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ASSESSMENT

Effects of raising the bar on medical student study progress: An intersectional approach

Vera M.A. Broks | Karen M. Stegers-Jager | Walter W. van den Broek | Andrea M. Woltman

Institute of Medical Education Research Rotterdam, Erasmus MC, University Medical Center Rotterdam, Rotterdam, The Netherlands

Correspondence
Andrea Woltman, Institute of Medical Education Research Rotterdam, Erasmus MC, University Medical Center Rotterdam, Room AE-231, PO Box 2040, 3000 CA Rotterdam, The Netherlands.
Email: a.woltman@erasmusmc.nl

Abstract

Context: Medical schools seek for measures to improve their students' study progress and are responsible for a diverse student population.

Objectives: The effect of a stricter academic dismissal (AD) policy in medical school on short-term and long-term study progress was investigated in a longitudinal cohort study. In addition, differential effects for subgroups were assessed by intersecting gender, ethnicity and prior education (intersectional framework).

Methods: Participants were first-year Bachelor students enrolled in 2011 to 2016 in a Dutch medical school. For cohorts 2011-2013, the AD policy consisted of a minimum of 67% of Year-1 credits required to remain enrolled (67%-policy, n = 1189), and for cohorts 2014-2016, this bar was raised to 100% of Year-1 credits (100%-policy, n = 1233). Outcome measures on study progress were Year-1 completion and dropout (short term) and Bachelor completion in three and four years (long term).

Results: Overall, Year-1 completion rates increased under the 100%-policy compared to the 67%-policy (OR = 2.50, 95%-CI:2.06-3.03, $P < .001$). Yet, this increase was not present for students with non-standard prior education – except for males with a migration background (OR = 7.19, 95%-CI:2.33-25.73, $P < .01$). The dropout rate doubled under the 100%-policy (OR = 2.41, 95%-CI:1.68-3.53, $P < .001$). Mainly students with standard prior education dropped out more often (OR = 3.68, 95%-CI:2.37-5.89, $P < .001$), except for males with a migration background. Bachelor completion rates after three and four years were not positively affected by the 100%-policy. Notably, females without a migration background and with non-standard prior education suffered from the 100%-policy regarding Bachelor completion after three years (OR = 0.29, 95%-CI:0.11-0.76, $P < .05$).

Conclusions: Despite increased dropout rates, the stricter AD policy improved Year-1 completion rates – especially for under-represented subgroups, thereby improving study progress without harming student diversity on the short term. However, these positive effects did not hold regarding Bachelor completion rates indicating that long-term effects require higher performance standards throughout the Bachelor, which in turn may harm other subgroups and thereby student diversity.

1 | INTRODUCTION

Medical schools seek for measures in the academic environment to improve their students' study progress.[1,2] Improved study progress minimises invested resources for students as well as medical schools,[3-5] and it reflects institutional effectiveness.[6] At the same time, medical schools are responsible for a diverse student population and need to deliver future doctors who are representative of the society they take care of.[7-11] Yet, several student characteristics that determine the diversity of the student population are also associated with study progress – such as gender,[12-14] ethnicity,[15-19] and prior education.[12,20] Moreover, study progress is not only affected by student characteristics, as previous research indicates that study progress is a complex product of student characteristics and characteristics of the academic environment.[21-24] Therefore, the goal of the current study is to investigate the effectiveness of a measure in the academic environment on the study progress of subgroups of students based on multiple student characteristics.

One measure in the academic environment to improve study progress is the academic dismissal policy (AD policy). An AD policy entails that Year-1 students are obligated to obtain a certain amount of Year-1 credits in order to remain enrolled. This is valuable since performance in the first year proves to be a marker for overall study progress.[3,25,26] Within higher education, the AD policy expedited the detection of a mismatch between the student and the programme, but did not improve completion rates.[3] For medical school specifically, the introduction of an AD policy demanding a minimum of 67% of Year-1 credits (67%-policy) did neither affect dropout rates in Year-1 nor study progress.[5] Recent research indicates that raising the bar to 100% of obligated Year-1 credits (100%-policy) in medical school leads to better Year-1 performance, especially for male students.[13] It is unknown whether this positive effect of the stricter AD policy persists across multiple cohorts and whether it affects dropout rates and Bachelor completion rates. Additionally, the effect for different subgroups based on student characteristics – besides gender – is unknown.

