

CHAPTER 6

*Unravelling the mechanism underlying motivation
for the medical study: interviews show
a negative effect of selection*

A Wouters
G Croiset
U Isik
RA Kusrkar

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Abstract

Introduction The objective was to explore the mechanism of motivation for the medical study of high school students and the role of selection in order to find clues about reasons for previously suggested self-selection of underrepresented students and to identify areas which can be targeted for stimulating a study choice based on the right motivations.

Methods Qualitative study using semi-structured one-on-one interviews. One predominantly white and one mixed high school in a large multicultural city in the Netherlands. Three study counsellors and 24 high school students, purposively sampled for demographic characteristics. Analysis consisted of 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 Main reasons for pursuing a medical career were (scientific) interest and helping people (autonomous motivations), but controlled motivations (e.g. parental influence, prestige) were also mentioned. Experiences with healthcare and patients positively influenced students' autonomous motivation and served as a reality check of students' expectations. Selection was an important demotivating factor, but did not withhold most students from applying. Having medical professionals in their network also sparked students' interest, while facilitating easier access to healthcare experience.

Conclusions Findings showed a complex interplay between healthcare experience, growing up in a medical family, selection and motivation. Healthcare experience, often one of the selection criteria, helps students to form autonomous motivation for the medical study. However, such experiences as well as support in the selection process seem unequally accessible to students. As a result, underrepresented students' motivation decreases. Medical schools should be aware of this and could create possibilities for gaining healthcare experience. High schools could incorporate internships as part of their study counselling programs and offer tailor-made guidance to each individual student.

Introduction

Concerns exist that the medical profession insufficiently reflects the society it serves¹. Debates increasingly focus on disadvantage of underrepresented socio-demographic groups due to selection for the medical study. Underrepresentation in medical education of ethnic minority students^{2,3}, students without a medical family background⁴⁻⁶, students who are first in family to go to university^{5,7,8}, lower socio-economic status (SES) students^{3,5,9} and males^{9,10} can, to some extent, be ascribed to biased selection processes¹¹⁻²⁴. However, underrepresentation is not always due to a bias in selection^{4,6,14,16,21,25-27} and widening-access efforts targeting selection bias to date have been only moderately successful in resolving disparities^{15,21,22,24,28}, which stresses the need for other measures. A self-selection effect, which refers to students deciding on whether or not to apply based on the information they have, for example about the selection process^{16,29}, has been suggested as another possible reason for underrepresentation. Indeed, certain groups of students are underrepresented 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 for self-selection by underrepresented groups have been suggested and entail lower awareness about selection as a result of attending a school that is less well informed^{2,31}, lack of parental and peer support due to negative views on academic excellence^{2,32}, and lack of access to preparatory activities needed to be successful in selection, such as healthcare experience^{2,31}. As a result, students' motivation for the medical study is likely to be negatively affected. The current study is an attempt to shed light on what happens among the applicant pool. The findings may provide clues as to whether underrepresentation of certain students results from students refraining from applying to medical school because of a decrease in their motivation induced by selection.

In line with Deci and Ryan's self-determination theory (SDT)^{33,34}, 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 autonomous motivation as the most desirable type of motivation and important for achievement outcomes and positive well-being of students³⁵⁻⁴⁰. Moreover, students

with autonomous motivation are more likely to deliver autonomy supportive patient care, which benefits healthcare⁴¹. Motivation is considered a continuum, and can shift from the autonomous to the controlled type and vice versa^{33;34}. The fulfilment of three basic psychological needs, being the need for autonomy (making one's own decisions), competence (feeling capable of doing something), and relatedness (sense of belonging to others), fosters intrinsic and thus autonomous motivation^{34;40}.

