Author’s response to reviews

Title: Selection and Academic Success of Medical Students in Hamburg, Germany

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Author’s response to reviews:

To the Editor

♦ Here we enclose the revised manuscript in two versions, one with changes tracked and the other without. We heeded the technical comments and respond to the reviewers as follows:

Reviewer 1

In Aims of Study section, the required versus option nature of the various admissions tests should be more clearly described.

♦ Aims of study section was clarified and expanded.

The exact research question(s) should be clearly stated at the end of this section.

♦ Research questions were elaborated.

Methods section: The authors state that 40% of students must be selected according to quotas, but it is not clear within this 40% how the various quota groups are allotted. Does each medical school decide how admissions are determined within each of the four quota groups described?
Legislation requires medical schools to select 40% of students according to quotas, whereof about half are allotted to the quota for excellent PEA and the waiting list, respectively. In a pre-selection process, small contingents of places are allotted to applicants from non-EU countries, applicants that apply for medicine as a second degree, cases of hardship, and medical officers of the Federal Armed Forces. An extensive description of this would probably distract from the main line of our article, so we give only a short account.

In the Results section, Table 4, it is not clear why 192 students are from a "Quota others, unknown" category. Which aspects of these students are "unknown"?

We explained “Quota others, unknown” in the footnote to Table 4:

Quota others, unknown: This category comprises 35 students who studied medicine as an adjunct to other studies; 31 students were medical officers from the Federal Armed Forces; 3 cases of hardship; 46 students who were admitted prior to 2012 through the quota for excellent pre-university educational attainment, the waiting list quota or the HAM-Nat, yet commenced their studies only after 2012 and 2015 due to interruption by military deployment; and 77 students whose path to admission could not be retrieved from the database of the university. An unknown part of this latter group is comprised of students who successfully sued for their admittance and students already enrolled in the study programme who swapped places with student enrolled at a different university.

Reviewer 2

GENERAL COMMENTS:

It is a well executed study, but one that may generate little interest outside Germany since probably no other countries have such major education qualification differences between states.

Yes, the German federal system seems to be unique among European nations in this respect. However, the issues of fairness raised in Germany, due to differential predictive behaviour of state-specific grades, parallel similar issues raised in the UK, due to differential predictive behaviour of grades obtained from selective schools as contrasted to non-selective schools. Thus, an account of the problem should be of interest at least in the UK, see for example: Mwandigha ML et al. (2018) What is the effect of secondary (high) schooling on subsequent medical school performance? A national, UK-based, cohort study. BMJ Open, http://dx.doi.org/10.1136/bmjopen-2017-02029.
The paper is over-long for the messages it seeks to convey, and the text is rambling and frequently goes off-course.

♦ The discussion of methods that are designed to improve fairness is too far off-course - we deleted this section. The composite nature of our sample (half entrance test, half quota groups) generates a complexity that is absent in most UK-studies. We tried out different ways of organizing the text but ultimately kept the original sequence.

The conclusion at the end of the Abstract is incomplete, but also inaccurate insofar as the data do not support the additional value of the Natural Science test.

♦ They do, we did not emphasize this sufficiently and now show p(F) for R2 change in Tab. 3. See also the conclusion section.

The Statistical approach is very sophisticated, but not sufficiently well-described for the average reader. In particular the terminology for the variable are cumbersome and confusing.

♦ Explanation of methods was expanded at appropriate places.

REQUESTED REVISIONS:

The actual aim of the study is unclear: The Abstract Conclusion implies that the Aim is to test whether the Natural Science Test adds value to selection based on academic criteria alone.

♦ The Natural Science Test adds value to selection as shown by regression coefficients in Tab. 3. This is also expressed in the text. However, this effect is small. As explicated in the discussion, it should not be taken as reflective of the test’s validity in a broader pragmatic sense.

The paper explores many other issues to do with medical school progress.

♦ For the evaluation of an entrance test, not only the group selected by entrance test, but also a comparison with groups selected by other means is of interest. Not only test performance is of interest, but also the effect of concomitant factors.
The authors need to state the hypotheses they wish to test at the outset, and then present the relevant data in a logical fashion. Then finally restrict the discussion to addressing whether the hypotheses are proven or otherwise. All tangential material and irrelevancies should be omitted.

♦ For an experimental study, this structure would be quite necessary, but this is a correlational study. We do not test a hypothesis, but report empirical findings, mainly about predictive validity and its concomitants. An example of a study we used as a model is: McManus IC, Dewberry C, Nicholson S, Dowell JS: The UKCAT-12 study: educational attainment, aptitude test performance, demographic and socio-economic contextual factors as predictors of first year outcome in a cross-sectional collaborative study of 12 UK medical schools. BMC medicine 2013, 11:219–244.

Currently the take-home message is obscure.

♦ Now clarified.

There are a number of language issues that need to be addressed, for example, stating that a test is "suitable" is ambiguous.

♦ Yes, "suitable" is too vague for a scientific paper – the statement has been made factual.

Also the word "tap" is used frequently; "measure" would be better.

♦ Yes, we changed the wording.

There are many examples of clumsy prose which have the potential to confuse a reader, e.g., "....by the predictor-outcome correlation based on the sample of the admitted applicants". Also, e.g., "Students admitted.....due to the quota for excellent pre-university educational attainment performed much better...."

♦ A native speaker helped us with the revision.

The Background section is excessively long, contains many irrelevant sections, and does not state the Aim of the study.

♦ One section deleted, aim of the study expanded.