Even though the main goal of the 100%-policy is to improve study progress, it is desirable that a change in the academic environment reinforces equal opportunities for subgroups. This is necessary to maintain a diverse student population.[27,28] Previous research demonstrated that ethnic minorities are under-represented in medical schools and that they underperform compared to ethnic majorities.[15-19] Further, males tend to be more and more under-represented in the medical student population, and they underperform compared to female students.[12-14] Also, students who enter higher education with a non-standard prior education perform worse.[12,20] Although socioeconomic status may also influence study progress under certain conditions, it does not influence study progress in the early (pre-clinical) stage of Dutch medical school when other student characteristics such as ethnicity and prior education are taken into account.[12,15]

To obtain in-depth insights into subgroups, multiple cohorts and a large number of students should be enrolled. This will also enable subgroup analyses with the intersectional approach. According to this approach, students are part of multiple subgroups which reinforce each other and should therefore be considered together.[29] To unravel new insights regarding the effectivity of a 100%-policy on short-term and long-term study progress for specific subgroups, the research questions explored in the current study are: What is the effect of a 100%-AD policy compared to a 67%-AD policy in medical schools on Year-1 completion, Year-1 dropout and Bachelor completion? And is this effect different for subgroups based on the intersection of gender, ethnicity and prior education?

2 | METHODS

2.1 | Context

The study was conducted with Bachelor students of Erasmus MC Medical School in the Netherlands. Dutch medical schools consist of a Bachelor's and Master's programme which each take three years. The Bachelor curriculum of Erasmus MC Medical School includes pre-clinical training in thematic blocks and competence-based learning lines for which students can obtain a maximum of 180 credits under the European Credit Transfer System (ECTS). Each year a maximum of 60 credits can be obtained. Grades are based on a 10-point scale from 1 to 10 (maximum) where 5.5 is the minimum to pass.

2.2 | Academic dismissal

Academic dismissal (AD) policy at Erasmus MC Medical school from 2005 onwards concerned academic probation and no access to Year-2 modules if students failed to obtain 67% of the Year-1 credits 12 months after enrolment. This was followed by dismissal after 24 months if students did not succeed in obtaining all Year-1 credits (67%-policy). In 2014, the AD policy changed and the Year-1 credit standard was raised from 67% to 100% to increase study progress of Bachelor students.[30] Under the 100%-policy, students were dismissed if they failed to obtain 100% of the Year-1 credits 12 months after enrolment. Opposed to the 67%-policy, under the 100%-policy compensation was possible for up to two grades between 5.0 and 5.49 provided these grades were not in a single thematic block and the grade average would not drop below 6.0.

2.3 | Participants

The participants were Bachelor students from Erasmus MC Medical School, who enrolled in cohorts 2011 to 2013 (67%-policy: 1189 students) and cohorts 2014 to 2016 (100%-policy: 1233 students), with a total of 2422 students. The university student administration provided data regarding the cohorts, study progress, age and gender. Information regarding ethnicity and prior education of the students was obtained through *1 Cijfer HO* (1CHO), a national database of

Dutch students of higher education. Since the data were analysed on an aggregated level, no individual consent was required. The study was carried out in accordance with the Declaration of Helsinki and was deemed exempt form review after evaluation by the Medical Ethics Committee of Erasmus MC Rotterdam.

2.4 | Student characteristics

The following variables were used: gender (female or male), ethnicity (with or without migration background) and prior education (standard Dutch pre-university education or non-standard). Students were considered to have a migration background when at least one of the parents was born in a foreign country, in line with the definition of Statistics Netherlands (www.CBS.nl). Within the subgroup of students with a migration background, students with a western or non-western migration background were distinguished. All countries in Europe (excluding Turkey), in North America and in Oceania, and Indonesia and Japan, were considered western. All countries in Africa, in Latin America and in Asia (excluding Indonesia and Japan), and Turkey, were considered non-western. The category non-standard prior education refers to students that entered medical school by obtaining a degree in applied sciences, obligatory certificates for Medical School at pre-university level, or with a foreign preliminary education diploma. Finally, age (categorical: younger than 19, 19 to 21 and older than 21 years) and pre-university grade point average (pu-GPA, continuous) are included as control variables since these are known to be predictors for study progress.[12]

2.5 | Study progress

Short-term study progress was operationalised as Year-1 completion (defined as obtaining all 60 credits from Year-1 within 12 months after enrolment under both the 67%- and the 100%-policy) and Year-1 dropout (dropping out during Year-1 without re-enrolment for the next academic year). Note that when students voluntarily (without academic dismissal) unenrolled during Year-1 but re-enrolled for the next year, they were not considered as dropouts since they just repeated Year-1. Study progress for the long term was based on Bachelor completion (180 credits) in three years and four years. The data regarding the completion of the Bachelor in four years were not available for students of cohort 2016. All outcome variables were dichotomous.

