CHAPTER 4

Medical schools' and students' approaches to selection: conflict of interest?

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Abstract

Introduction Medical schools aim to admit motivated students who fit best with their curriculum. The aim of this study was to examine students' main reasons for medical school choice and the relation with student characteristics and motivation during the medical study.

Methods Year-1 and Year-4 students from three Dutch medical schools completed an online survey comprising personal data and standard, validated questionnaires to measure strength of motivation (Strength of Motivation for Medical School-Revised) and autonomous and controlled type of motivation (Academic Self-regulation Questionnaire). We performed frequency analyses, regression analyses and ANCOVAs.

Results Four hundred seventy-eight students participated in this study. Students indicated "city" (24.7% - 36.0%) and "selection procedure" (46.9% - 56.9%) as the main reasons for their medical school choice. The main reasons were associated with gender, age, being a first-generation university student, ethnic background and medical school and there was no association with the strength and type of motivation.

Conclusions Applicants' approaches do not seem to align with medical schools' desire to instigate a curriculum-based choice. Approaches vary between different types of students and medical schools. All students show good quality motivation. Aligning the selection procedure with the curriculum could be useful to reach a good student-curriculum fit.

Introduction

Medical schools aim to admit students who are motivated and fit with their curriculum best so that students can perform optimally[1,2]. When students apply, however, they may focus on other characteristics of the medical schools besides the curriculum when choosing which one(s) to apply to. Moreover, different types of students may have different approaches. Students' approaches have thus far gained little attention. In this study we investigate students' reasons for medical school choice and the association with student characteristics and motivation during the medical study.

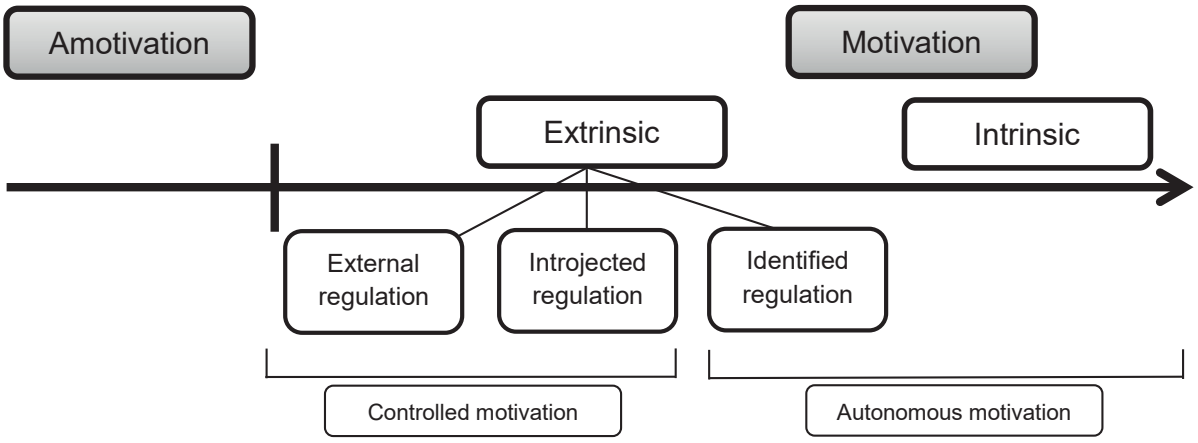
Little is known about what drives applicants' medical school choice. Research on this topic has mainly been conducted in the UK (one study from the US) and indicated reasons related to curriculum (e.g. teaching and course characteristics)[3-7], school (e.g. reputation and atmosphere)[3;5-8], admissions (e.g. the interview process)[4;5], and geographical characteristics (e.g. city)[3-7] as common reasons for choosing a medical school. The settings of these studies are similar to each other in the respect that applicants are able to apply to multiple medical schools at once before they participate in medical school selection (i.e. from up to four schools in the UK to as many as applicants want in the US, with an average of 15 per applicant, www.students-residents.aamc.org). They make their final choice after they receive admission offers from one or more medical schools. In such situations, applicants may make their first choices based on the selection procedures of the medical schools and their final choice, after being offered admission, based on curriculum and school characteristics. When applicants are restricted to choosing one medical school only and they have to choose before entering any selection procedure, as is the case in the Netherlands, the selection procedure may play a larger role in their choices. How applicants make their medical school choice in such a setting has not yet been investigated. Because of the creation of this unique situation in the Netherlands, conducting this investigation in this context may also provide initial insights into how students make their first choices in other contexts like in the UK or US.