The motivations for pursuing a medical career are well investigated. People generally have multiple motivations for pursuing a medical career. These motivations mainly entail altruistic reasons (e.g. helping patients, serving the society)^{7;8;10;42-55}, but also relate to scientific interest^{8;10;42;44;45;50;52;54}, vocation^{47;48}, career opportunities^{42;44;45;47;48;52;55}, high income^{7;8;42;45;47-50;55}, prestige^{7;8;43-45;47;48;55} and family expectations or pressure^{43;49;53;56}. Factors of influence on the choice for the medical study that have been identified are work experience with patients⁴², having a medical family background^{45;47;48}, experiences with illness in the close environment^{45;48;49;52}, previous school achievements^{47;48}, receiving support^{49;50}, positive role models^{49;50} and TV⁵⁰. Demotivating factors have also been investigated, and are related to financial concerns^{2;10;30;54;57}, characteristics of the profession (e.g. lack of independence, work-life balance, unemployment)^{2;30;46;49;54;57;58}, discouragement by others^{2;30;49;57}, bad publicity⁴⁶, study characteristics (e.g. length of study)^{2;10;30;58}, selection^{2;10;30;57}, interest in other study/career^{2;30}, lack of support^{2;49} and lack of self-confidence⁴⁹. 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 in order to enhance student performance and well-being.

To understand the complex mechanisms, background characteristics of students, 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 attempts to assess motivation during selection processes.

It has been argued that for widening access purposes, interventions should be targeted at the underrepresented groups to encourage them to apply to medical school⁹. To be able to effectively do this, there needs to be greater understanding about the factors that encourage or discourage students to apply to medical school⁴⁶. Most studies addressing

the motivations for the medical study have gathered information retrospectively from medical students^{5,8,42-45,49,51,52,56} or even physicians⁴⁷. 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 factors that are involved. We have the opportunity to study this in a setting where admission is changing from lottery-based to selection-based. 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 are high school students' motivations for applying to medical school and how can these motivations be classified according to self-determination theory?
2. What is the mechanism for reaching these different types of motivations?
3. What is the role of selection in high school students' motivation for the medical study?

Methods

Because the mechanisms and the interplay between the factors that are involved are unknown, we chose a qualitative design. We set up the study with a constructivist point of view, in which knowledge is considered to be socially constructed by the people involved in the research process. The aim is to seek understanding of the complex world from the point of view of those who live it⁶⁰. We conducted interviews because interaction between the researcher and the researched is crucial⁶¹. Multiple perspectives and perceptions of a variety of people were sought to enable better interpretations of meanings.

Setting

In the Netherlands, high school students graduating from 6-year pre-university education with science subjects are eligible for entry to the medical study. Students choose these subjects in the third grade. At the time this study was conducted, March to December 2015, the admissions system was changing from lottery- and selection-based to selection-

based only from 2017. The lottery procedure was weighted for pre-university grade point average and chances of admission increased with a higher grade point average. In addition, applicants could participate in a selection procedure. For participation in selection, high school students had to apply halfway through their final year, while 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 increased from 50% to 100% throughout the years. Annually, nearly 2800 students can enrol in the medical study in the Netherlands.

Participants

We interviewed a purposive sample of high school students and high school study counsellors from two schools in Amsterdam (see Table 1), because we were interested in a variety of views 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), 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 to suffice in yielding the desired diverse study sample in terms of students' background characteristics. In order to obtain the views and experiences of students who are in different phases of their study choice process, we interviewed 3rd to 6th year high school students who (once) were interested in studying medicine.

Procedure

Directors of two high schools were invited to participate in this research. Firstly, in semi-structured interviews with the study counsellors of the high schools we gathered information about which elements they identified in students' study choice processes (e.g. 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 study choice counselling was organised. Students were approached by the study counsellors for participation in the study. Interviews were conducted by AW at the two high schools and lasted between 31 and 52 minutes. At the end of the interview, students were asked to draw how their motivation had increased and/or decreased over time and to write down when and why changes

Table 1 High school characteristics

	School A	School B
Type of education offered	Pre-university education only	Higher general education and pre-university education
Geographic location	Predominantly white part of the city with the highest average disposable income per household	Ethnically and culturally diverse part of the city where the average disposable income per household is substantially lower
Student population	Ca. 800 students; Mostly ethnic majority students, some ethnic minority students; Most of students' parents are highly educated.	Ca. 750 students; Mostly from ethnic minority (over 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; 1-week internship in fourth year; No classroom teaching about study choice; Students are stimulated to attend external information meetings, open days and participate in student-for-a-day programs; Study counsellors inform students about activities; External study choice counselling available at a charge of €200.	Starts in third year, when students have to choose their subjects; Digital study choice program; Classroom teaching about study choice; Information meetings for students and parents; Students are stimulated to participate in student-for-a-day programs; 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; Mentee ship program especially for ambitious first in family students.
Nature of study choice activities	Study choice activities are not mandatory	Information meetings are mandatory

occurred. This graph served as a summary as well as to stimulate recollection of further important aspects. Interviews were semi-structured and were altered based on arising topics in earlier interviews in an iterative process and adjusted to the type of participant (study advisor or student) and to the expected study choice phase of students based

on the grade they were in. 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. When sufficiency (to answer the research questions) was reached, no more interviews were conducted.