2.6 | Statistical analysis

First, baseline differences between the groups of students under the 67%-policy and 100%-policy were examined. The two groups were compared based on the earlier discussed student characteristics with a chi-squared test (categorical variables) or a t test (continuous variable). Second, the relationship between the AD policy and study progress for different subgroups was studied with logistic regression analyses in different models: Model 0 compared the 67%-policy and 100%-policy for the total group of students; Model 1 included subgroups based on gender, ethnicity and prior education separately; Model 2 combined two of the three student characteristics; and Model 3 combined all three student characteristics. Based on these analyses, odds ratios were computed with the interaction term of the policy and the subgroup. So each odds ratio depicts the effect of the 100%-policy compared to the 67%-policy for the specified subgroups. When 1 was not included in the 95%-confidence interval (95%-CI) of the odds ratio, it was considered statistically significant. An effect size of the odds ratio is based on the following guidelines: 1.22 = small, 1.86 = medium, 3.00 = large (inverse equivalents 0.82 = small, 0.54 = medium, 0.33 = large).[31] The effects for subgroups of students were compared using a reference subgroup to test whether the odds ratios were significantly different. Post hoc analyses to assess subgroup differences within the 67%-policy or within the 100%-policy were performed with a logistic regression model where being part of a specific subgroup (no = 0, yes = 1) was the predictor variable. To perform the analyses, R version 3.6.1 in combination with RStudio was used.

3 | RESULTS

3.1 | Student characteristics

The 100%-policy cohorts contained significantly more females, more students younger than 19 and fewer students between 19 and 21 and older than 21, and a slightly higher pu-GPA compared to the 67%-policy cohorts (Table 1). These differences were controlled for in the logistic regression models. There were no statistically significant differences between the cohorts within the 67%-policy and the 100%-policy regarding ethnicity and prior education.

3.2 | Year-1 completion

The percentage of students that successfully completed Year-1 in the first year increased from 51.0% to 70.0% from the 67%-policy to the 100%-policy (Table 2 – Model 0). The odds for students in the 100%-policy were 2.50 times higher to successfully complete Year-1 in the first year compared to students under the 67%-policy (OR = 2.50, 95%-CI: 2.06-3.03, $P < .001$, Table 2 – Model 0).

Subgroup analysis revealed that the positive effect of the 100%-policy was stronger for males (OR = 3.60, 95%-CI: 2.62-4.98, $P < .001$) than females (OR = 2.04, 95%-CI: 1.61-2.59, $P < .001$, Table 2 – Model 1a). This closed the gender performance gap; post hoc analysis showed that female students performed significantly better than males regarding Year-1 completion under the 67%-policy (43.1% males vs 56.0% females, OR = 0.59, 95%-CI = 0.47-0.75, $P < .001$), and no such difference was observed under the 100%-policy (69.1% males vs 70.3% females). Students

TABLE 1 Comparison of 67%-policy and 100%-policy based on student characteristics (age, gender, ethnicity, prior education and pre-university GPA)

	67%-policy (cohorts 2011-2013)[a]		100%-policy (cohorts 2014-2016)[a]		
	n	%	n	%	Test for difference[b]
Age					
<19	370	31.1%	548	44.4%	$\chi^2 = 51.9$, $df = 2$, $P < .001$
≥19 & ≤21	721	60.6%	630	51.1%	
>21	98	8.2%	55	4.5%	
Gender					
Female	730	61.4%	842	68.3%	$\chi^2 = 12.3$, $df = 1$, $P < .001$
Male	459	38.6%	391	31.7%	
Ethnicity					
No migration background	826	69.5%	823	66.7%	$\chi^2 = 2.5$, $df = 2$, $P = .291$
Migration background	363	30.5%	410	33.3%	
Western	*97*	*8.2%*	*118*	*9.6%*	
Non-western	*266*	*22.4%*	*292*	*23.7%*	
Prior education					
Standard	1052	88.5%	1065	86.4%	$\chi^2 = 2.2$, $df = 1$, $P = .134$
Non-standard[c]	137	11.5%	168	13.6%	
Pre-university GPA[d]					
Mean	1052	71.0	1065	72.1	$t = -4.2$, $df = 2112$, $P < .001$
Total	**1189**		**1233**		

[a]Number of students per cohort: 392 (2011), 388 (2012), 409 (2013), 412 (2014), 408 (2015), 413 (2016).

[b]For age, gender, ethnicity and prior education (categorical) Pearson's chi-square test is used, for pre-university GPA (continuous) the *t* test is used.

[c]Students with non-standard prior education obtained the obligatory certificates for Medical school at pre-university level (76%) or through foreign preliminary education (24%).