The Dutch admission system is gradually changing from admission based on pre-university grade point average (GPA; i.e. top pre-university GPA and weighted lottery) and qualitative selection procedures to admission based on selection only. Admission based on pre-university GPA is regulated at the national level, while admission based on selection is regulated at the institutional level[9]. Students can choose to apply through one or both routes. Applicants with a top pre-university GPA (≥8 out of 10) are admitted

at the medical school of their choice. Applicants with lower GPAs enrol in the weighted lottery and indicate their top 3 medical school preferences. In addition, applicants are allowed to apply to a qualitative selection procedure at one medical school per year. Each medical school can design their own selection procedure. This allows the medical schools to select the students they consider most likely to perform well in their medical course. When rejected in selection, applicants are automatically enrolled in the weighted lottery. Over the years, the proportion of places that medical schools are allowed to fill through selection has increased from a maximum of 50% in 2005 to a maximum of 100% in 2013. This transition enables the investigation of applicants' behaviour in different situations.

Few studies report on the relation between reasons for medical school choice and student characteristics. In a Scottish study, females valued course aspects more than males, and location was more important for younger students than for older students[6]. To students born outside the UK compared to local born students, reputation and prestige were more important reasons, while course aspects and location were less important reasons. Among American students, ethnic minority students placed greater emphasis on diversity aspects in selecting their medical school. Moreover, reasons differed between students from different medical schools[7]. All Asian females in a UK interview study indicated the importance of the location of the medical school because of their wish to live at home during their medical study[5].

Figure 1 *The Self-Determination continuum of motivation (adapted from Ryan & Deci[13]).*



With regard to academic motivation, high strength of motivation is not sufficient. Research shows that the type of motivation is more important[10;11]. Self-Determination Theory (SDT) acknowledges the differences in quality of motivation and describes motivation along a continuum[12]. Students can lack motivation or be motivated based on external factors or internal factors (Figure 1). Intrinsic motivation (e.g. a sincere interest in an activity) and identified regulation (e.g. a positive valuation of an activity) together form what is called autonomous motivation. Introjected regulation (internal pressures, such as feelings of shame or guilt) and external regulation (external pressures, such as status or parental pressure) together form what is called controlled motivation. Motivation is considered dynamic and can change from controlled to autonomous and vice versa[13]. Autonomous motivation is considered the most desirable type of motivation because it is associated with better learning outcomes and positive well-being of students[14-19]. Moreover, students with autonomous motivation are more likely to deliver autonomy supportive patient care, which benefits health care[10]. If medical schools want to attract students that fit best with their curriculum, they should try to attract the students with autonomous motivation for choosing their curriculum.

Reasons for medical school choice have, to our knowledge, not yet been investigated in relation with student motivation during the medical study. In this study we investigate the main reasons for choosing a particular medical school, whether different student characteristics are associated with different reasons for medical school choice and whether the reasons are associated with strength and type of motivation during the medical study. We examine this among students of three of the eight Dutch medical schools to detect possible medical school effects.

The following research questions guided our study:

1. What are students' main reasons for applying to a particular medical school?

2. Are the main reasons for medical school choice associated with student characteristics (i.e. gender, age, ethnic background, being a first-generation university student, have a parent in the medical profession, area of growing up, medical school)?

3. Are the main reasons for medical school choice associated with motivation for the medical study during the medical course?

Methods

Study design

This was a multi-site cross-sectional study using an online survey (Net Questionnaire) comprising personal data, a multiple-choice question for main reasons for medical school choice and standard, validated questionnaires to measure motivation.

Setting

This study was carried out at three Dutch medical schools: VUmc School of Medical Sciences Amsterdam (VUmc), Academic Medical Center Amsterdam (AMC), and University Medical Center Groningen (UMCG). The medical study in the Netherlands consists of three years of pre-clinical education followed by three years of clinical education, after which students obtain their medical degree. The curricula across the Netherlands are largely comparable because they are all vertically integrated, student-centred and driven by nationally standardized end terms[9;20]. Yet, local differences between the medical schools still exist, such as focus of education (problem-based versus theme-based), student intake, proportion of students admitted through selection and geographical location. An overview of the characteristics of the medical schools is provided in Table 1.

Participants

In the academic year 2013-2014, Year-1 and Year-4 students were invited via e-mail (with up to two reminders) to participate in this study. The sample consisted of Year-1 and Year-4 students. For every ten participants, a gift card of €25 was rewarded through random selection. Participation was voluntary and informed consent was taken. Students that had participated in a qualitative selection procedure (both accepted and rejected students) were included in this study.

Variables

Variables used in this study were main reason for medical school choice, student characteristics and motivation. Based on the literature[3-8], we provided city, curriculum, university culture and selection procedure as response options to the question about the

main reason for medical school choice. If neither were applicable to students, they could choose 'other' and provide their main reason as an open comment in a textbox.

Student characteristics

Data on age, gender, medical school (VUmc/AMC/UMCG), being a first-generation university student (yes/no), whether a student had one or two parents working in the medical profession (yes/no), ethnicity (Dutch/western minority/non-western minority), and area of growing up (city/village) were collected as part of the questionnaire. Ethnicity was defined following the definition used by Statistics Netherlands (CBS; www.cbs.nl), which states that a person belongs to an ethnic minority group if at least one of the parents was born outside the Netherlands.

