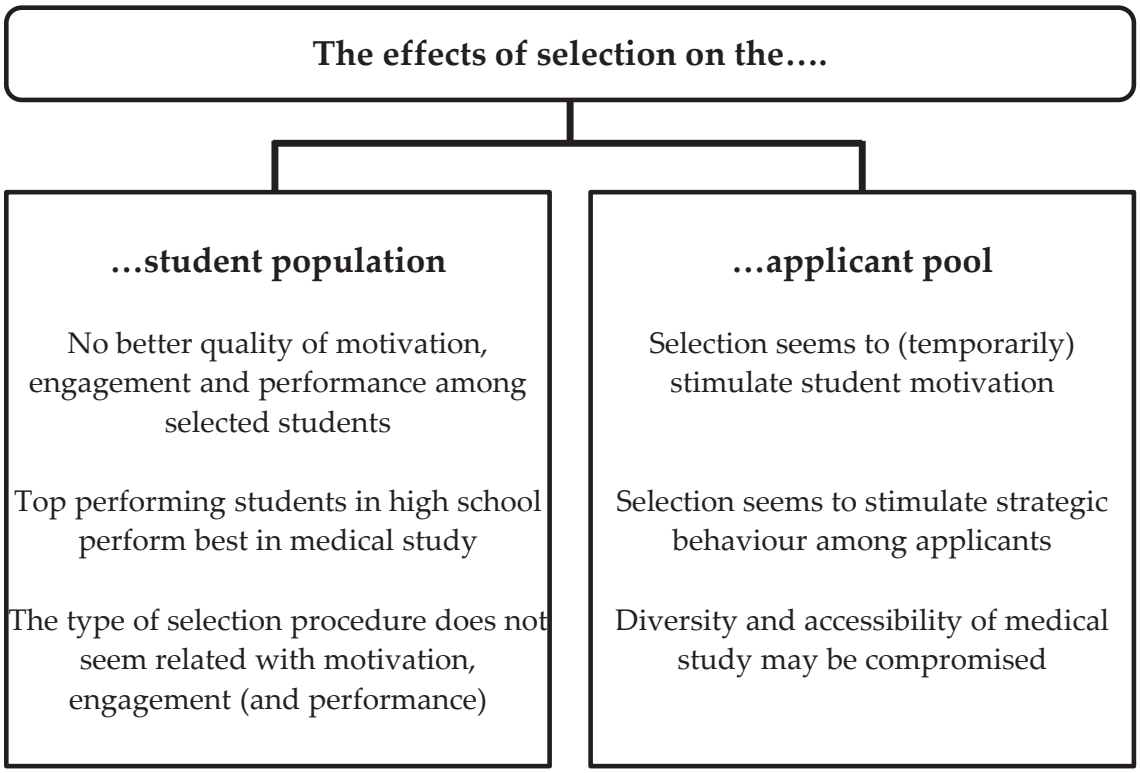
CHAPTER 8

General discussion

Globally, medical schools face the challenges of admitting students they consider able to perform well by using appropriate selection tools and procedures without disadvantaging students of lower socioeconomic backgrounds. Motivation and engagement appear to be important factors in student learning and performance[1-17]. During medical training itself students take care of patients and evidence suggests that motivation and engagement are related with positive patient outcomes as well, such as fewer self-reported medical errors and more autonomy-supportive interactions with patients, which in turn can lead to improved adherence to health-promoting behaviours[8;16]. The question is whether selection results in a student population with these desirable characteristics. At the same time, participation in a selection procedure may influence the motivation for applying to the medical study, especially compared to a lottery procedure. The aim of this thesis was to enhance the understanding of the effects of selection on the motivation of the medical student population and the applicant pool. The research in this thesis was conducted in the Netherlands, in a period in which admissions gradually changed from lottery-based to selection-based. The main findings of the studies conducted are depicted in Figure 1. In this general discussion, the main findings are discussed to generate an overview, followed by implications for research and practice.

