturally diverse part of the city, where the average disposable income per household is substantially lower (<http://www.ois.amsterdam.nl/feiten-en-cijfers/stadsdelen>) (school B). Because students usually go to a school close to their homes, we felt this approach sufficed in yielding the desired diverse study sample in terms of students' background characteristics. To obtain the views and experiences of students who are in different phases of their study choice process, we interviewed third-year to sixth-year high school students who (once) were interested in studying medicine.

Procedure

Directors of two high schools were approached and invited to participate in this research. First, in

Table 1 High school characteristics	
	School B
Type of education offered	Higher general education and pre-university education
Geographic location	Ethnically and culturally diverse part of the city where the average disposable income per household is substantially lower
Student population	Approximately 750 students Mostly from ethnic minority (>50 nationalities are represented: mostly Moroccan, Turkish, Surinamese and a number of ethnic majority students)
Study choice counselling	Starts in third year, when students have to choose their subjects Digital study choice programme Classroom teaching about study choice Information meetings for students and parents Students are stimulated to participate in student-for-a-day programmes Study counsellors and mentors actively provide information One on one study counselling for students who haven't made their choice yet Monitoring of study choice process Mentorship programme especially for ambitious first in family students
Nature of study choice activities	Information meetings are mandatory
	Study choice activities are not mandatory

semistructured interviews with the study counsellors of the high schools that were involved in the guidance of the students, we gathered information about which elements they identified in students' study choice processes (eg, parental influence), which yielded topics to address in the subsequent interviews with students. These interviews also served to gather information about the composition of the schools' student populations and the way in which study choice counselling was organised. The study counsellors purposively recruited students they knew considered or had considered studying medicine for one-time participation in the study. All students participated and none dropped out of the study. The one-on-one interviews were conducted by AW at the two high schools and lasted between 31 and 52 min. At the beginning of the interview, AW introduced herself and explained the purpose of the study. At the end of the interview, students were asked to draw a graph showing how their motivation had increased and/or decreased over time from the moment they considered medicine as a possible study choice and to write down when and why changes occurred. This graph served as a summary and stimulated the recollection of further important aspects. Interviews were semistructured and were altered based on arising topics in earlier interviews in an iterative process and adjusted to the type of participant (study counsellor or student) and to the expected study choice phase of students based on the grade they were in. See [box](#) for the interview guide used in the interviews with the students. Interviews were audiotaped and transcribed verbatim. All transcriptions were checked for accuracy. A summary of each interview was presented to the respective interviewee as a form of member checking. Students either approved their summary or provided no response. When sufficiency (to answer the research questions) and data saturation were reached, no more interviews were conducted.

Data analysis

AW read and reread and familiarised herself with the data. AW coded all interviews using ATLAS.ti. The first interview was coded together with a second researcher, UI. Further in the coding process, another four interviews were independently coded by AW and UI. Whenever there were differences in coding, these were discussed until consensus was reached. Because there were very few differences and they mainly concerned the phrasing of new codes, AW coded the remaining interviews. We analysed all data using SDT as a theoretical framework. The different motivation types (intrinsic motivation, identified regulation, introjected regulation and external regulation) formed the basis for a coding template for students' reasons to pursue a medical career.⁶⁴ The quotations were first identified as expressions of a particular motivation type (eg, intrinsic motivation) and further categorised (eg, scientific interest). Open coding was conducted to identify the factors that influenced students' motivation in a positive or negative manner.⁶⁵

Box Interview guide used in the interviews with the students

Q1: Study choice process

- ▶ Where are you in your study choice process?
- ▶ What are the considerations you made/make? Which doubts have you had/do you have? Why?
- ▶ What kind of information do you gather to make a study choice? How did you acquire this information?
- ▶ Which source of information is/was most important to you?

From the moment you considered medicine as a possible study choice:

Q2.1: Reasons for choosing medicine

- ▶ What started your desire to study medicine?
- ▶ What other reasons inspired you to study medicine?
- ▶ Have these reasons, or their importance, changed? Why?
- ▶ Which other factors have influenced your choice? Examples: student (characteristics, illness), home situation (parents, illness in family), school (guidance, peers), friends, culture, university (information days, selection)

- ▶ What is the most important reason for you to study medicine?