Motivation variables

Strength and type of motivation (autonomous motivation and controlled motivation) were measured using standard, validated questionnaires.

Strength of motivation was measured with the 15-item Strength of Motivation for Medical School-Revised (SMMS-R)[21-23]. Students had to indicate, on a 5-point Likert-scale, to what extent they agreed with the statements (1 = strongly disagree; 5 = strongly agree). We used the total scale score, as well as the scores on the subscales; Willingness to sacrifice (example item "I would still choose medicine even if that meant I would never be able to go on holidays with my friends anymore"), Readiness to start (example item "I wouldn't consider any other profession than becoming a doctor", and Persistence (example item "I would quit studying medicine if I were 95% certain that I could never become the specialist of my choice").

Type of motivation was based on the concept of motivation put forth by SDT[12]. Autonomous and controlled motivation were measured with the 16-item Academic Self-regulation Questionnaire[11]. Students had to indicate, on a 5-point Likert-scale, how important they considered the stated reasons for studying medicine (1 = not important at all; 5 = very important). An example item of autonomous motivation is "I am motivated to study for the medical study because…. I enjoy doing it". An example item of controlled motivation is "I am motivated to study for the medical study because…. I want others think I'm a good student".

Table 1 *Medical school characteristics*

	VUmc	AMC	UMCG
Focus of the curriculum	Theme-based	Theme-based	Problem-based
Selection procedure	*Selection procedure A* Two phases: 1) Portfolio including previous academic records and extracurricular activities. 2) Lectures followed by assessment of academic skills, measured with tests about medical subjects and study skills. (http://www.med.vu.nl/nl/opleidingen/bachelor-geneeskunde/decentrale-selectie/index.aspx)	*Selection procedure B* Two phases: 1) Cognitive tests and portfolio including previous academic records and extracurricular activities. 2) Lecture followed by an academic test and three-station MMI (Year-1) or interview (Year-4). (https://www.amc.nl/web/Onderwijs/Aankomend-student/Geneeskunde/Decentrale-selectie-1.htm)	*Selection procedure C* Two phases: 1) Portfolio (comprising sections on pre-university education, extracurricular activities, and reflection) and academic and non-academic tests. 2) Patient lecture followed by assignments (related to the lecture, writing an essay, and scientific reasoning) and a four-station MMI assessing communication skills, collaboration skills and reflection. (http://www.rug.nl/umcg/education/medicine/selection_-admission-requirements-and-deficiencies)
Student intake and places assigned through selection	Year-1: 60% of 350 places Year-4: 50% of 350 places	Year-1: 75% of 350 places Year-4: 50% of 350 places	Year-1: 100% of 410 places Year-4: 50% of 410 places
Geographical location	In the capital city (Amsterdam)	In the capital city (Amsterdam)	In a smaller city in the North of the country

Statistical analysis

We calculated frequencies and percentages for each main reason for medical school choice. We assessed associations between the main reasons and student characteristics using binary logistic regression to calculate odds ratios (OR). The variable main reason for medical school choice was transformed into dummy variables for analyses. Odds ratios reflect the change in the probability of a choice based on that particular reason relative to the probability of a choice based on one of the other reasons associated with each of the independent variables (i.e. student characteristics). An OR of > 1 reflects an increased likelihood of a choice based on that particular reason compared to a choice based on one of the other reasons. For investigation of the association between reasons for medical school choice and motivation during the medical study, we conducted analyses of variance while controlling for age and gender (ANCOVA). Bonferroni post-hoc analyses were used to correct for multiple comparisons. Analyses were performed using IBM SPSS Statistics for Windows Version 20.0 (IBM Corp., Armonk, NY, USA).

Ethical approval

Informed consent was obtained from all participants. The data were anonymized before analyses. The study was approved by the Ethical Review Board of the Netherlands Association for Medical Education (NVMO-ERB, dossier number 266).

Results

First, we provide the descriptives of all the variables and the reliability tests of the used scales. Next, we report the results for each research question separately. Correlations between the reasons for medical school choice and motivation variables are provided in the appendix.

The 666 participants (response rate 35%) included 387 Year-1 students and 273 Year-4 students. To answer our research questions, we included only a subsample of students who had participated in selection for the regular medical programme and had indicated a main reason for their medical school choice (n = 478; 315 Year-1 students and 163 Year-4 students). Because the percentage of students the medical schools were allowed to admit through selection has increased from 50% to 100% over the years, we conducted the analyses for the Year-1 and Year-4 subsamples separately. The mean ages of the

subsamples were 18.8 and 22.8 years old for Year-1 and Year-4, respectively. The gender distribution was comparable across the subsamples and representative of that in Dutch medical schools; 74.5% females (n = 283) in Year-1 and 73.9% females (n = 190) in Year-4.