Figure 1 *Main findings of this thesis*



The effects of selection on the student population (chapters 2 and 3)

Motivation, next to academic ability and other aspects, is one of the attributes selection committees look for in an attempt to select the most suitable students for the medical study[18;19]. Motivation in this thesis is viewed from the perspectives of both *quantity* and *quality*, among which the quality of motivation is found to be most important[2;3]. Different motivation profiles can be distinguished based on the levels of autonomous and controlled motivation, as defined by the Self-determination Theory[2;3;17]. The desirable motivational profile consists of high autonomous motivation and low controlled motivation[17;20;21]. To explore the effects of selection on the motivation of the student population, we investigated i) whether selection, compared to admission based on lottery or a top pre-university GPA (pu-GPA) yields a student population with better quality of motivation (as well as student engagement and performance; *chapters 2 and 3*), ii) whether the applicants who chose to participate in a demanding selection procedure as opposed to a lottery procedure show better quality of motivation, engagement and performance in the medical study (*chapter 3*), and iii) whether selection procedures from three medical schools result in different student populations with regard to motivation, engagement and performance (*chapter 3*).

The findings in this thesis indicate that selection does not result in a student population with better quality of motivation, engagement and performance. The research included both students in the pre-clinical (Year-1) and the clinical (Year-4) phases of the medical study. In line with previously reported findings[22], higher strength of motivation was found among selected students compared to the other students. However, in other studies, no differences were found[23]. The higher strength of motivation may partly be explained by an increase in motivation immediately after selection, which is explained in further detail below. Another explanation relates to students' willingness to sacrifice time to enhance their chances in selection, which had resulted in getting selected. The willingness to sacrifice is considered a component of strength of motivation[23;24]. Against the expectations based on previous research[11], no differences with regard to the quality of motivation were found between selected and lottery-admitted students. Similarly, no difference in performance was found among selected students compared to lottery-admitted students. As more research comparing the admission groups emerges, the inconsistencies across findings become more evident. The only finding that seems to be consistent across different studies is that top pu-GPA students outperform the

other students in both the pre-clinical and clinical phases of the medical study[22;25;26], which supports the notion that previous achievement is a good predictor of future achievement[27-30]. Comparisons between selected and lottery-admitted students have rendered either no differences or better performance among selected students[22;25;26;31-35]. Moreover, the differences found are usually small. To our knowledge, the study described in *chapter 3* was the first study which examined engagement in relation with selection. No differences were found between engagement of the different admission groups.

There is a lack of consistent evidence for better outcomes of selection compared to lottery, which suggests that the two groups of students may not be very different from each other. It has been suggested that motivation differences within the group of lottery-admitted students may explain this, because the lottery group consists of students who had participated in selection but were rejected, and students who only participated in the lottery procedure[25;26;36]. Therefore, participation in selection was taken into account. Students who had been rejected in selection prior to being admitted through lottery were expected to show better motivation than students who had not participated in selection prior to admission, but our findings did not confirm this. Our study showed differences in performance and engagement in the clinical phase of the medical study, but no differences in the pre-clinical phase. Selection participants performed better in the clerkships and showed higher levels of engagement than non-participants. The students in the clinical phase had all been selected at a time when 50% of students were still admitted through lottery. The most dedicated students may have opted for participation in selection. Engagement is related to student's well-being and engaged students are less likely to suffer from burnout which is highly prevalent among medical students and professionals[37;38]. Following this, selection participants may have been more resilient and able to cope with the demands of the clerkships, resulting in better clerkship grades. At the time the students in the pre-clinical phase were selected, the proportion of students medical schools were allowed to select had increased substantially. This may have made selection more appealing to a broader range of applicants. This may be the reason why the performance, motivation and engagement gap between the selection participants and non-participants has started to fade, but this requires further investigation.

