Reviewer's report

Title: Motivational profiles of medical students: Association with study effort, academic performance and exhaustion

Version: 1 Date: 21 February 2013

Reviewer: Larry Gruppen

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The use of the Academic Motivation Scale and Study Process Questionnaire and other instruments on a physician-in-training sample raises questions about similarities or differences compared with a more general population. If such comparative information is available from the literature, it would be very useful to include to judge the extent to which this sample is more or less motivated by the two factors the authors describe.

In describing the intrinsic and controlled motivational dimensions, I was left wondering about on which the authors would classify examination performance as a motivating factor? It is typically not considered intrinsic motivation, but it also seems different from the examples provided by the authors (family pressure and money). Where should it go?

The theoretical foundation for the study is sound and the literature summary appropriate, though constrained by space. The hypotheses derive logically from the theoretical analysis and are relevant to concerns about motivation in medical students. My question about the framework, which is not limited to this study, is the sense that it treats motivation as a fairly stable “trait-like” characteristic related to medicine as a whole. One can also consider motivation as a much more situated phenomenon in which an individual’s actions and decisions can be analyzed in a more constrained time frame (should I study tonight or go out with friends). Although one could hypothesize that the large-scale, long-term motivational profiles the authors propose would impact individual decisions, it does not seem to address the more fluid fluctuations in motivation in the instant. Does SDT provide for a more situational analysis of decisions?

Page 4, 1st paragraph: the phrase “…would exhibit a different type of study behaviour…” seems vague. Could you describe the types of behaviors you are thinking of?

The section on Page 7 linking student characteristics to the hypothesized motivational profiles is intriguing, but, as the authors note, speculative. The study provides no evidence to judge the validity of these characterizations and I wonder if they are really appropriate for this manuscript. If retained, please emphasize that they lack empirical evidence.

The sample reflects a limited response rate, but not out of line with many other survey studies of medical students. One issue that the authors should address is
the large predominance of women in the sample. Although consistent with the demographics of the University Medical Center Utrecht, it is quite different from the balance in many other parts of the world and, given the impact of gender on the results, makes it difficult to know how to generalize these results to other countries. Any thoughts the authors might have on this would be welcome.

The statistical procedures appear well-selected and conducted. The cross-validation of the cluster solution is an important step, given the tendency for such data-fitting methods to generate very localized solutions. Also, the MANOVA, controlling for gender, is a good decision.

Although statistically reliable, the correlational results are generally quite small, accounting for only 1-3% of the variance in the variables. The exceptions are the correlations between intrinsic and extrinsic motivation and deep vs. surface study strategies. (7% to 21% of the variance). It would be useful for the authors to distinguish this difference in effect size. The same applies on 13 to the contrasting effect sizes of the MANCOVA results, ranging from 6% to 51% of the variance – a very large contrast, even though both are statistically significant. Statistical significance is a necessary, but hardly sufficient condition for making sense of data.

I would like to see the % of variance accounted for by each of the 3-, 4-, 5-cluster solutions to better understand the extent of the superiority of the 4-cluster option.

The interpretation of the results appear reasonable and are described clearly.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I have no competing or conflicting interests that interfere with my review.