Data analysis

AW read and reread and familiarised herself with the data. AW coded all interviews. 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 differences were very few in number and 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. Open coding was conducted to identify the factors that influenced the motivation of students in a positive or negative manner. Quotations that contained expressions of the basic psychological needs (i.e. autonomy, competence and relatedness) were also coded. 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 motivation for the medical study, this particular focus may also cause us to miss out on other relevant aspects. We tried to keep this to a minimum by keeping notes, so-called memos, of findings outside our theoretical framework that seemed relevant for understanding the mechanisms.

Ethical considerations

Participation was voluntary. We provided participants with information about the study and the handling of personal data, after which they signed for informed consent. Data was anonymised and only the main researcher, AW, had access to identifying data. 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.

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

Grade	Gender		School	
	Female	Male	School A	School B
Student: End of 3 rd / beginning of 4 th	5	1	4	2
Student: End of 4 th / beginning of 5 th	3	1	2	2
Student: End of 5 th / beginning of 6 th	3	4	3	4
Student: End of 6 th	7	0	3	4
Student: Total	18	6	12	12
Study counsellor	2	1	2	1

Results

An overview of the distribution of participants is provided in Table 2.

Motivations for applying to medical school

Both subtypes of autonomous motivation were addressed to a great extent by the students. Intrinsic motivation related to 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 a 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 chose 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 the 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 the medical study because they value and acknowledge the importance of the medical study and profession.

“The fact that my sister was in the hospital played a big role. It was the doctors that 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 side 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 keeping up their image. One of the reasons was that students felt they had to stick with their choice for the medical study, because 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 girl of ethnic minority origin.” (S3, female, school B)

Main factors influencing motivation for the medical study

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 a patient or when students came in 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 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 feeling 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 the medical study. Students experienced how doctors make diagnoses and treat diseases, which often confirmed their interest in medicine.

“The internship was much fun. [...] a woman, she 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, give attention, so she can talk to someone, 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 led to a decrease in their autonomous motivation. Getting an impression of 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 gathered information about the profession matched with their own preferences and perceived capabilities.

“Yes, that is a little why I lost my 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 programs (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 programs. [...] 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. This was particularly, but not only, true for students from school B, even for those in their final year of high school. They were either unaware of the change from 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 and one female student even refrained from applying due to selection. Their motivation decreased because it is difficult to gain admission to the medical study and students lost hope of being successful in selection because they felt insecure about their competence, in particular compared to 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 I thought, 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 selection with the most demotivating effect on students. It was considered by some students from school A, that attending their school was an advantage in selection because the education was perceived to be superior to that of other schools. Moreover, some school A students reported that they had people in their network that could help them prepare for selection 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, that I found it interesting to learn how it works. Then I figured that the study which addresses the human body most is the medical study.” (S16, male, school A)

Study choice related activities

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

“When I attended the open day, they were talking about the medical study. 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 a study I aspire, but they presented it in a much nicer way. It came across as more interesting than the medical study, while I actually want to study medicine.” (S21, female, school B)

Study and job characteristics

Some aspects of the medical study and profession made students doubt their study choice, such as an expected clash with religion (e.g. regarding dress code, practicing skills on students of the opposite sex) for female students from school B, hierarchical culture, job perspectives, responsibility for the life and death of patients, working conditions (e.g. working hours, work-life balance), difficulty of the study, and length of the study. These aspects did not seem to withhold students from choosing medicine, which was explicitly expressed by students.

“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)

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 for doing what they want. Many students pointed out that they expect it will 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.

“I didn’t want to do something because of my parents. I wanted something for myself. When I would do something to prove myself to someone else, it won’t be fun.” (S18, male, School A)

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 students think.