As selection is costly, identifying which type of procedure is most effective in identifying the most suitable students can inform policy decisions. The multisite character of the study described in *Chapter 3* allowed for comparisons between different selection procedures. The hypothesis was that the presence of a selection procedure for which applicants have

to invest time and effort may be more important than the specific characteristics of the procedure. Three medical schools, each applying a different selection procedure, were included in this study. No differences in motivation, performance and engagement were expected. The findings confirmed the hypothesis with regard to quality of motivation and engagement in both the pre-clinical and clinical phases, and for quantity and quality of motivation, engagement and performance in the clinical phase. Some differences, pertaining mainly to performance outcomes, were found. The difficulty in interpreting these findings is that we could not control for the influence of curricular differences[39]. Although it can be expected that differences between the three curricula are small, educational differences, such as the way of grading, may still have had a stronger influence on the findings than the selection procedures. Moreover, it might be that each medical school attracts a different type of student, resulting in different outcomes during the medical study. If medical schools succeed in attracting and selecting the students that fit with their curriculum, students can perform optimally.

Overall, good levels of motivation, engagement and performance were found. This highlights the challenge selection committees face while selecting the best students from a pool of suitable applicants. Levels of autonomous and controlled motivation among Belgian teacher training students, for example, were found to be 2.8-3.2 and 2.3-2.4 (on a scale from 1 to 5)[17], while in this thesis scores ranging from 4.0-4.3 and 1.8-2.2 (on a scale of 1-7) for autonomous and controlled motivation were reported. Similarly, for engagement, the mean score of 4.17 (on a scale of 0-6) reported in this thesis exceeded the mean score of the norm group of social sciences students (3.18)[40]. Moreover, medical school performance is generally good and the reported medical school dropout rate of approximately 10% in the Netherlands[41], is low as compared to other fields of study and in line with the average medical school dropout rate of 9.1% reported across countries[42]. The question is whether the possibility to further improve the success rates should be sought in medical school selection or in ensuring that students receive proper training during the six years of medical education[43;44]. It has been argued that most applicants are likely to be able to complete their studies and most of them are able to become capable doctors, if properly trained[45]. The Taylor-Russell model can be used to determine the success ratio of selection. The success ratio is calculated based on the base rate (the expected success rate without applying selection), selection ratio (the percentage of students that will be selected) and the predictive validity of the selection procedure. A small effect of selection can be expected when either the base rate or the selection ratio is high. For the Dutch context, calculations showed that with a base rate of around 0.80 and a selection

ratio of around 0.60, the success rate increases with 1.8% (from 81.3% to 83.1%) when selection is applied. This corresponds with a gain of around 6 successful students at each medical school (with a total number of 2785 places in eight different medical schools)[46]. Instead of investing in identifying potentially suitable applicants based on their ability, it may therefore be more efficient to identify potentially unsuitable applicants based on their non-academic personal qualities[47;48]. Moreover, in the Netherlands and many other countries, students enrol in the medical study at the age of 17-18 years. At the time the students are assessed in selection, their motivation may not yet be fully developed[49].

The effects of selection on the applicant pool (chapters 2, 4, 5 and 6)

To explore the effects of selection on the motivation of the applicant pool, we investigated i) whether and how selection affects applicants' motivation for the medical study (*chapter 2*), ii) whether selection affects applicants' decisions to apply to a particular medical school and whether this is related with student characteristics and motivation during the medical study (*chapter 4*), iii) whether applicant motivation can be assessed by using a statement on motivation in selection (*chapter 5*), and iv) whether selection affects the development of motivation for medical study (*chapter 6*).

Student motivation

Why people choose to study medicine has been well-investigated. The studies reported in *chapter 5* and *chapter 6* address this issue. Both, statements on motivation used during selection for a graduate entry programme and interviews with high school students about their motivation for the medical study, demonstrated that reasons for aspiring for a medical career were mainly pertaining to autonomous motivation, specifically to scientific interest and helping people. However, reasons pertaining to controlled motivation, such as prestige and a high salary were also mentioned. This is in line with previous research[50-52]. It appears difficult to predict which students will have the desirable motivation during the medical study. This thesis explored whether applicant motivation can be assessed by using a statement on motivation in selection. A statement on motivation is one of the tools used in an attempt to assess motivation in selection. The selection interview, which can be a traditional interview or multiple mini interviews, often also includes some form of assessment of motivation[53-55]. Findings indicate that the written statement is unsuitable for the measurement of motivation in a high stakes