The Crohnbach's alpha values for reliability for the (sub) scales Autonomous motivation, Controlled motivation, Strength of motivation, Willingness to sacrifice, Readiness to start and Persistence were 0.82, 0.84, 0.79, 0.64, 0.67 and 0.58 respectively. The Crohnbach's alpha values of the SMMS-R subscales are slightly below the desired value of 0.70. Findings should therefore be interpreted with caution.

Main reasons for medical school choice

Year-1 Of the Year-1 students, 95.2% (n = 300) indicated one of the proposed reasons as the main reason (see Table 2). Fifteen Year-1 students (4.8%) provided 'other' reasons, of which two could be classified as 'city' and two could be classified as 'curriculum'. Two answers contained more than one reason and were unclear as to what the main reason was. Examples of the other reasons were 'having been treated in the university hospital', 'friends and family studying at the same university' and 'only option due to late application'. A majority of students in Year-1 (56.9%; n = 173) indicated the selection procedure as main reason for medical school choice, followed by city (24.7%; n = 75), curriculum (11.2%; n = 34) and university culture (7.0%; n = 22).

Year-4 Of the Year-4 students, 86.5% (n = 141) indicated one of the proposed reasons as the main reason (see Table 2). Twenty-two Year-4 (13.5%) students indicated 'other' reasons, of which three could be classified as 'city' and one could be classified as 'curriculum'. Four answers contained more than one reason and were unclear as to what the main reason was. Examples of other reasons were that students were already studying at that university or the opportunity to skip a year at that particular medical school. Among Year-4 students results revealed a similar pattern. Almost half of the students (46.9%; n = 68) based their medical school choice on the selection procedure, 36.0% (n = 52) on the city, 12.4% (n = 18) on the curriculum and 4.8% (n = 7) on the university culture. Analyses were conducted using only the main categories 'city', 'curriculum', 'university culture' and 'selection procedure'.

Association between reasons for medical school choice and student characteristics (Table 3)

Year-1 City, curriculum and selection procedure as main reasons for medical school choice were associated with student characteristics. Females were more likely to have chosen based on city than males (OR 2.20; 95% CI 1.16-4.15). Students at VUmc (OR 2.43; 95% CI 1.23-4.79) and AMC (OR 3.43; 95% IC 1.66-7.06) were more likely to have chosen based on city than students at UMCG. First-generation university students were less likely to have chosen based on the curriculum than students whose parent(s) attended higher education (OR 0.28; 95% CI 0.11-0.07). Students at VUmc (OR 3.11; 95% CI 1.19-8.16) and AMC (OR 3.46; 95% CI 1.19-10.03) were more likely to have chosen based on the curriculum. Females (OR 0.56; 95% CI 0.31-1.00) and older students (OR 1.69; 95% CI 1.00-2.84) were more likely to have chosen based on the selection procedure.

Year-4 City, curriculum and selection procedure as main reasons for medical school choice were associated with student characteristics. Students at VUmc (OR 4.72; 95% CI 1.58-14.15) and AMC (OR 5.15; 95% CI 1.72-15.46) were more likely to have indicated city as main reason for their medical school choice. Minority students, both Western (OR 0.12; 95% CI 0.02-0.60) and Non-Western (OR 0.07; 95% CI 0.01-0.74) were less likely to indicate curriculum as the main reason for medical school choice than Dutch students. Students at VUmc (OR 0.17; 95% CI 0.06-0.48) and AMC (OR 0.39; 95% CI 0.16-0.95) were less likely to have indicated the selection procedure as main reason than students at UMCG.

Association between reasons for medical school choice and motivation during the medical study (Table 4)

Year 1 We report overall scores for strength of motivation (M = 55.5; SD = 6.9), Willingness to sacrifice (M = 17.5; SD = 2.8), Readiness to start (M = 18.7; SD = 3.1), Persistence (M = 19.3; SD = 2.6), Autonomous motivation (M = 4.3; SD = 0.4) and Controlled motivation (M = 2.0; SD = 0.7). No associations were found between the main reason for medical school choice and strength and type of motivation.

Table 2 *Distribution of main reasons for medical school choice across Year-1 and Year-4 students*