[d]Pre-university GPA is only known for students with standard prior education.

with a western migration background profited a lot (large effect size) from the 100%-policy as their Year-1 completion rate increased from 50.5% to 79.7% (OR = 4.35, 95% CI:2.24-8.63, $P < .001$, Table 2 – Model 1b) – again especially the male students in that subgroup profited from the stricter policy with an increased Year-1 completion rate from 40.0% to 87.5% (OR = 11.59, 95%-CI: 3.14-48.76, $P < .001$, Table 2 – Model 2c).

Also prior education affected the effect of the 100%-policy compared to the 67%-policy. The performance of students with standard prior education significantly improved under the 100%-policy from 54.5% to 76.3% (OR = 2.74, 95%-CI: 2.23-3.37, $P < .001$, Table 2 – Model 1c). In contrast, the performance of the already underperforming students with non-standard prior education did not improve significantly as their Year-1 completion rates were 24.8% and 29.2%. One exception showed up in the group of students with non-standard prior education: the subgroup of male students with a migration background (OR = 7.19, 95%-CI: 2.33-25.73, $P < .01$, Table 2 – Model 3). This specific subgroup's Year-1 completion rate increased significantly from 14.7% to 54.8% with the transition to the 100%-policy. Post hoc analysis showed that this specific subgroup did not differ significantly from their fellow students under the 100%-policy where they did under the 67%-policy (OR = 0.27, 95%-CI: 0.18-0.41, $P < .001$).

3.3 | Dropout

The proportion of students that dropped out in the first year doubled with the introduction of the 100%-policy, from 3.7% to 8.4% (OR = 2.41, 95%-CI: 1.68-3.53, $P < .001$, Table S1 – Model 0). Despite this increase, the prevalence of dropouts was still low, resulting in wider confidence intervals.

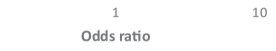
Opposed to students with non-standard prior education, students with standard prior education dropped out significantly more often under 100%-policy compared to the 67%-policy, as their dropout rate increased from 2.5% to 8.2% (OR = 3.68, 95%-CI: 2.37-5.89, $P < .001$, Table S1 – Model 1c). Post hoc analysis showed that under the 67%-policy, students with non-standard prior education dropped out significantly more often than students with standard prior education (13.1% vs 2.5%, OR = 5.97, 95%-CI:3.13-11.15,

TABLE 2 Effects of the 67%-policy vs the 100%-policy on Year-1 completion (obtaining all 60 credits from Year-1 within 12 months after enrolment)

Model				67%-policy n	67%-policy %Year-1 complete	100%-policy n	100%-policy %Year-1 complete	Odds ratio (95% CI)[a]		Graph of odds ratios including CI[b]	
0				**1189**	**51.0%**	**1233**	**70.0%**	**2.50 (2.06-3.03)**	***		
1	a	Gender	Female	730	56.0%	842	70.3%	2.04 (1.61-2.59)	***		ref.
			Male	459	43.1%	391	69.1%	3.60 (2.62-4.98)	***		**
	b	Ethnicity	No migration background	826	53.6%	823	70.5%	2.42 (1.92-3.06)	***		ref.
			Migration background	363	45.2%	410	68.8%	2.65 (1.90-3.70)	***		
			Western	*97*	*50.5%*	*118*	*79.7%*	*4.35 (2.24-8.63)*	***		
			Non-western	*266*	*43.2%*	*292*	*64.4%*	*2.25 (1.53-3.32)*	***		
	c	Prior education	Standard	1052	54.5%	1065	76.3%	2.74 (2.23-3.37)	***		ref.
			Non-standard	137	24.8%	168	29.2%	1.34 (0.80-2.26)			*
2	a	Gender * prior education	Female & standard	655	58.9%	738	76.7%	2.31 (1.80-2.98)	***		ref.
			Male & standard	397	47.1%	327	75.5%	3.74 (2.64-5.34)	***		*
			Female & non-standard	75	30.7%	104	25.0%	0.81 (0.42-1.60)			***
			Male & non-standard	62	17.7%	64	35.9%	2.77 (1.23-6.55)	*		
	b	Ethnicity * prior education	No migration background & standard	769	55.4%	721	77.5%	2.82 (2.21-3.62)	***		ref.
			Migration background & standard	283	51.9%	344	73.8%	2.55 (1.77-3.69)	***		
			Western	*74*	*55.4%*	*97*	*85.6%*	*5.27 (2.45-11.80)*	***		
			Non-western	*209*	*50.7%*	*247*	*69.2%*	*2.05 (1.35-3.14)*	***		
			No migration background & non-standard	57	29.8%	102	20.6%	0.65 (0.31-1.40)			***
			Migration background & non-standard	80	21.3%	66	42.4%	2.86 (1.39-6.04)	**		
			Western	*23*	*34.8%*	*21*	*52.4%*	*2.17 (0.65-7.56)*			
			Non-western	*57*	*15.8%*	*45*	*37.8%*	*3.39 (1.35-8.96)*	*		
	c	Gender * ethnicity	Female & no migration background	521	58.9%	580	71.2%	1.98 (1.49-2.64)	***		ref.
			Female & migration background	209	48.8%	262	68.3%	2.21 (1.44-3.41)	***		
			Western	*72*	*54.2%*	*78*	*75.6%*	*2.92 (1.34-6.47)*	**		
			Non-western	*137*	*46.0%*	*184*	*65.2%*	*2.06 (1.23-3.46)*	**		
			Male & no migration background	305	44.6%	243	68.7%	3.53 (2.37-5.30)	***		*
			Male & migration background	154	40.3%	148	69.6%	3.57 (2.11-6.10)	***		
			Western	*25*	*40.0%*	*40*	*87.5%*	*11.59 (3.14-48.76)*	***		*
			Non-western	*129*	*40.3%*	*108*	*63.0%*	*2.68 (1.50-4.84)*	***		
3		Gender * ethnicity * prior education	Female & no migration background & standard	492	60.2%	511	77.9%	2.28 (1.69-3.09)	***		ref.
			Female & migration background & standard	163	55.2%	227	74.0%	2.46 (1.54-3.96)	***		
			Male & no migration background & standard	277	46.9%	210	76.7%	4.28 (2.78-6.68)	***		*
			Male & migration background & standard	120	47.5%	117	73.5%	2.80 (1.56-5.10)	***		
			Female & no migration background & non-standard	29	37.9%	69	21.7%	0.50 (0.19-1.29)			**
			Female & migration background & non-standard	46	26.1%	35	31.4%	1.37 (0.51-3.65)			
			Male & no migration background & non-standard	28	21.4%	33	18.2%	0.90 (0.25-3.25)			
			Male & migration background & non-standard	34	14.7%	31	54.8%	7.19 (2.33-25.73)	**		