Q2.2: Possible reasons for refraining from choosing the medical study

- ▶ What would be reasons for you to move away from your choice for medical study?

Q3: Applying for medical study (selection)

- ▶ What do you know about selection? Have you seen the criteria? (How) did/do you prepare? What are your expectations of the procedure? How do you estimate your chances of success? Do the criteria affect your desire to study medicine? Or do they have any other effects?

Q4: Facilitators/barriers during study choice process

- ▶ Which factors made/make it difficult to make a study choice?
- ▶ Which factors decrease(d) your motivation for the medical study?
- ▶ Which factors made/make it easier to make a study choice?
- ▶ Which factors increase(d) your motivation for the medical study?

Q5: Motivation graph

- ▶ Can you draw a graph which represents your motivation for studying medicine from the moment you considered medicine as a possible study choice?

Closing question

- ▶ What has not been discussed but is deemed relevant by the student?

Factors identified in quotations were first categorised as factors of influence, next (if possible) as positively or negatively influencing factors, and finally according to the topic (eg, selection processes) and subcategory (eg, CV building). Quotations that contained expressions of students' basic psychological needs (ie, autonomy, competence and relatedness) were also coded. The findings were discussed and agreed upon by the full research team. Reflexivity is a critical aspect in the analytical process. We acknowledge that while using SDT as a theoretical framework for our analysis allows for a deeper understanding of students' motivation for studying medicine, this particular focus may also cause us to overlook other relevant aspects. We tried to keep this to a minimum by keeping notes, 'memos', of findings outside our theoretical framework that seemed relevant for understanding the mechanisms.

Table 2 Distribution of participating students by high school, gender and grade

Grade	Gender		School	
	Female	Male	School A	School B
Student: end of third/beginning of fourth	5	1	4	2
Student: end of fourth/beginning of fifth	3	1	2	2
Student: end of fifth/beginning of sixth	3	4	3	4
Student: end of sixth	7	0	3	4
Student: total	18	6	12	12
Study counsellor	2	1	2	1

Ethical considerations

Participation was voluntary. We provided participants with information about the purpose of the study and the handling of personal data, after which they signed an informed consent form. The audio-recordings and interview transcripts did not contain identifying information about the participants, have been stored with anonymous descriptions and are accessible only to the principal researcher. Students received a €15 gift card for their participation. This study has been approved by the Netherlands Association for Medical Education Ethical Review Board (NVMO-ERB), dossier number 408.

RESULTS

Three study counsellors and 24 students participated in this study. Tables 2 and 3 provide overviews of the distribution of participants, and the identified categories and subcategories, respectively.

Motivation for applying to medical school

Both subtypes of autonomous motivation were addressed to a great extent by the students. Intrinsic motivation was seen in a (scientific) interest in medicine and the working of the human body and altruistic reasons (the desire to help patients). The desire to help people was more prominent among females than among males. Students stressed the importance of choosing an area of study they find interesting.

[The most important reason is] that I am interested in the human body, in combination with working with people. [...] This has actually always been most important. I believe that when you choose a study, interest, wanting to learn, is most important. You can say, then this, then that, then you make a lot of money or something, but you have to persevere in your studies, which can only be done when you are interested. (S13, female, school A)

With regard to identified regulation, students expressed that they were interested in studying medicine because they value and acknowledge the importance of medical study and the medical profession.

The fact that my sister was in the hospital played a big role. It was the doctors who cured her. It instigates admiration and then you want to do it yourself. (S19, female, school B)

Some expressions of external regulations and some expressions of introjected regulations could also be identified. External regulations related to obtaining a degree, job perspectives, parental pressure and expectations, prestige, high salary and working conditions (atmosphere, action and variety).