Year -1		Main reason for choice of university			
		City	Curriculum	University culture	Selection procedure
Medical school	VUmc (n = 90)	20.0% (n = 18)	7.8% (n = 7)	10.0% (n = 9)	62.2% (n = 56)
	AMC (n = 92)	15.2% (n = 14)	5.4% (n = 5)	9.8% (n = 9)	69.6% (n = 64)
	UMCG (n = 122)	35.2% (n = 43)	18.0% (n = 22)	3.3% (n = 4)	56.9% (n = 53)
Gender	Male (n = 70)	35.7% (n = 25)	8.6% (n = 6)	8.6% (n = 6)	47.1% (n = 33)
	Female (n = 234)	21.4% (n = 50)	12.0% (n = 28)	6.8% (n = 16)	59.8% (n = 140)
Ethnic background	Majority (n = 261)	24.1% (n = 63)	11.1% (n = 29)	6.9% (n = 18)	57.9% (n = 151)
	Western minority (n = 22)	31.8% (n = 7)	13.6% (n = 3)	9.1% (n = 2)	45.5% (n = 10)
	Non-western minority (n = 21)	23.8% (n = 5)	9.5% (n = 2)	9.5% (n = 2)	57.1% (n = 12)
Having a medical doctor as a parent	Yes (n = 47)	31.9% (n = 15)	12.8% (n = 6)	8.5% (n = 4)	46.8% (n = 22)
	No (n = 256)	23.0% (n = 59)	10.9% (n = 28)	7.0% (n = 18)	59.0% (n = 151)
Being a first-generation university student	Yes (n = 55)	20.0% (n = 11)	18.2% (n = 10)	1.8% (n = 1)	60.0% (n = 33)
	No (n = 248)	25.8% (n = 64)	9.3% (n = 23)	8.5% (n = 21)	56.5% (n = 140)
Area of growing up	City (n = 137)	27.0% (n = 37)	10.2% (n = 14)	8.0% (n = 11)	54.7% (n = 75)
	Village (n = 167)	22.8% (n = 38)	12.0% (n = 20)	6.6% (n = 11)	58.7% (n = 98)
Total (n = 304)		24.7% (n = 75)	11.2% (n = 34)	7.0% (n = 22)	56.9% (n = 173)
Year-4		Main reason for choice of university			
		City	Curriculum	University culture	Selection procedure
Medical school	VUmc (n = 26)	19.2% (n = 5)	3.8% (n = 1)	3.8% (n = 1)	73.1% (n = 19)
	AMC (n = 35)	14.3% (n = 5)	14.3% (n = 5)	11.4% (n = 4)	60.0% (n = 21)
	UMCG (n = 84)	50.0% (n = 42)	14.3% (n = 12)	2.4% (n = 2)	33.3% (n = 28)
Gender	Male (n = 34)	32.4% (n = 11)	14.7% (n = 5)	5.9% (n = 2)	47.1% (n = 16)
	Female (n = 111)	36.9% (n = 41)	11.7% (n = 13)	4.5% (n = 5)	46.8% (n = 52)
Ethnic background	Majority (n = 130)	37.7% (n = 49)	9.2% (n = 12)	4.6% (n = 6)	48.5% (n = 63)
	Western minority (n = 10)	20.0% (n = 2)	40.0% (n = 4)	10.0% (n = 1)	30.0% (n = 3)
	Non-western minority (n = 5)	20.0% (n = 1)	40.0% (n = 2)	0.0% (n = 0)	40.0% (n = 2)
Having a medical doctor as a parent	Yes (n = 15)	26.7% (n = 4)	20.0% (n = 3)	0.0% (n = 0)	53.3% (n = 8)
	No (n = 130)	36.9% (n = 48)	11.5% (n = 15)	5.4% (n = 7)	46.9% (n = 68)
Being a first-generation university student	Yes (n = 31)	25.8% (n = 8)	9.7% (n = 3)	6.5% (n = 2)	58.1% (n = 18)
	No (n = 113)	38.9% (n = 44)	12.4% (n = 14)	4.4% (n = 5)	44.2% (n = 50)
Area of growing up	City (n = 54)	24.1% (n = 13)	16.7% (n = 9)	5.6% (n = 3)	53.7% (n = 29)
	Village (n = 91)	42.9% (n = 39)	9.9% (n = 9)	4.4% (n = 4)	42.9% (n = 39)
Total (n = 145)		36.0% (n = 52)	12.4% (n = 18)	4.8% (n = 7)	46.9% (n = 68)

Table 3 *Regression analyses of student characteristics and reasons for medical school choice*