“So far, my father ranked medicine number one, but I don’t think this had an influence on me, 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 medical study, the medical profession and selection, 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, it sounds very stupid and really very arrogant, but I think I will be a good doctor. I think I just have the capacities to do all that. But yes, the admissions criteria did not scare me, because I knew I had

it.” (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 the medical study, for example, passing a test of a school subject related to medicine.

Relatedness

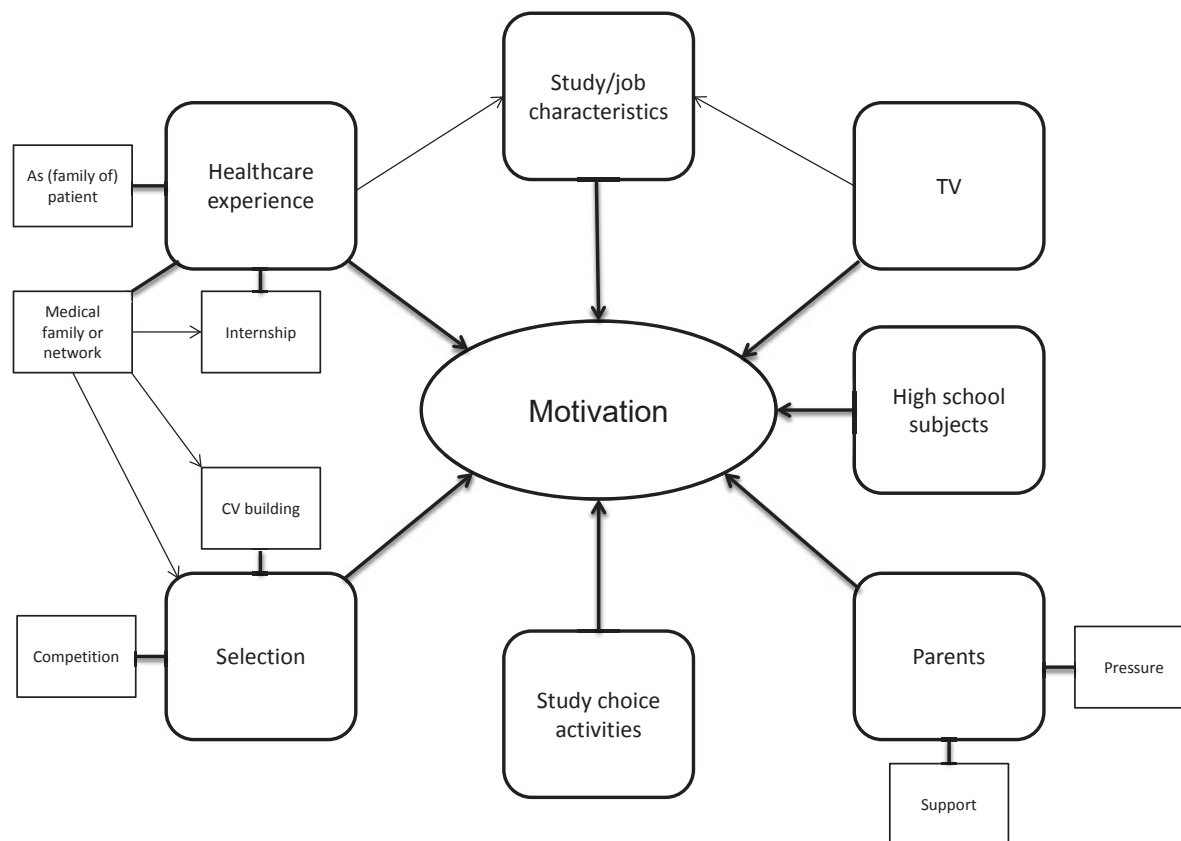
Female students from school A got a positive impression of doctors because of family members in the medical profession. This made some students want to belong to that professional group.