But on the other hand, I think, it's my own life. But it is easier to conform to your parents' wishes, to get rid of the nagging. And also, it's a little like, it doesn't feel right to do something your parents disapprove of. (S7, female, school A)

Actually, what everyone secretly thinks, prestige. Being a doctor is highly regarded. I think that's one of the main reasons for the recent popularity of the study. Many people want prestige in society. I am not going to be a hypocrite and say, not me. (S16, male, school A)

Introjected regulations seemed related to maintaining self-worth and one's image. One of the reasons was that students felt they had to stick to their decision to study medicine, as that is what they had always wanted. Another reason is that students had a tendency to comply with the views others had of them, or prove themselves to others, which was mainly seen among female students.

My friends know me well, you know. And they are just being honest, like, I don't really see this for you. [...] You know, they ... see, like you're a bit lazy, things that really matter for choosing a study. (S3, female, school B)

In the case of the following student, this was related to having an ethnic minority background:

Because I actually really liked it, but I thought, if I am really going to do it, it will be like ... Maybe people will see that it doesn't matter if you are a girl of ethnic minority origin. (S3, female, school B)

Table 3 Overview of identified categories and subcategories illustrated with sample quotations

Category	Subcategory	Code	Sample quotation
<i>Motivation</i>			
Autonomous motivation	Intrinsic motivation	Scientific interest	[The most important reason is] that I am interested in the human body. (S13)
	Identified regulation	Desire to help people	I have always wanted to help people, and this is a form of helping people by means of health care and curing people, or improving quality of life. (S5)
Controlled motivation	External regulation	Valuing and acknowledging importance of medical study and profession	You save lives. That, to me, is a very important job. (S8)
		Obtaining a degree	No, I really want to obtain a degree. In sports, you can be a champion one day, and the next day you may not be able to do anything for six months. So I really want a degree. (S10)
	Job perspectives	To me it is important to have job opportunities after 12 years of studying. Doctors are always needed, so that is an advantage of studying medicine. (S1)	
	Parental pressure and expectations	But it is easier to conform to your parents' wishes, to get rid of the nagging. And also, it's a little like, it doesn't feel right to do something your parents disapprove of. (S7)	
	Prestige	Actually, what everyone secretly thinks, prestige. Being a doctor is highly regarded. (S16)	
	High salary	Salary. That is important, besides helping people of course. I want to have a good salary. That is something that plays a role too. (S20)	
	Working conditions	Yes, it never seems boring. Not like an office job. (S9)	
Introjected regulation	Maintaining self-worth or image	My mother is a doctor, and so was my grandmother. That's why I always said: not me, that will be boring at parties and stuff. (S7)	
	<i>Factors influencing motivation for studying medicine</i>		
Getting acquainted with the medical profession	As (family of) a patient	Have a role model (in the family)	Three years ago I had a severe infection in my head. [...] That experience, like, excited me. I saw the whole environment. [...] And I saw everything happening. I thought it was really cool, what everyone was doing. I wanted that too. (S1)
			I became more enthusiastic after those internships. I got a good impression, too. (S14)
	Internships	TV programmes	Yes, in primary school we watched TV programmes. [...] Sometimes about history, sometimes about nature, about animals. Sometimes it was about human beings, that they were ill and things like that. I think that made me realise what I liked and didn't like. (S22)
	<i>Selection process</i>		
Lack of knowledge about selection	Difficulty in gaining admission	Feeling incompetent	Medicine was so demotivating, because I still don't understand these selection processes and the selecting of students. (S18)
			Yes, the chances of being admitted [have been the main reason I chose pharmacy over medicine]. My chances of getting into the study. (S1)
			That, to me, was so demotivating, because it's like 'if you get really good grades, you will definitely get admitted'. And I am not a very good student. I am not very good at chemistry. (S18)
Building CV	High school subjects		On the one hand, I think it is a good thing, for the future patients. But on the other hand, it is also demotivating for the less ... for students who are very motivated, but who didn't really have the opportunity to build a CV. (S1)
	During the biology classes, I noticed that I found it all very interesting, especially the human body, and that I found it interesting to learn how it works. Then I figured that the field of study that addresses the human body most is the medical field. (S11)		