Student characteristic		Model 1 City	Model 2 Curriculum	Model 3 University culture	Model 4 Selection procedure
Year-1		**Odds ratio (95% CI)**	**Odds ratio (95% CI)**	**Odds ratio (95% CI)**	**Odds ratio (95% CI)**
Female		**2.20** (1.16-4.15)	0.57 (0.20-1.64)	1.36 (0.48-3.82)	**0.56** (0.31-1.00)
Age ≥ 19 years		1.00 (0.55-1.80)	0.50 (0.21-1.17)	0.39 (0.13-1.13)	**1.69** (1.00-2.84)
Ethnic background (Reference group = Majority)	**Western minority**	0.44 (0.16-1.24)	1.22 (0.25-5.99)	0.65 (0.13-3.24)	2.03 (0.78-5.23)
	Non-western minority	0.82 (0.28-2.47)	0.89 (0.18-4.40)	0.73 (0.15-3.67)	1.28 (0.49-3.33)
Being a first- generation university student		1.56 (0.69-3.52)	**0.28** (0.11-0.70)	5.12 (0.66-40.04)	0.96 (0.50-1.84)
Having a medical doctor as a parent		0.76 (0.37-1.58)	0.58 (0.20-1.65)	1.06 (0.32-3.51)	1.52 (0.77-2.99)
Growing up in city		0.81 (0.46-1.43)	1.17 (0.53-2.59)	0.98 (0.39-2.43)	1.10 (0.67-1.80)
University† (Reference group = UMCG)	**VUmc**	**2.43** (1.23-4.79)	**3.11** (1.19-8.16)	0.33 (0.10-1.14)	**0.41** (0.23-0.74)
	AMC	**3.43** (1.66-7.06)	**3.46** (1.19-10.03)	0.24 (0.07-0.87)	**0.35** (0.19-0.64)
Year-4		**Model 1 City**	**Model 2 Curriculum**	**Model 3 University culture**	**Model 4 Selection procedure**
		Odds ratio (95% CI)	**Odds ratio (95% CI)**	**Odds ratio (95% CI)**	**Odds ratio (95% CI)**
Female		0.67 (0.30-1.90)	1.42 (0.41-4.93)	1.11 (0.17-7.20)	1.04 (0.44-2.47)
Age ≥ 23 years		1.21 (0.54-2.70)	1.70 (0.52-5.59)	0.73 (0.14-3.72)	0.71 (0.33-1.50)
Ethnic background (Reference group = Majority)	**Western minority**	2.22 (0.38-13.00)	**0.12** (0.02-0.60)	0.30 (0.03-3.40)	3.40 (0.70-16.44)
	Non-western minority	1.00 (0.07-13.44)	**0.07** (0.01-0.74)	n.a.	4.00 (0.49-32.65)
Being a first- generation university student		1.73 (0.64-4.70)	2.28 (0.40-12.99)	0.70 (0.11-4.28)	0.51 (0.20-1.29)
Having a medical doctor as a parent		1.77 (0.46-6.82)	0.84 (0.17-4.23)	n.a.	0.45 (0.13-1.56)
Growing up in city		1.66 (0.71-3.89)	0.93 (0.28-3.05)	1.08 (0.18-6.46)	0.63 (0.28-1.39)
University‡ (Reference group = UMCG)	**VUmc**	**4.72** (1.58-14.15)	3.57 (0.40-32.22)	0.66 (0.06-7.78)	**0.17** (0.06-0.48)
	AMC	**5.15** (1.72-15.46)	0.95 (0.24-3.79)	0.20 (0.03-1.37)	**0.39** (0.16-0.95)

OR = odds ratio; 95% CI = 95% confidence interval.

* Numbers in bold denote significant ORs ($p < 0.05$).

† Year-1: VUmc compared to AMC (reference group): Model 1 City OR 0.71 (95% CI 0.31-1.61); Model 2 Curriculum OR 0.90 (95% CI 0.26-3.09); Model 3 University culture OR 1.35 (95% CI 0.46-3.92); Model 4 Selection procedure OR 1.16 (95% CI 0.60-2.25).

‡ Year-4: VUmc compared to AMC (reference group): Model 1 City OR 0.92 (95% CI 0.22-3.76); Model 2 Curriculum OR 3.73 (95% CI 0.35-39.50); Model 3 University culture OR 3.24 (95% CI 0.31-33.85); Model 4 Selection procedure OR 0.45 (95% CI 0.14-1.45).

Table 4 *ANCOVA analyses of mean differences in motivation outcomes in the groups of students categorised by main reason for medical school choice*

Year-1	N	Autonomous motivation¶ Mean* (SE)	Controlled motivation¶ Mean* (SE)	Strength of motivation† Mean* (SE)	Willingness to sacrifice‡ Mean* (SE)	Readiness to start‡ Mean* (SE)	Persistence‡ Mean* (SE)
City	75	4.22 (0.05)	1.94 (0.08)	53.97 (0.80)	16.64 (0.33)	18.32 (0.36)	18.96 (0.30)
Curriculum	34	4.38 (0.08)	1.88 (0.12)	58.54 (1.21)	18.79 (0.48)	19.46 (0.53)	20.43 (0.45)
University culture	22	4.18 (0.09)	2.22 (0.14)	54.69 (1.48)	17.45 (0.61)	18.65 (0.66)	18.96 (0.55)
Selection procedure	173	4.30 (0.03)	2.05 (0.05)	55.82 (0.52)	17.72 (0.22)	18.79 (0.24)	19.32 (0.20)
F-value by group		$F_{3, 294} = 1.623$	$F_{3, 295} = 1.332$	$F_{3, 293} = 0.503$	$F_{3, 297} = 0.178$	$F_{3, 300} = 0.577$	$F_{3, 296} = 1.067$
p-value		n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Year 4							
City	52	4.15 (0.06)	1.78 (0.09)	52.69 (0.87)	16.75 (0.38)	17.16 (0.44)	18.69 (0.34)
Curriculum	18	4.32 (0.10)	1.70 (0.16)	52.62 (1.46)	16.72 (0.64)	17.53 (0.75)	18.38 (0.58)
University culture	7	4.28 (0.15)	1.49 (0.25)	55.46 (2.53)	18.92 (1.02)	17.96 (1.30)	18.75 (0.92)
Selection procedure	68	4.15 (0.05)	1.97 (0.08)	52.24 (0.77)	16.17 (0.33)	17.81 (0.39)	18.14 (0.30)
F-value by group		$F_{3, 139} = 0.258$	$F_{3, 139} = 1.729$	$F_{3, 137} = 0.341$	$F_{3, 141} = 1.819$	$F_{3, 139} = 0.775$	$F_{3, 139} = 1.389$
p-value		n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