[a] With the computation of the odds ratios (OR), the model controls for age, gender, and pre-university GPA. H_0: OR=1, H_1: OR≠1, where '*' denotes p<0.05, '**' denotes p<0.01 and '***' denotes p<0.001.

[b] Odds ratios of the subgroups are compared to the odds ratio of the reference group ('ref.'). H_0: $OR_{ref}=OR_{subgroup}$, H_1: $OR_{ref} \neq OR_{subgroup}$, where '*' denotes p<0.05, '**' denotes p<0.01 and '***' denotes p<0.001.



$P < .001$). Under the 100%-policy, this gap is no longer present (9.5% vs 8.2%). For students with standard prior education, the dropout rate increased especially for female students from 1.8% to 8.3% with a large effect size (OR = 5.00, 95%-CI: 2.75-9.88, $P < .001$), and for males to a smaller extent from 3.5% to 8.0% with a medium effect size (OR = 2.45, 95%-CI: 1.27-4.93, $P < .01$, Table S1 – Model 2a). Beside the female students and students with standard prior education, students without a migration background dropped out more often too under the 100%-policy, with an increase in dropout rate from 3.1% to 9.2% (OR = 3.08, 95%-CI: 1.96-5.00, $P < .001$). Of note, students with a migration background who are male and have standard prior education did not show an increase in dropout rate. This subgroup's dropout rate was very low under the 100%-policy (1.7%, Table S1 – Model 3), and post hoc analysis showed this subgroups' dropout rate is significantly lower than the dropout rate of the rest of the students (OR = 0.17, 95%-CI:0.03-0.56, $P < .05$). In conclusion, especially students with standard prior education dropped out more often under the stricter policy – except for males with a migration background.

3.4 | Bachelor completion

The proportions of students who completed the Bachelor in three years were similar between the 67%-policy and the 100%-policy (54.0% vs 56%, Table 3 – Model 0).

A negative effect of the 100%-policy on the Bachelor completion rate was only present for students without a migration background with a non-standard prior education (OR = 0.45, 95%-CI: 0.21-0.94, $P < .05$, Table 3 – Model 2b). Within this subgroup, especially female students suffered from the 100%-policy with regard to Bachelor completion, with only 17.4% completing the Bachelor in three years under the 100%-policy where this percentage was 44.8% under the 67%-policy (OR = 0.29, 95%-CI: 0.11-0.76, $P < .05$, Table 3 – Model 3). Post hoc analysis shows that this specific subgroups' performance did not significantly differ from their fellow students' performance under the 67%-policy but was significantly worse under the 100%-policy (OR = 0.15, 95%-CI:0.08-0.27, $P < .001$). After four years, the 67%-policy and the 100%-policy resulted in comparable Bachelor completion rates (74.9% vs 75.0%, Table S2 – Model 0), which were not significantly affected by gender, ethnicity or prior education.