selection situation. Although medical schools aim to admit students with the desirable motivation profile[18;19], this seems to be challenging. Faking good behaviour is a threat to the reliability of and validity of motivation assessments. Faking good has previously been reported for personality assessments in high stakes situations such as selection and job applications[56]. In assessment of motivation, applicants seem to overstate their autonomous motivation and underreport their controlled motivation. This behaviour has been described as the 'hidden curriculum of admissions', which entails that applicants estimate what the selection committee expects from them and adjust their strategy accordingly[57]. Applicants often provided descriptions of their motivation which were in line with the published programme description. Moreover, applicants make use of opportunities to provide additional information, such as their qualifications, which was outside the scope of the assignment, to show their suitability for the medical programme and to distinguish themselves from the other applicants[58-60]. Based on our investigation we do not recommend the use of a statement on motivation to assess applicants' motivation. It could however be a useful tool for stimulating applicants to gather information about the medical programme and make an informed study choice[27;47].

Motivation is dynamic and can be influenced by environmental factors[3]. It has been suggested that selection positively affects motivation[9;22;26;61;62]. This assumption was tested in this thesis. The quantitative and qualitative findings described in *chapter 2* indicate a stimulating effect of selection on student motivation. Whereas this study showed no differences in quality of motivation between the three admission groups, differences were found when the time passed since selection was taken into account. Quantitative data showed higher strength and autonomous and controlled motivation among recently selected students compared to non-selected students and students that were selected years before. The effects were even stronger when non-selected students were excluded from the analyses. comparisons, An explanation for the findings can be sought in selected students' written answers about the perceived effect of selection on their motivation. Autonomous motivation thrives when the needs for autonomy, competence and relatedness are fulfilled[3;4]. When students get selected, they appear to feel in control of their admission (autonomy), perceive that they are competent in handling the medical study (competence) and feel like they are part of a special group (relatedness). But external factors were also of influence. Recognition by an external party, i.e. the selection committee, of students' suitability for the medical study is likely to have stimulated their controlled motivation, resulting in the desire to prove themselves to others. The enhancing effect seemed to be of a temporary nature. This is not surprising as many

factors can influence the motivation of students. It can be expected that the influence of selection fades over time and the influence of the educational environment on the motivation of students increases. Students enter the medical study with good and even enhanced motivation after being selected. Medical schools can aim to retain students' autonomous motivation by offering autonomy-supportive education[61;63;64]. Problem-based learning curricula, blended learning, early contact with and responsibility for patients, standards-based assessment and the opportunity to follow elective courses have been identified as beneficial for students' motivation[9;65].

Choice for medical school and motivation

Medical schools strive for a match between the students they admit and their curriculum. In this thesis we explored what approaches applicants employed while deciding which medical school to apply for. Reasons for choice of a medical school have been studied before in countries where applicants could apply to multiple medical schools. The Dutch admissions situation provided a unique setting in which applicants can apply for selection at one medical school only. The selection process is organised locally by the medical schools. In the study described in *chapter 4*, it was investigated whether selection has an influence on applicants' approaches towards choosing a particular medical school. Year-4 students, who had participated in selection when medical schools were allowed to select a maximum of 50% of their students, and year-1 students, who had participated in selection when medical schools were allowed to select up to 100% of their students, indicated the selection procedure as the most important factor in deciding which medical school to apply to. Moreover, it seems that selection has become more important in applicants' decisions to apply for a particular medical school. Applicants choose more strategically when more places are allocated through selection and less through lottery. This strategic approach contrasts with medical schools' aim to achieve alignment between the student and the curriculum. Medical schools should be aware that applicants' approaches may differ from their aims. For only about 10% of the students, the curriculum had been the determining factor. Medical schools could use applicants' focus on the selection procedure to stimulate them to consider the curriculum when they make their choice by ensuring that the selection procedure is a true reflection of the curriculum and values of the medical school[66;67]. This can be reached by employing a selection procedure based on work sample testing, which focuses on situation specific performance[66]. E.g., at VUmc School of Medical Sciences, Amsterdam, the Netherlands, the selection procedure includes a lecture and a test that are representative of a Year-1