Continued

Table 3 Continued

Category	Subcategory	Code	Sample quotation
Study choice-related activities	Open days		When I attended the open day, they were talking about the study of medicine. It was so tedious. And also, they didn't present it in an animated way, it was so boring. (S21)
	Thinking about study choice		[Then my motivation increased] because I got to thinking about my study choice and about my future. (S2)
	Growing interest in other courses		I'm not sure if I still want to study medicine, because other subjects appeal to me more at the moment. I haven't decided yet. (S22)
Study and job characteristics	Hierarchical culture		I also have my doubts about the profession because of the hierarchy. The culture can be tough at times. I think, not very friendly. (S7)
	Job perspectives		Many people, medical doctors or specialists, are without a job for a year or a half, or sometimes two years. [...] When I graduate, after 12 years of training to become a medical specialist, I don't want to wait another year. (S17)
	Responsibility for patients		Another reason for refraining from studying medicine can be the prospect of being the one who has to make the decisions in life and death situations. (S16)
	Working conditions		Having to be available at all times as a paediatrician, that is also an issue. For example, you never know what will happen when you're asleep. (S1)
	Difficulty and length of medical programme		Sometimes I think 'it takes too long; I will be already 30 when I become a doctor'. (S2)
	Clash with religious beliefs		I would love to work in a hospital, but there are all kinds of [clothing] regulations, and I am not sure whether that suits me. I am ... I wear a headscarf, and well, I comply with the dress code of the Islam, and I am not sure whether that goes together. (S1)
<i>Basic psychological needs</i>			
Autonomy	Need for making own choice		I didn't want to do something because of my parents. I wanted something for myself. If I do something to prove myself to someone else, it won't be fun. (S18)
	Feeling competent		Then I really thought, okay, this is me. That sounds really stupid. This, I just know, sounds very stupid and really very arrogant, but I think I will be a good doctor. I think I just have the capability to do all that. But yes, the admissions criteria did not scare me because I knew I met them. (S14)
Competence	Feeling incompetent		I think my chances are not very good because I'm not a great student. (S13)
	Having a medical doctor in the family		Nice people in the profession, that's the impression I get. [...] I like all my mother's colleagues, very much. So ... they all have a very good sense of humour. They all make funny jokes, for example about gastroenterology being the diarrhoea-unit. That kind of stuff. So, that is a lot of fun. (S8)
Relatedness			

Main factors influencing students' motivation for studying medicine

Getting acquainted with the medical profession

The most prominent factor that influenced students' autonomous motivation and strength of motivation was experiencing or gaining knowledge about the medical profession. This was reached when students themselves or relatives had been patients or when students had come into contact with the medical profession due to having medical professionals in the family or other role models, which led them to realise the importance of the medical profession and elicited their interest in medicine.

Well, that thing with my cousin, that made quite an impact. It really made me see how much doctors do. (S9, female, school A)

A general belief was that having a medical doctor as a parent made it easier to gain information about the medical profession, as well as getting access to internships in healthcare. However, while several school A students had a medical doctor parent, none of the school B students did. Internships were considered most valuable for getting acquainted with the medical profession, and gaining such experiences was the main factor that had a positive influence on autonomous motivation for studying medicine. Students experienced how doctors make diagnoses and treat diseases, which often confirmed their interest in medicine.

The internship was so much fun. [...] one woman had a lot of complaints; she had many illnesses, let's put it that way. [...] I had to keep her company. She told me many things about what it's like, so I had to really listen, pay attention, so she can talk to someone and get things off her chest. [...] It was just nice; listening to someone, helping someone; it gave me a good feeling. After that meeting [...] I thought, that was actually nice. Then I thought, I really want to do something to help people. (S18, female, school B)

Getting acquainted with the medical profession through medical professionals and internships also served as a reality check, which reduced their autonomous motivation. Learning about the downsides made some female students realise that their image of the profession was inaccurate and that they had romanticised the aspects they valued and liked about the profession. Students considered whether the information they had gathered about the profession matched their own preferences and perceived capabilities.