4 | DISCUSSION

The present study demonstrates the effect of raising the bar for passing the first year in medical school from 67% to 100% on students' short-term study progress, that is, Year-1 completion and dropout rate, as well as long-term study progress, that is, Bachelor completion. Increased Year-1 performance standards resulted in increased overall Year-1 completion rates despite increased overall Year-1 student dropout rates, without affecting Bachelor completion rates after three or four years. When zooming in to different subgroups based on student characteristics by applying the intersectional framework, the current study shows that increased performance standards enhanced Year-1 completion rates stronger for male than for female students, resulting in a closed gender performance gap. In particular, students with a non-standard prior education were not likely to benefit from this stricter policy, except for male students with a migration background. Although increased performance standards resulted in increased Year-1 completion for students with standard prior education, this subgroup also demonstrated an increased dropout rate, albeit still relatively low. Although the raised bar in the first year did not affect overall Bachelor completion rates, female students without a migration background and with a non-standard prior education were significantly less likely to complete their Bachelor programme in three years.

The current study shows that raising the bar has a positive effect on the short term. Earlier research showed no effects on completion rates of the introduction of an AD policy demanding a minimum of 67% of Year-1 credits in medical school compared to no AD policy.[5] In line with previous research on stricter Year-1 performance standards in medical school as well as other schools, the current study shows that a stricter AD policy does lead to better performance on the short term.[13,24,32] This indicates that the bar needs to be raised further than 67% to obtain a positive effect. A less strict academic dismissal policy may focus on minimum standards rather than on the benefits of an optimal study rate. Students of medical schools already perform relatively well compared to those of other schools, and the bar of 67% is probably in line with the baseline performance of many students. Interestingly, the positive effect of the higher bar is only visible on the short term, not the long term, indicating once students completed the first year, their performance relapses – leading to no effects on Bachelor completion rates. In line with the literature, this indicates that the higher bar extrinsically stimulates students to improve their performance, which drops again when the performance standard is removed.[33] A previous study on 450 Dutch Bachelor programmes showed a positive but small long-term effect as defined by Bachelor completion in four years for faculties on Social Sciences, Humanities, Law and Economics, but not for Medicine, which may be partially explained by the lower completion rates compared to medical schools prior to the introduction of that policy.[3]

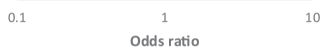
The intersectional approach revealed notable differences in the effect on performance for different subgroups of students. First, with respect to gender, it was found that, on the short term, males profited more from the 100%-policy compared to females, which closed the gender performance gap in Year-1. This is in line with previous results where only two cohorts were included[13] and can be explained with earlier research that indicated that male students are generally more extrinsically motivated.[34,35] The study performance of male students dropped compared to the performance of female students in the remaining part of the Bachelor programme once this extrinsic motivation in the shape of a strict performance standard was removed. Hence, after three years, the gender performance gap returned, demonstrating the importance of a long-term follow-up. Second, especially males with a migration background profited from

TABLE 3 Effects of the 67%-policy vs the 100%-policy on Bachelor completion 3 years after enrolment