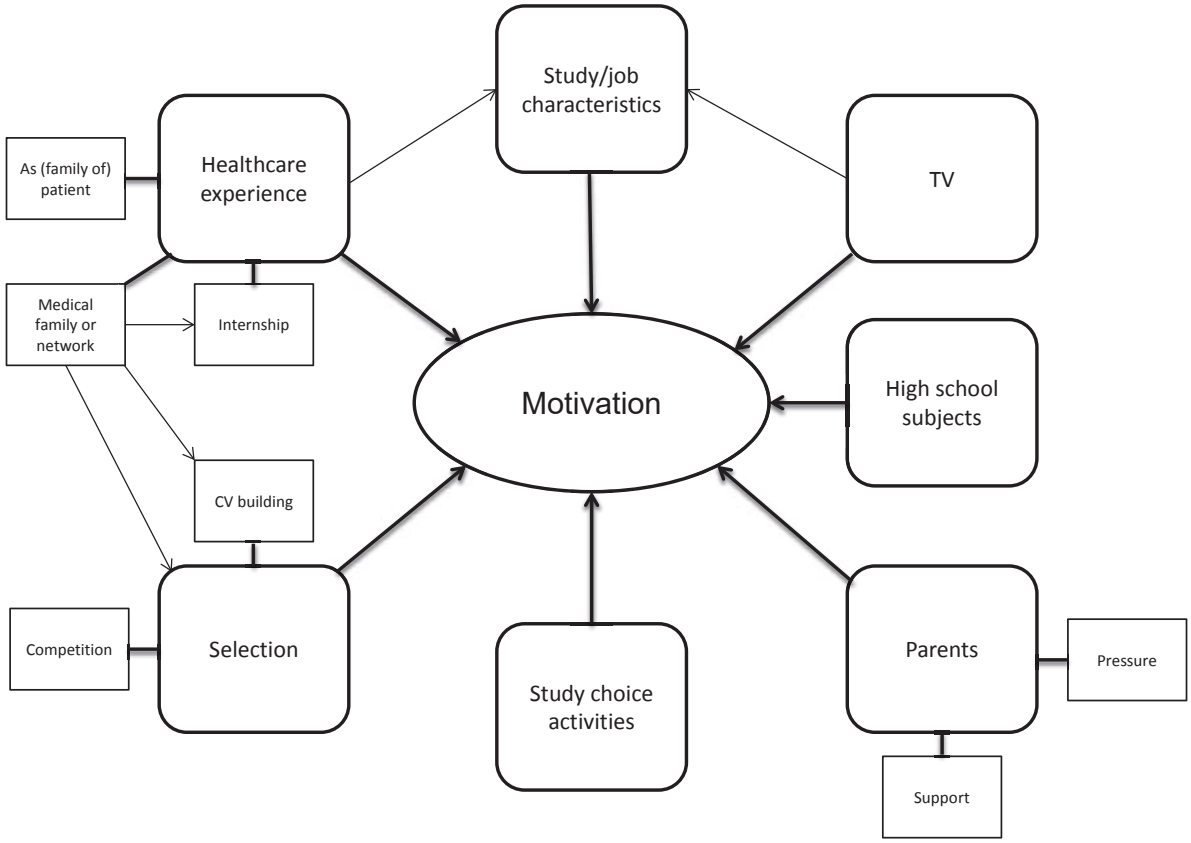
course. With this, together with proper recruitment strategies, a student-curriculum fit may still be achieved. Even though the majority of applicants makes a strategic choice, our findings indicated that this is not related with poorer motivation during the medical study, which implies that a student-curriculum fit may be achieved. The findings indicate that first generation students and ethnic minority students are less likely to base their choice on the curriculum than students with highly educated parents and majority students. This may reflect an inequality in knowledge about higher education and the level of support applicants receive in identifying the curriculum that fits the students' educational needs the best.