Yes, that is partly why I lost interest in medicine. I thought, when you, as a doctor, hear such things, you must be able to cope with not everyone being healthy, and that anything can happen. That makes me wonder, can I handle that?' (S22, female, school B)

For some female students, TV programmes (reality shows and documentaries) also played a role. While reality

shows elicited autonomous motivation, popular TV series, such as *Grey's Anatomy*, made students aware of the 'coolness' of the medical profession.

Yes, in primary school we watched TV programmes. [...] Sometimes about history, sometimes about nature, about animals. Sometimes it was about human beings, that they were ill and things like that. I think that made me realise what I liked and didn't like. (S22, female, school B)

Selection

Overall, many students appeared to have little knowledge about the admissions process. There seemed to be differences between students from the two schools. Students from school B in particular lacked knowledge about the admissions process. This was true even for those in their final year of high school. They were either unaware of the change from the lottery to selection or what selection entailed.

While males mentioned that selection had no effect on their motivation, for a number of females it had a significant impact; one female student even refrained from applying due to the presence of a selection process. Their motivation decreased due to the difficulty in gaining admission to medical programmes and students lost hope of being successful in the selection process because they felt insecure about their competence, particularly compared with other applicants.

Sometimes [my motivation] was higher, sometimes lower. It was always high, but sometimes I thought, I always wanted to help people, and this of course is very much helping people by means of health and by means of curing people, enhancing quality of life. But at some point, at age 12, I knew how difficult it is to become a doctor. Then I thought, I need an alternative. (S5, female, school A)

Building a CV appeared to be the aspect of the selection process with the most demotivating effect on students. There seemed to be differences in the experiences of the students from the two schools with regard to building their CV and their chances of success in the selection process. Some students from school A thought that attending their school would be an advantage in the selection process because the education was perceived to be superior to that of other schools. Moreover, some students from school A reported that they had people in their network who could help them prepare for the selection process because of their experience as a student, medical professional or because they were involved in the selection process at a medical school. In addition, many of those students had easy access to healthcare-related activities for CV-building purposes. One student from school B expressed that she heard that applicants with a foreign last name would be discriminated against.

High school subjects

Studying high school subjects related to medicine, seeing how these relate with practice and finding out how the human body works boosted students' interest and enjoyment.

During the biology classes, I noticed that I found it all very interesting, especially the human body, and that I found it interesting to learn how it works. Then I figured that the field of study that addresses the human body most is the medical field. (S16, male, school A)

Study choice-related activities

Attending open days (especially student-for-a-day programmes) and actively thinking about their career choice generally increased students' strength of motivation. Open days could also have a demotivating effect when the talks were boring. Another common factor that was mentioned as having a negative influence on motivation for studying medicine was a growing interest in other courses.

'When I attended the open day, they were talking about the study of medicine. It was so tedious. And also, they didn't present it in an animated way, it was so boring. If I compare it to pharmaceutical sciences ... That is not really something I aspire to study, but they presented it in a much nicer way. It came across as more interesting than the medical field, while I actually want to study medicine. (S21, female, school B)

Study and job characteristics

Some aspects of medical education and the medical profession made students doubt their study choice, such as the hierarchical culture, job perspectives, responsibility for the life and death of patients, working conditions (eg, working hours, work-life balance) and the difficulty and length of medical programmes. There was one factor that particularly played a role for female students from school B. They expected a clash with their religious beliefs (eg, regarding dress code, practising skills on students of the opposite sex).

Yes, what I hear a lot lately is that the job opportunities after graduation are very limited. That is really something that holds me back a little. Otherwise I would definitely have chosen medicine, I'm sure about that. (S20, male, school B)

I would love to work in a hospital, but there are all kinds of [clothing] regulations, and I am not sure whether that suits me. I am ... I wear a headscarf, and well, I comply with the dress code of the Islam, and I am not sure whether that goes together. (S1, female, school B)

These aspects did not seem to prevent most students from choosing medicine, which was explicitly expressed by students.