SE = standard error.
¶ Possible score range is 1 - 5
* Corrected mean
† Possible score range is 15 – 75
‡ Possible score range is 5 - 25

Year-4 We report overall scores for strength of motivation (M = 52.4; SD = 6.2), Willingness to sacrifice (M = 16.5; SD = 2.7), Readiness to start (M = 17.4; SD = 3.2), Persistence (M = 18.4; SD = 2.5), Autonomous motivation (M = 4.2; SD = 0.4) and Controlled motivation (M = 1.9; SD = 0.7). No associations were found between the main reason for medical school choice and strength and type of motivation.

Discussion

In this study we explored students' main reasons for medical school choice and whether these main reasons are associated with student characteristics and motivation for the medical study during the medical course. We found that the selection procedure and the city were most often indicated as the main reason for choosing to apply to a particular medical school. Different types of students reported city, curriculum and selection procedure as the main reason to a different extent. The main reasons for medical school choice were not associated with motivation for the medical study during the medical course. Our study adds to the existing literature addressing medical school choice because, to our knowledge, it is the first study which investigates medical school choice in relation with motivation outcomes during the medical study and in a unique setting in which students can apply to selection at one medical school only.

Main reason for medical school choice Our study suggests that applicants mainly choose which medical school to apply to based on the selection procedure and the city. The curriculum had been a critical factor in medical school choice for about 10% of students only. Year-1 and Year-4 students showed similar patterns, although the importance of the selection seems to have increased over the years (main reason for 46.9% of Year-4 students and for 56.9% of Year-1 students). We found selection to be an important factor in medical school choice in a setting in which applicants can participate in selection at only one medical school per year. A medical school choice based on the selection procedure can be considered a strategic choice. Earlier research from the UK, where applicants have to limit their choice to four medical schools, also showed how much applicants focus on selection[24]. From 2017, medical school admission in the Netherlands will be selection-based only, which raises questions as to how the desired student-curriculum fit can best be reached. Besides providing proper information about the medical course during recruitment activities, applying a selection procedure that reflects the curriculum may become even more important for both matching and selection purposes. Applicants can judge whether important curricular aspects appeal to them, while medical schools

can assess which applicants have the most potential to perform well in their curriculum.

Reasons for medical school choice and student characteristics Medical school choice approaches varied across students with different background characteristics. Among Year-1 students, female students in our study were more likely to have based their choice on the city than male students, while male students' choices were more often based on the selection procedure. In other research, gender differences were found for curriculum aspects as a reason for medical school choice[6]. We did not find differences in this respect, which may be explained by the different study designs. In our study, students had to indicate one main reason, while in the UK study students were asked to indicate three reasons. Curriculum aspects may have been important to the males and females in our sample to a different extent as well, but clearly not as the main reason. Among Year-4 students, Dutch students were more likely to have taken the curriculum into account than both Western and non-Western minority students. Students at the three medical schools differed in their approaches as well. Two medical schools in our study are situated in the same city, Amsterdam. Students from these two schools showed similar approaches. These approaches differed from those of students from the smaller city, Groningen. For the students from Amsterdam, city and curriculum were more often important factors than for the students from Groningen. This raises the question as to what students valued most in the school of their choice after they decided to apply to a medical school in Amsterdam. The selection procedure was more often important to the Year-4 students from Groningen compared to the students from Amsterdam. The selection ratio was equal to that of the other medical schools at the time these students had applied (i.e. 50%). The preference for the selection procedure used at UMCG among the students from Groningen was likely related to the content of the procedure. In that period, multiple mini interviews (MMIs), which were used at UMCG, were not commonly used in Dutch medical school selection. Other medical schools used predominantly academic tools to select their students. Possibly, this distinctive part of the UMCG procedure appealed to applicants.

In their communication towards future applicants, each medical school puts forward different aspects of their school in order to attract the types of students they want to admit. For example, universities can present themselves as aspiring diversity, being research minded or having an international orientation and look for students that share these ambitions. When applicants make a strategic choice, the profiles of the different medical schools are likely to be overlooked. This also raises the question about whether

different types of selection procedures attract different types of students. Medical schools should realise that approaches of different types of applicants can vary. This highlights the importance of recruitment strategies which focus on the type of student that they look for. Important aspects of the medical schools are best put forward by students and faculty during personal contact, because research has shown that applicants highly value that during open days[4;7;24].