Student diversity

The mechanisms through which different types of motivation for the medical study are formed are explored in *chapter 6*. Interviews with high school students provided insights into the factors that are important for stimulating autonomous motivation. For prospective students, it is crucial to get acquainted with the medical study and profession by gathering information or experiencing healthcare. This can be reached through stories from medical professionals, watching TV programs, being a patient or visiting one, and doing an internship. The findings brought to light a complex interplay between healthcare experience, growing up in a medical family, selection and motivation (see Figure 2). The research was conducted in a school with mainly ethnic majority students and a school with mainly ethnic minority students. As a result, the study sample comprised of students with various backgrounds. The research confirmed previously suggested inequalities due to applicants' socioeconomic backgrounds. There was a general feeling that having a medical doctor as a parent makes it easier to gain information about the medical profession, as well as acquiring internships in healthcare. A Dutch study found that approximately 15% of students have a medical doctor as a parent[68]. When students without parents in the medical profession perceive their chances of success in selection to be lower than the students with parents in the medical profession, this can negatively affect their motivation, and subsequently cause them to refrain from applying. A lack of motivation, similar to motivated behaviour, can stem from various sources. Perceived barriers and costs associated with performing an activity can have a negative impact on the overall value of a task, causing an individual to move away from certain behaviour and in some cases towards alternative behaviour[69]. In this thesis, it was found that for each individual, different factors influence motivation for medical study, causing students either to apply to the medical study or refrain from

it. When students refrain from applying to the medical study, they can be either 'pulled' or 'pushed' away from it[69]. Adopting a differentiated approach considering such pushes and pulls, and how these are driven by autonomous and controlled motivations, can help in gaining more nuanced insight into how the applicant pool is shaped. It appears that students can be pulled away from applying to medical school because they discover that another study appeals to them more or they can be pushed away, because the presence of selection discourages them, illustrating autonomous and controlled motivations for refraining from applying to the medical study. This differentiated approach towards not engaging in an activity is increasingly gaining attention in motivation research[69]. The research described in this thesis adds to the understanding of how different pushes and pulls determine non-participation in medical school selection. The knowledge gained in this research can form the basis for designing an interview guide which can be used by high school counsellors to help students form a study choice based on autonomous motivations and identify the factors that play a role in an individual's study choice process. Moreover, the research method could be extended to map the specialty choice process of medical students. This can be used to gain an insight into how students can be motivated towards a choice for the specialties that are in alignment with the changing health care scenario and patient population, such as geriatric medicine. Furthermore, students with highly educated (medical) parents were able to receive more practical help in making a study choice and preparing for selection. This deserves attention because it implies that the currently used criteria contribute to inequality in access to medical education. As a result, the medical profession will not reflect the society it serves, necessary for providing proper care in the future[70;71]. Inequality in education is not restricted to medical education. Socioeconomically disadvantaged students are underrepresented in higher education in general[72-74]. However, the influences of having a medical network and the presence of selection seem to add an extra dimension to this issue, further widening the gap. The findings in this thesis stress the importance of monitoring the social composition of the applicant pool and student population to investigate whether the diversity is compromised due to the change from lottery to selection. Widening participation efforts should be focused on the entire educational spectrum to help students prepare for the transition to higher education and ensure that able students can perform to their full potential[75]. To improve the success rates of eligible underrepresented students in enrolling in medical education, a holistic review during medical school selection is recommended and the Association of American Medical Colleges (AAMC) argues that the selection criteria should be considered in the context of

Figure 2 *Overview of the mechanisms through which motivation for the medical study is influenced according to students and the interplay between the factors*



an applicant's pathway to medical education[67]. Holistic review is defined by the AAMC as *'a flexible, individualized way of assessing an applicant's capabilities by which balanced consideration is given to experiences, attributes, and academic metrics and, when considered in combination, how the individual might contribute value as a medical student and physician.'*[76] This may include identifying students who have faced economic, social or other barriers to success. The holistic review approach in medical school selection seems promising for increasing student diversity[77].