Basic psychological needs

Autonomy

Students described how they wanted to feel autonomous in making their career choice. Although they mentioned that parents' and, to a lesser extent, friends' opinions were important, they stressed the need to do what they want. Many students pointed out that they expected it to be difficult to remain satisfied with their professional life when their career choice would be driven by what others want instead of what they want. Students from school A expressed this more firmly than students from school B.

I didn't want to do something because of my parents. I wanted something for myself. If I do something to prove myself to someone else, it won't be fun. (S18, male, school A)

Parental influence was reported by the study counsellors as one of the most important factors influencing students' study choices. Parents seem to stimulate their children to make their own choice, although at the same time strongly conveying their expectations to their children. Parents may have a stronger influence than is perceived by students, and students' need for autonomy may therefore be less satisfied than they perceive it to be.

So far, my father ranked medicine number one, but I don't think this had an influence on me, or that I wanted to study medicine because of him. I'm doubting a little, [...], whether I am influenced by people. (S22, female, school B)

Competence

Female students expressed feelings of (in)competence that were related to the study of medicine, the medical profession and their participation in a selection process, while both male and female students expressed the need to be challenged in their studies.

Then I really thought, okay, this is me. That sounds really stupid. This, I just know, sounds very stupid and really very arrogant, but I think I will be a good doctor. I think I just have the capability to do all that. But yes, the admissions criteria did not scare me because I knew I met them. (S14, female, school A)

I found it a bit scary, the lottery and selection [...]. And I am very smart. I don't want to be arrogant. I am intelligent, but I don't have a pre-university attitude. And yes, my grades are always about 6.5 average. And yes, I thought, this doesn't quite fit ... my attitude and yes ... It was a bit scary; it made me a little insecure. (S3, female, school B)

Feelings of competence increased students' motivation for studying medicine, for example, passing a test in a school subject related to medicine.

Relatedness

Female students from school A had a positive impression of doctors as a result of having family members in the

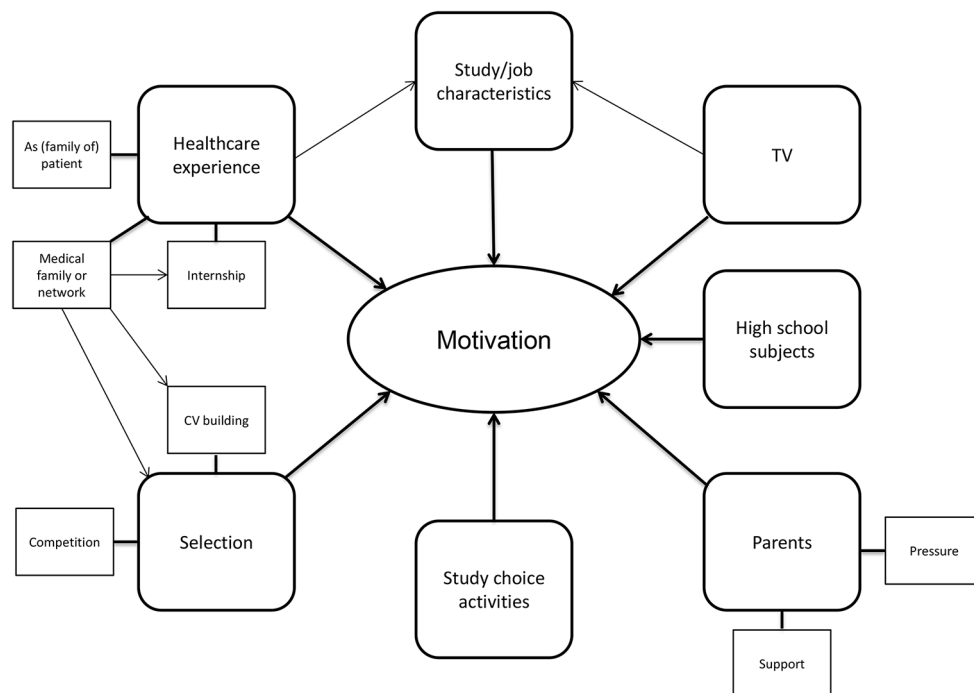


Figure 1 Overview of the mechanisms through which motivation for studying medicine is influenced according to students and the interplay between the factors.

medical profession. This gave some students the desire to belong to that professional group.