Reasons for medical school choice and motivation during the medical study Even though a majority of students seems to enrol the medical study with a strategic approach, their motivation during the medical study is not inferior to the motivation of those who base their choice on more autonomous motivations, such as the curriculum. This suggests that the medical schools in the current study may have been successful in attracting students who fit with their curriculum by means of their selection procedure. The strength of motivation among medical students reported in this study is comparable to findings from other studies[21;25;26] and can be considered good. In addition, students reported more autonomous motivation and less controlled motivation than students from teacher training institutes in another study[11]. Overall, the motivation of Year-4 students appears to be lower than the motivation of Year-1 students, which is in line with a previously reported decrease of motivation throughout the medical study[27]. Identifying students with the desirable type of motivation during the selection procedure is difficult, because applicants tend to mainly put forward their autonomous motivations, while underreporting their controlled motivations. The selection procedure can, however, be used to stimulate applicants to think about the curriculum aspects[28].

Limitations Several limitations have to be considered when interpreting the findings of this study. First, we do not know if our study sample is representative of the population with regards to the main reasons and motivation. The most motivated students may be more likely to participate in research, although the data did include reports of low strength and autonomous motivation and high controlled motivation. Second, the Year-4 students had to recall what their main reason for medical school choice had been several years before. The reasons they have reported may not be accurate. Moreover, the educational programme may have influenced their motivation[14]. To examine whether the motivation of students who enter the medical study with varying approaches develops differently throughout the study, a longitudinal design would be more appropriate. Lastly, while providing four particular reasons for medical school choice in the questionnaire allowed better assessment of associations with the other variables, this method obviously did not

cover the full range of possible reasons and the nuances in the proposed reasons that might drive applicants. However, because we based the provided reasons on previous findings from the literature[3-8] and considering that the participants provided only few other reasons, we believe these reasons to be a fair representation of the majority of applicants' reasons. In addition, we haven't gathered information about *why* students chose for a certain selection procedure. Therefore, we don't know whether their choice was mainly based on the criteria assessed or the tools used in the selection procedure, or on the acceptance ratio of the medical school. The results of the current study led us to conduct a next qualitative study to gain a better understanding of applicants' pre-admission behaviour.

Implications Considering the importance of the selection procedure for applicants, the findings stress the importance of alignment of the selection procedure with the medical schools' curriculum characteristics and values. This can involve including a lecture which is designed around a particular area of the human body (when education is more theme-based) or a lecture designed around a certain diagnose (when education is more problem-based), as well as using tests that are representative of assessment during the medical study.

Conclusion

Our study indicates a conflict of interest between medical schools' and applicants' approaches to selection. A majority of applicants makes a strategic choice for a particular medical school, which highlights the importance of aligning recruitment and selection strategies with the curriculum to establish the desired student-curriculum fit. Different approaches are not associated with differences in motivation during the medical study. Medical schools should, however, take into account the different approaches towards medical school choice among applicants with various background characteristics if they desire to attract a student population that reflects the diversity of the patient population.

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Appendix

Pearson correlations between reasons for medical school choice and motivation outcomes

Year-1 Year-4	1 Reason City	2 Reason Curriculum	3 Reason University culture	4 Reason selection procedure	5 Autonomous motivation	6 Controlled motivation	7 Strength of motivation	8 Willingness to sacrifice	9 Readiness to start	10 Persistence
1 Reason City	-	n.a.	n.a.	n.a.	-0.085	-0.058	**-0.140***	**-0.185****	-0.092	-0.078
2 Reason Curriculum	n.a.	-	n.a.	n.a.	0.067	-0.091	**0.132***	**0.141***	0.067	**0.137***
3 Reason University culture	n.a.	n.a.	-	n.a.	-0.071	0.078	-0.046	-0.017	-0.022	-0.045
4 Reason Selection procedure	n.a.	n.a.	n.a.	-	0.069	0.067	0.063	0.079	0.049	0.006
5 Autonomous motivation	-0.048	0.123	0.052	-0.058	-	-0.017	**0.572****	**0.459****	**0.524****	**0.395****
6 Controlled motivation	-0.075	-0.086	-0.125	**0.184***	-0.042	-	-0.055	-0.076	-0.007	-0.047
7 Strength of motivation	0.000	-0.022	0.081	-0.018	**0.407****	-0.100	-	**0.846****	**0.820****	**0.746****
8 Willingness to sacrifice	0.036	-0.003	**0.185***	-0.112	**0.247****	-0.067	**0.745****	-	**0.547****	**0.497****
9 Readiness to start	-0.094	-0.012	0.019	0.091	**0.386****	-0.072	**0.752****	**0.281****	-	**0.374****
10 Persistence	0.069	-0.027	0.029	-0.061	**0.222****	-0.108	**0.700****	**0.390****	**0.254****	-

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Grey cells represent Year-1 correlations. White cells represent Year-4 correlations.