Conclusions

The findings raise the question whether selection should be replaced by lottery (*chapter 7*). It has become evident that several factors need to be considered. While selection, which is generally costly, is aimed at increasing the quality of the student population, research indicates that selection yields only small gains compared to a lottery procedure. Overall,

during the change from a threefold admissions system (including lottery, selection, and admission based on a top pu-GPA) to selection only, the gains of selection seem to have decreased, while the strategic behaviour of applicants, i.e. choosing a medical school based on the selection procedure, seems to have increased. The increased proportion of places allocated through selection may have led to a decrease of the motivation, engagement and performance gap between selected and lottery-admitted students. Applying for selection may have become appealing to a wider range of applicants due to reduced chances of being admitted through lottery. It remains difficult to draw strong conclusions about selection due to inconsistent findings across the literature. These inconsistencies may result from the varying contexts in which selection research is conducted[39]. In addition, differences between different admission groups at the start of the medical study appear to fade throughout the medical study. This is not surprising, as medical education is aimed at training all students so that they become well-performing medical professionals. It is difficult to select students with the desirable motivation. Furthermore, the diversity of the student population may be compromised, while the diversity of society increases. This may have a negative effect on the quality of future healthcare and calls for measures to counteract this effect. Current widening participation measures are not always successful in decreasing the inequalities. It appears that a relatively inexpensive and fair (in terms of equity) procedure that yielded a well-performing, motivated student population was exchanged for a more expensive procedure which seems to disadvantage students that are underrepresented in medical education.

Strengths and limitations

This thesis adds to the existing body of selection literature by investigating selection through the perspective of motivation. While most research focuses on the predictive validity of selection tools, the focus on motivation allows for gaining a deeper understanding of the processes involved before, during and after selection at the student level. The research is strongly embedded in theory, i.e. Self-Determination Theory (SDT). As SDT formed the basis for designing all the research studies, the findings of the studies combined contribute to an overview of the effects of selection on motivation.

The multi-method approach of this thesis, in which qualitative research methods were used to further explore the quantitative findings, allowed for exploration of mechanisms involved in selection. Investigating this in the Dutch admissions setting, allowed for comparisons of motivation between students. As motivation assessments in a high stakes

selection procedure are deemed to be unreliable, pre and post selection comparisons of motivation are difficult, which complicates investigation of the relation between motivation and selection. Because the Dutch situation yielded a control group of students that had not enrolled the medical study through selection, differences could be studied. Moreover, the changing admissions policy allowed for investigation of medical school choice approaches of applicants in different situations.

Another strength of this thesis is the focus on the applicant pool, next to the student population. With this, a broader understanding could be gained of the effects of selection. While diversity issues are generally mainly considered from the selection bias perspective, the self-selection mechanisms have been understudied. The qualitative approach towards this issue yielded insight into the complex interplay of mechanisms that determines whether or not a student applies to the medical study.

Apart from the limitations of each individual study that are described in more detail in the respective chapters, the overall main limitations of this thesis relate to low response rates and possible response bias. The quantitative studies yielded response rates varying from 35% to 61%. Consistent with the literature[78], a digital questionnaire yielded a lower response rate than a paper questionnaire. However, due to practical reasons, collecting data with a digital questionnaire in the multi-site study was considered more feasible. Moreover, even though the response rate was low, it was in line with our power calculations for finding significant differences. A possible response bias may have influenced the findings, especially the findings relating to motivation, as the more motivated students are likely to be more willing to participate in the research. The lower levels of autonomous motivation and higher levels of controlled motivation that were reported as well suggest that the study sample was representative of the student population.

Another limitation is that the conclusions in this thesis are based on cross-sectional research. Longitudinal research is necessary to further investigate the development of motivation of the different groups of students throughout the medical study.

This study was conducted in the Netherlands only. While the national admissions policy resulted in a unique situation, which yielded benefits for research, it is difficult to generalize the findings to other admissions situations. Most countries apply selection as the only route to admit students to the medical study. The Netherlands deployed a

lottery system, but then chose to join the global movement towards selection. Because selection was implemented gradually, in co-existence with lottery, insights into to effects of such a change could be generated. More specifically, the research in this unique setting provided indications of the downsides of a "selection-only" policy, which may be generalizable to other contexts. Further research is needed to investigate this.

Practical implications

Several implications arise from the research described in this thesis.

Medical schools should try to reduce the costs of selection as much as possible. This may be done by conducting some of the selection steps at the national level for all medical schools, following the examples of the use of national aptitude tests in the UK, the US, Canada and Australia. Furthermore, the use of expensive selection tools for which low validity and reliability has been reported should be reconsidered.