Nice people in the profession, that's the impression I get. [...] I like all my mother's colleagues, very much. So ... they all have a very good sense of humour. They all make funny jokes, for example about gastroenterology being the diarrhoea-unit. That kind of stuff. So, that is a lot of fun. (S8, female, school A)

Summary

An overview of the factors that play a role in high school students' motivation for studying medicine is provided in figure 1. We found that students' main motivation was of the autonomous type, such as interest in science, helping others and valuing the medical profession. Controlled motivation concerned parental pressure, prestige and salary. Healthcare experiences, the presence of selection processes and having a parent in the medical field were important factors for students' study choice process and motivation, but social disparities in exposure to medicine exist.

DISCUSSION

Principal findings

Mainly autonomous motivation for studying medicine, that is, the desire to help people and a scientific interest, was reported, but controlled motivation, such as prestige, was also reported. This is in line with previously reported findings. With regard to how the motivation for studying medicine is formed and the role of selection processes in this, there appears to be a complex interplay

between healthcare experiences, growing up in a medical family, the use of selection processes and motivation (see figure 1). We found exposure to healthcare to be a crucial factor impacting students' motivation. Such exposure fostered an interest in medical subjects and the desire to help others and made students value the medical profession, but it could also serve as a reality check and make students realise that they previously had unrealistic expectations. The beneficial effect of healthcare experiences with real patients on students' motivation has been reported previously.³² Moreover, the variety of factors in combination with the interplay between these factors highlights how the motivation for studying medicine is shaped depending on the individual student. Growing up in a medical family enhanced students' motivation to study medicine and provided easier access to acquiring healthcare internships and assistance in the selection process. Healthcare experience is often one of the selection criteria. This highlights an inequality in access to resources relevant for both the study choice process and the selection process related to students' background characteristics. In our study, we found that the perceived inequality could be a demotivating factor for students without a medical network. This may induce self-selection among students without such a network. This might especially be true for students who grow up with the notion that they are not fit for a university and have no doctor role models to inspire them.^{2 32} As a result, the intended diversity within the student population could be compromised. The change from lottery-based admissions to selection-based admissions, as is occurring in the Netherlands, allows student diversity to be monitored to

determine whether the use of selection processes negatively affects student diversity.

Implications of the study

Our findings provide initial insight into which areas can be addressed to help students choose a field of study based on autonomous motivation. Although most interventions aimed at widening access are focused on facilitating the access of under-represented students by stimulating the fair treatment of applicants in selection processes,^{66 67} it seems worthwhile to simultaneously direct efforts towards the recruitment of a diverse group of prospective applicants. Recruitment efforts need to start with guiding high school students towards a study choice based on the right information and autonomous motivation. SDT posits motivation along a continuum and this can change from the autonomous to the controlled type and vice versa.^{33 34} The current study shows the complexity of how motivation is formed. Each individual student is motivated by a combination of different factors. Similarly, students experience a variety of demotivating factors. These demotivating factors can 'pull' or 'push' students away from their choice to study medicine.⁶⁸ A student can be pulled away from her choice because she develops interest in other subjects or because she finds that another study better suits her values (eg, religion). A student can also be pushed away from her choice because she wants to avoid negatively valenced aspects of her choice to study medicine (eg, the presence of selection processes). The interplay between motivating and demotivating factors will lead to differently formed choices for each individual student. Therefore, tailor-made guidance of high school students appears necessary. Based on the findings, we plan to create an interview guide for study counsellors to determine which factors play a role for each student. The interplay between the factors can then be explored by means of mind mapping. This way, the motivation for choosing a study can be determined and when the controlled type of motivation is dominant, the student can be stimulated to choose a study based on autonomous motivation. A similar approach could be useful for guiding medical students towards their specialty choice. Knowledge about how autonomous motivation for different specialties is formed may provide possibilities to motivate students to opt for specialties that are aligned with the changing healthcare structure and societal needs,⁶⁹ such as family medicine and geriatrics.