Model				67%-policy n	67%-policy % Bachelor completion in 3 years	100%-policy n	100%-policy % Bachelor completion in 3 years	Odds ratio (95% CI)[a]		Graph of odds ratios including CI[b]	
0				**1189**	**54.0%**	**1233**	**56.0%**	**1.00 (0.84-1.20)**			
1	**a**	**Gender**	**Female**	730	59.3%	842	59.7%	0.98 (0.78-1.22)			ref.
			Male	459	46.0%	391	48.1%	1.04 (0.77-1.40)			
	b	**Ethnicity**	**No migration background**	826	57.7%	823	57.0%	0.93 (0.75-1.15)			ref.
			Migration background	363	46.0%	410	54.1%	1.18 (0.87-1.62)			
			Western	*97*	*57.7%*	*118*	*61.0%*	*1.01 (0.55-1.85)*			
			Non-western	*266*	*41.7%*	*292*	*51.4%*	*1.25 (0.86-1.80)*			
	c	**Prior education**	**Standard**	1052	57.8%	1065	61.2%	1.01 (0.84-1.22)			ref.
			Non-standard	137	26.3%	168	23.2%	0.92 (0.54-1.57)			
2	**a**	**Gender * prior education**	**Female & standard**	655	62.3%	738	65.0%	1.03 (0.82-1.30)			ref.
			Male & standard	397	50.4%	327	52.6%	0.97 (0.71-1.33)			
			Female & non-standard	75	33.3%	104	22.1%	0.64 (0.32-1.26)			
			Male & non-standard	62	17.7%	64	25.0%	1.68 (0.71-4.09)			
	b	**Ethnicity * prior education**	**No migration background & standard**	769	59.4%	721	62.4%	0.99 (0.79-1.24)			ref.
			Migration background & standard	283	53.4%	344	58.7%	1.07 (0.76-1.51)			
			Western	*74*	*64.9%*	*97*	*63.9%*	*0.87 (0.44-1.71)*			
			Non-western	*209*	*49.3%*	*247*	*56.7%*	*1.15 (0.77-1.72)*			
			No migration background & non-standard	57	35.1%	102	18.6%	0.45 (0.21-0.94)	*		*
			Migration background & non-standard	80	20.0%	66	30.3%	1.92 (0.89-4.18)			
			Western	*23*	*34.8%*	*21*	*47.6%*	*1.88 (0.56-6.57)*			
			Non-western	*57*	*14.0%*	*45*	*22.2%*	*1.93 (0.69-5.58)*			
	c	**Gender * ethnicity**	**Female & no migration background**	521	62.2%	580	60.0%	0.91 (0.70-1.18)			ref.
			Female & migration background	209	52.2%	262	59.2%	1.17 (0.78-1.75)			
			Western	*72*	*68.1%*	*78*	*64.1%*	*0.72 (0.34-1.51)*			
			Non-western	*137*	*43.8%*	*184*	*57.1%*	*1.54 (0.94-2.51)*			
			Male & no migration background	305	50.2%	243	49.8%	0.97 (0.67-1.41)			
			Male & migration background	154	37.7%	148	45.3%	1.19 (0.73-1.97)			
			Western	*25*	*28.0%*	*40*	*55.0%*	*2.78 (0.88-9.41)*			
			Non-western	*129*	*39.5%*	*108*	*41.7%*	*0.99 (0.56-1.73)*			
3		**Gender * ethnicity * prior education**	**Female & no migration background & standard**	492	63.2%	511	65.8%	1.00 (0.76-1.32)			ref.
			Female & migration background & standard	163	59.5%	227	63.4%	1.13 (0.72-1.75)			
			Male & no migration background & standard	277	52.7%	210	54.3%	0.97 (0.66-1.44)			
			Male & migration background & standard	120	45.0%	117	49.6%	0.99 (0.57-1.71)			
			Female & no migration background & non-standard	29	44.8%	69	17.4%	0.29 (0.11-0.76)	*		*
			Female & migration background & non-standard	46	26.1%	35	31.4%	1.43 (0.53-3.84)			
			Male & no migration background & non-standard	28	25.0%	33	21.2%	0.92 (0.27-3.11)			
			Male & migration background & non-standard	34	11.8%	31	29.0%	3.18 (0.91-13.02)			

[a] With the computation of the odds ratios (OR), the model controls for age, gender, and pre-university GPA. H_0: OR=1, H_1: OR≠1, where '*' denotes p<0.05, '**' denotes p<0.01 and '***' denotes p<0.001.

[b] Odds ratios of the subgroups are compared to the odds ratio of the reference group ('ref.'). H_0: $OR_{ref}=OR_{subgroup}$, H_1: $OR_{ref} \neq OR_{subgroup}$, where '*' denotes p<0.05, '**' denotes p<0.01 and '***' denotes p<0.001.



the stricter policy on the short term regardless of their prior education. This subgroup is relatively small, yet interesting, since these students generally are under-represented and underperforming in medical schools.[12-19] Their dropout rates did not increase while their Year-1 completion rates increased, closing the performance gap with their fellow students. Yet, on the long term, this performance gap returns as the Bachelor completion rates for this subgroup remained unchanged. The higher performance standards pushed this subgroup of students to perform better, demonstrating that these students are able to perform much better than they originally showed. This is in line with previous research on undergraduate management students regarding goal-setting theory,[36] describing that especially male students and students with a migration background profit more from specific and challenging goals.[37] The removal of a relatively high performance demand as a clear and challenging goal during the rest of the Bachelor programme may have caused the relapse to its original performance level resulting in underperformance compared to its peer group on the long term. A third and surprising subgroup effect was found for female students without a migration background and with a non-standard prior education. These students did not profit nor suffer from the 100%-policy on the short term and actually suffered from the stricter policy on the long term. Their Bachelor completion rate decreased compared to the less strict policy. Whether this subgroup has different needs or is more prone to experience stress which may affect performance should be investigated. Further research is needed to determine whether the observed divergent effects for subgroups exposed by the intersectional framework reflect previous findings that subgroups of students based on gender, ethnicity and prior education have different study strategies and motivation.[38-41]