“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 diarrhea-unit. That kind of stuff. So that is much fun.” (S8, female, school A)

Summary

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

Figure 1 Overview of the mechanisms through which motivation for the medical study is influenced according to students and the interplay between the factors



Discussion

Principal findings

There appears to be a complex interplay between healthcare experience, growing up in a medical family, selection and motivation (see Figure 1). Moreover, the variety of factors in combination with the interplay between those factors highlights how motivation for the medical study is shaped depends on the individual student. We found exposure to healthcare to be a crucial factor for the motivation of students. Such exposure sparked off 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 realize if they had unrealistic expectations. The beneficial effect of healthcare experience with real patients on students' motivation has been reported before³². Growing up in a medical family enhanced 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. A change from lottery to selection, as is occurring in the Netherlands, 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 university and have no doctor role models to inspire them^{2;32}. As a result, the intended diversity within the student population will be compromised.

Strengths and weaknesses of the study

The qualitative design allowed for exploration of the complex mechanism underlying motivation for the medical study and more specifically the role of selection. The use of SDT as a theoretical framework was useful in understanding how autonomous motivation, the most desirable type, is formed. Having members with various backgrounds in the research team strengthened the validity and reliability of the data analysis. Using interviews with study counsellors, next to 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 some limitations. We have currently included students from urban high schools only. Possibly, other factors 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 the medical study was rather unclear. 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 motivation for the medical study among those who are still in the process of making a study choice. Also, the qualitative design

yielded a richer data collection on motivations and factors that influence motivation than the quantitative surveys used in most previous studies. This enabled the investigation of interplay between the factors involved. We investigated the mechanism while acknowledging the importance of the qualitatively different types of motivation, and therefore our study adds a new dimension to the previous findings.

Meaning of the study Our findings provide clues as to which areas can be addressed to help students reach the right study choice. Although most interventions aimed at widening access are focused on facilitating access of underrepresented students by stimulating fair treatment of applicants in selection^{62;63}, it seems worthwhile to simultaneously direct efforts towards the recruitment of a diverse group of prospective applicants. Recruitment efforts should start with guiding high school students towards a study choice based on the right information and motivations. The current study shows the complexity of how motivation is formed. Each individual student is motivated by a combination of different factors. Similarly, a variety of demotivating factors is experienced by students. These demotivating factors can 'pull' or 'push' students away from their choice for the medical study⁶⁴. 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 (e.g. religion). A student can also be pushed away from her choice because she wants to avoid negatively valenced aspects of a choice for the medical study (e.g. selection). 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. 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 needs⁶⁵, 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 the pursuit of a medical career of underrepresented students^{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 that do not grow up in a medical family have less access to such information and activities⁵⁸. For stimulating a choice based on autonomous motivation, high schools could stimulate students to consider which subjects students like in school and offer time and possibilities for internships. In addition, a program, such as the one used at school B, in which students who are first in the 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.

Striking was that many students seemed to be poorly informed about the selection process⁵⁸. Moreover, students felt they would have less chances of success than their competitors because they felt that others may have more knowledge about medicine and selection and have more resources to prepare for selection. Indeed, our findings indicate an inequality in this respect. Concerns among underrepresented students about the complexity of the admissions process⁵⁸ and not being able to compete with other applicants have previously been reported⁵⁷. When medical schools wish to incorporate healthcare experience as one of their selection criteria, they should acknowledge the unequal access to such experiences among high school students. For those who lack the possibility of gaining healthcare experience 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.

Helping others was an important factor for students pursuing a medical career. Altruism is important as the lack of it has recently been found to be a major risk factor for the cynicism and reduced academic efficacy dimensions of burnout⁴⁵. Moreover, a choice based on altruistic reasons⁴⁸, a vocation^{47;48} and the wide range of professional opportunities^{47;48}, compared to a choice based on previous school achievements was found to be associated with greater job satisfaction among physicians⁴⁸. Having or knowing someone with experience as a patient often inspires students to study medicine^{45;48;49;52}, as was also seen in the current study. Because these students are more likely to suffer from emotional exhaustion during the medical study⁵², collecting such information during the application process or at the start of the study can inform guidance of these students.

Unanswered questions and future research

The mechanism for the interplay between healthcare experience, growing up in a medical family, selection and motivation has been hypothesized, but still requires quantitative testing on a larger scale. A next step would be to validate the model in different countries and cultures. In addition, in future research, the findings with regard to the (formation of the) different types of motivation for the medical study and the extent to which the identified factors discourage students from applying can be compared for students with different background characteristics. Research could also focus on which types of motivations mainly occur in which cultural settings in order to identify the optimal setting for fostering autonomous motivation for the medical study.

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