Selection seems to have a stimulating effect on student motivation. This effect seems to be of temporary nature. To ensure that students' enhanced motivation is maintained throughout medical study, it is important to design a curriculum which fosters students' autonomous motivation. This can be reached by offering autonomy-supportive education, including giving students responsibility for their learning, challenging students optimally, providing positive and constructive feedback, and providing structured guidance[64].

A statement on motivation should not be used to assess motivation in selection. In fact, every assessment of motivation in selection should be questioned, as applicants are likely to 'fake good behaviour', which hampers reliable assessment of motivation. The findings also showed that such a statement can be useful to stimulate applicants to get informed about the medical course. Therefore, it can be used in selection as a matching tool, but should not be used to inform admission decisions.

The selection procedure used should be aligned with the medical school curriculum. In this way, if applicants base their medical school choice on the selection procedure instead of the curriculum, a match between student and curriculum may still be reached.

If medical school admissions remain based on selection, measures should be taken to

take care of inequalities in admissions and improve the student diversity.

The support for students that are underrepresented in higher (medical) education should start earlier. High school students should be guided towards a well-informed study choice. High school counsellors can help students identify the factors that influence their study choice and guide them towards a choice based on autonomous motivation. The interview guide that was used in *chapter 6* may be useful to this end and can be found in the appendix.

Role models should be used to inspire students to aspire for a medical career. For example, medical students from ethnic minority backgrounds can be involved in giving information to high school students about the medical study and profession as a form of inspiration. This can be incorporated in the curriculum as a community service activity.

Medical schools can contribute by improving their information days and aiming their recruitment strategies at high schools with a high proportion of students that are underrepresented in medical education. Medical schools can organize (or increase the number of students in) pre-med weeks for underrepresented students.

Medical schools could take up the social responsibility to create equal opportunities for all students by providing healthcare internships for students that lack the resources to arrange these themselves.

The discussion about whether selection should be replaced by lottery needs to be considered.

Suggestions for further research

The findings described in this thesis reveal a myriad of opportunities for further research, some of which have led to concrete research projects.

This thesis indicated a negative effect of selection on the motivation for the medical study of underrepresented students, and therefore possibly on the diversity of the student population. Furthermore, a few years before (in the Netherlands) students could obtain scholarships for studying medicine, but this has now been replaced by opportunities to take student loans. This has increased the financial burden on students. Future research

should be aimed at monitoring whether the social composition of the applicant pool and the student population changes in the following years due to these two major changes.

The development of motivation and engagement of the different admission groups throughout the medical study needs further investigation. Moreover, empathy is considered as an important quality in medical students[79]. Longitudinal research is needed to investigate whether the different admission groups develop different levels of empathy during medical study. At VUmc School of Medical Sciences, these data will be collected as part of a bigger longitudinal study called the Student Motivation and Success Study[80]. To further follow up on the research, we wish to monitor the specialty choices of these students, as well as their performances after graduation. After all, selection is not only aimed at getting a well-performing student population, but ultimately well-performing medical professionals.

Making well-informed policy decisions based on the cost-effectiveness of admissions, should include consideration of the financial costs and gains of selection as well as the educational aspects. Towards this end, research weighing the financial costs and gains against the educational and societal implications of selection is needed.

This thesis indicated the need for better guidance of high school students towards a study choice. An interview guide may be a useful tool for helping students reach a choice based on the right motivation. To this end, the interview guide used in *chapter 6* (see Appendix) will be adjusted, tested and validated with school counsellors. Next, we will investigate whether such an interview guide can be used for guiding medical students towards a specialty choice.

In the domain of medical education, motivation and engagement are relatively understudied. Cross-cultural research will be set up to explore whether similar levels of motivation and engagement are reported in more collectivistic cultures such as Portugal and China.

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Appendix

Interview guide used in the study described in chapter 6

Q 1: **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 onwards:
Q 2.1: Reasons for choosing medicine

- What started you 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?

Q 2.2: Possible reasons for refraining from choosing the medical study

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

Q 3: 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?

Q 4: 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?

Closing question
What has not been discussed but is deemed relevant by the student?