Previous research has shown the negative impact of the lack of connections to physicians and the misconceptions of both students and parents about the medical field on under-represented students' pursuit of a medical career.^{57 58} and there seems to be a desire for more information about the medical profession and study, and the admission processes.^{32 58} Exposure to healthcare seems crucial in this respect.^{2 58} Both high schools and medical schools should realise that students who do not grow up in a medical family have less access to such information and activities.⁵⁸ To stimulate a choice based on

autonomous motivation, high schools could encourage students to consider which subjects they like in school and offer time and possibilities for internships. In addition, a programme, such as the one used at school B, in which students who are first in their family to enrol in a university are assigned a mentor relevant to their career preferences, can provide such students with information. Despite the study choice activities offered at school B, however, many of those students still seem to be disadvantaged due to a lack of medical professionals in their network.

A striking finding was that many students seemed to be poorly informed about the selection process.⁵⁸ Moreover, students felt they would be less likely to succeed than their competitors because they felt that others may have more knowledge about medicine and selection processes and more resources to prepare for the selection process. Indeed, our findings indicate an inequality in this respect. Under-represented students' concerns about the complexity of the admissions process⁵⁸ and not being able to compete with other applicants have been reported previously.⁵⁷ When medical schools wish to incorporate healthcare experiences as one of their selection criteria, they should acknowledge the unequal access to such experiences among high school students. For those who lack the opportunity of gaining healthcare experiences through their own network, medical schools could facilitate this. Furthermore, considering that some students have access to more information about the selection process through their network, selection committees should be as transparent as possible about their process.^{45 48 49 52}

Strengths and weaknesses of the study

The qualitative design allowed the exploration of the complex mechanisms underlying students' motivation for studying medicine and more specifically the role of selection processes. The use of SDT as a theoretical framework was helpful in understanding how autonomous motivation, the most desirable type, is formed. Having members with various backgrounds on the research team strengthened the validity and reliability of the data analysis. Using interviews with study counsellors, in addition to findings from previous literature, to generate topics for the student interviews, enabled us to touch upon more relevant factors to answer our research questions. Moreover, the timeline that was provided to the students at the end of the interviews yielded additional information in some cases.

Our study has several limitations. We only included students from urban high schools. Other factors could play a role in the motivation of students from more rural areas. However, our findings are in line with previously reported findings. Therefore, we expect that the mechanisms can be generalised to a larger student population. Further research is required to test this hypothesis. In addition, the influence of parents on students' motivation for studying medicine was rather unclear. The study

counsellors' and students' perceptions with this regard seemed to differ. Including parents in the study might have provided more evidence about their role in students' study choice process.

Strengths and weaknesses in relation with other studies

This study is one of the few that investigates the motivation for studying medicine among those who are still in the process of making a study choice. In addition, the qualitative design yielded richer data on motivation and factors that influence motivation than the quantitative surveys used in most previous studies. This enabled the investigation of the interplay between the factors involved. We investigated the mechanisms while acknowledging the importance of the qualitatively different types of motivation; therefore, our study adds a new dimension to the previous findings.

Future research

The mechanisms for the interplay between healthcare experiences, growing up in a medical family, the presence of selection processes and motivation have been hypothesised, but still require quantitative testing on a larger scale. One potential next step would be to validate the model in different countries and cultures. In addition, in this explorative study we found indications for differences and inequalities between students due to their backgrounds. In future research, the findings with regard to the (formation of the) different types of motivation for studying medicine and the extent to which the identified factors discourage students from applying could be compared for students with different background characteristics. Research could also focus on which types of motivation mainly occur in which cultural settings to identify the optimal setting for fostering students' autonomous motivation for studying medicine.

Correction notice This paper has been amended since it was published Online First. Owing to a scripting error, some of the publisher names in the references were replaced with 'BMJ Publishing Group'. This only affected the full text version, not the PDF. We have since corrected these errors and the correct publishers have been inserted into the references.

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