Reviewer's report

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

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Reviewer: Dirk T Tempelaar

Reviewer's report:

This manuscript is one of a series of articles by the same author team on the role of autonomous and controlled motivation in the medical study: see [9], [12], [31], [34], [35]. Especially [12] is to be regarded as a companion paper to the current manuscript: where [12] sets up a model of the same phenomena within a variables-context (structural equation model), this manuscript does so within a person-context (cluster model). In most disciplines, empirical research focuses on variables-oriented models rather than person-oriented models. SDT, self-determination theory, is somewhat the exception to this rule. The reason why ‘person-profiling’ approaches are so common in applied SDT research, is to be found in the major paradigm of the discipline: it is not the quantity of motivation, but the quality of motivation, that counts. Phrased in an alternative way: the effects of autonomous and controlled motivation are not linear, but it is the relative balance between the two that is the crucial dimension in SDT models.

A typical example of such non-linearity is where both autonomous and controlled motivation individually contribute to better learning, but the partial effects do not sum to a combined effect of being highly motivated, in both the autonomous and controlled sense. However, in the data set of the current study, looking at the correlations in columns 1 and 2 of Table 2, the effects of autonomous and controlled motivation seem to be opposite, rather than in the same direction (as in many studies). At the same time, it is not clear whether there exists any non-linearity in the model. With the limited information I have at hand (Tables 2, 4), it seems that the model is at least approximately linear. That is, most of the profiles expressed in Table 4, can be constructed from the correlations in Table 2, plus the cluster solution. But if so, what is the rational of introducing profiles? In other words, what do we learn from this study, that is not already in [12] (beyond the existence of the 4-cluster solution). Given the circumstance that [12] is so strongly linked with this manuscript, it is my opinion that the authors are obliged to motivate their profiling approach much better than they do now in the first two sentences of the discussion section. The method section needs a motivation of what we can learn from person-oriented studies, that we cannot learn from variables-oriented studies, and under what conditions. The discussion section should next elaborate on what we can learn from this study, what is not yet included in the outcomes of [12]. I regard this, in terms of the categories described by Biomed’ s Guidelines, as a ‘Major Compulsory Revision’.

A comparison with [12] leads to two further issues. The first one can be shortly
expressed as: what happened to Amotivation? The authors used the 7-scale instrument AMS. But in discussing empirical outcomes, it is as if AMS contains no more than 6 scales. There is no single sentence discussing the empirical outcomes with regard to Amotivation, there is no single explanation as to why Amotivation is left out. It is not too difficult to guess why: this study seems to be strongly inspired by [23], and in [23], amotivation does not play a role. But that is because Vansteenkiste et al applied a different instrument, not the AMS, not including the Amotivation scale. In this study, the authors do have Amotivation data, so one cannot just throw it out, without any discussion or explanation. (Minor Essential Revision)

A similar remark refers the role of identified regulation: why is it kicked out, forcing the authors to use the uncommon concept of intrinsic motivation, rather than autonomous motivation? There is a short reference to this modeling step, in the second sentence of the limitations section: the scale is ‘non-applicable’ to students of health professions. No reason is provided, other than referring to study [31]. First, I regard this as the most crucial modeling step in your profiling, so it is highly unsatisfying to refer to an external manuscript for this major step. Second, after reading [31] twice, I have not found any reason in it why the identified regulation scale is ‘non-applicable’ (the word applicable is even not in the text). Stronger: the scale is part of the empirical outcomes of [31]. Even more stronger: the companion paper [12] is based on all six scales, including identified regulation, and thus focuses on autonomous and controlled motivation, instead of intrinsic and controlled motivation, as would be the preferred focus. This issue is a truly major one, that needs to be addressed. In the current setup, the lack of any discussion of the identified regulation scale makes the reader suspicious: is it that the ideal 4-profile structure of HH, HL, LH, LL is sensible to the incorporation of this scale? The authors should avoid giving room to such thoughts, and for that reason, make revisions to take out any breeding ground for such thoughts. Preferably by adopting the same modeling approach as in [12]: include the identified regulation scale, switch to the more common concept of autonomous motivation. (Major Compulsory Revision)

Some minor issues:
There is redundancy in Tables 3 and 4 and Figure 1: the same information is three times in. I can see the added value of a graph over a table, but that makes at least one table superfluous. I would suggest taking out Table 3, and reproduce Figure 1 with raw data, not z-scores (I cannot see a good reason to introduce z-scores at all).
P3: please do not use the word ‘assign’: it suggest an experimental setup. Better us: classify.
P12: I would prefer row% rather than column%, since the aim is to compare gender ratios in the four different profiles.

Level of interest: An article of importance in its field
Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

Not at all