With the introduction of the 100%-policy, the dropout rate increased most for the largest subgroup, that is, students without a migration background with standard prior education, despite their above average performance regarding Year-1 and Bachelor completion. This raises the question whether the 100%-policy made students drop out for the wrong reasons. Perhaps they would have been able to complete their Bachelor but got discouraged and/or more stressed by the higher bar. In particular, females dropped out more and, on average, they were found to be more prone to stress when the bar was raised.[13] Opposed to students with standard prior education, students with non-standard prior education did not drop out more often under the 100%-policy. As a result, the dropout gap closed between students with standard and non-standard prior education under the 100%-policy. A recent study suggests that students entering medical school are not used to failing, and they need support to deal with failure since it is inevitable in medical school.[42] Possibly, students with non-standard prior education have learnt to deal with challenges or failure before entering medical school – contrary to the average student with standard prior education – because of their alternative and often longer paths towards medical school admission, but further research is needed. Recent literature mentions the need to identify medical students who avoid difficult tasks and hide their weaknesses (a fixed mindset), as opposed to students who thrive in challenging situations (a growth mindset), based on Carol Dweck's mindset theory.[43-45] A stricter policy may strengthen a fixed mindset that leaves limited room for failure. Perhaps such a mindset makes students more likely to drop out and to hide their weakness when they are struggling instead of embracing the challenge. Whether students without a migration background and standard prior education – especially female students – have a more fixed mindset opposed to students with a migration background or with non-standard prior education, requires further research.

The application of the intersectional framework is considered as a strength of the current study compared to previous research, as illustrated by the complexity of effects for different subgroups of students. Sometimes specific subgroups profited or suffered from the policy change when overall such effect was not visible. Another strength is the longitudinal design in which data were collected over four years for each cohort (except for the last included cohort), allowing the examination of short-term and long-term effects. The analysis of six subsequent cohorts of medical students, thereby preventing specific cohort effects, can be considered a strength as well. However, this timeframe of six years is a limitation too, since the context inevitably changes inside and outside the academic environment. Even though no extensive curriculum changes took place in these years, a small number of students was still submitted by lottery until 2014, where the students of subsequent cohorts were all admitted by selection. However, this was corrected for as much as possible by controlling for age and pre-university GPA beside gender, ethnicity and prior education. The operationalisation of ethnicity by having a migration background (western or non-western) is a limitation too, since every categorisation is a reduction of one's identity. It can be argued that this could also be operationalised with a focus on one's own preferred ethnic identity, as recommended by others.[46] Also, this study focused on the effectivity of a stricter AD policy for medical schools, it is plausible that different schools with different types of students and completion rates yield other results of such stricter policy. Finally, it should be noted that the intersectional approach can help to detect patterns for subgroups, but at the same time a risk arises of thinking in stereotypes resulting in stigmatisation.[47] Therefore, the current study should be considered as a first essential step, which should be followed up by exploring the underlying constructs causing subgroups to respond differently as the ultimate goal – not the classification of subgroups itself.

In conclusion, an increased Year-1 performance standard in medical school improves study progress in the first year, but does not affect Bachelor completion rates. When medical schools are interested in improving the relatively high Bachelor completion rates and thereby study progress on the long term, a policy applied to all consecutive years of the Bachelor can be considered to improve study progress. Medical schools should be aware that increased performance standards can result in positive effects on performance for specific subgroups (male students with migration background) and may harm the study progress of others (female students without a migration background and non-standard prior education). It

is important for medical schools to identify what characteristics or needs cause these differential effects. Only then, medical schools can meet their students' diverse needs and optimise student performance.

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CONFLICT OF INTEREST

None.

AUTHOR CONTRIBUTIONS

VMAB, KMS-J and AMW substantially contributed to the conception and design of the study. VMAB and KMS-J collected the data. VMAB analysed the data and wrote the first draft of the article. All authors (VMAB, KMS-J, AMW and WWvdB) interpreted the data, revised it critically for important intellectual content, approved the final manuscript for publication, and have agreed to be accountable for all aspects of the work in ensuring that questions related to its accuracy or integrity are appropriately investigated and resolved.

ETHICAL APPROVAL

The current study was carried out in accordance with the Declaration of Helsinki and was deemed exempt from full review after evaluation by the Medical Ethics Committee of Erasmus University Medical Center, Rotterdam.

ORCID

Vera M.A. Broks https://orcid.org/0000-0002-8874-2580
Karen M. Stegers-Jager https://orcid.org/0000-0003-2947-6099

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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