Author’s response to reviews

Title: Swiss chocolate and free beverages to increase the motivation for scientific work amongst residents – A prospective interventional study in a non-academic teaching hospital in Switzerland

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Author’s response to reviews:

Dear Editors,

thank you for considering our original manuscript (TRLS-D-18-00897) entitled:

“Swiss chocolate and free beverages to increase the motivation for scientific work amongst residents – A prospective interventional study in a non-academic teaching hospital in Switzerland“

for consideration of publication in Trials and for giving us the opportunity to resubmit our re-revised manuscript.
We like to thank you and the two reviewers once more for their very extensive, comprehensive and helpful comments. The extensive comments have clearly improved the manuscript.

We responded to all comments in our attached point-by-point response and revised the manuscript accordingly. All changes to the manuscript were highlighted in red/blue using the track change version. Additionally, we provide a revised manuscript as clear file without track changes.

I would be pleased if the revised manuscripts meets your criteria for publication in your journal.

Sincerely and on behalf of all the co-authors,

Dr. A. Rühle

Point-by-point Response

Reviewer #1: Thank you very much for the revised submission, which addresses many of my comments. I've some more points to raise below, many of which are minor and some of which are in response to substantial new sections of content in your paper. I hope everything is clearly explained.

I have now read through the abstract (clean copy only), and have the following comments.

The sentence beginning 'We hypothesize…' does not read well - the reader gets lots at 'resident motivation' - is that part of the list of things with 'continuous information and gratification'? If so, it should have an 'and' before it; if not, it needs rewording.

Thank you, you are right there was something missing in this sentence, we rephrased it to make clear that we believe that our approach helps to increase residents motivation as well as recruitment rates.

Suggest the Background is written in the past tense as you have already done the work ('we hypothesized...that recruitment rates would improve')

You are right, we changed that.

The abstract should, like the main text, make clear that the soft drink machine is just for delivery of the randomisation result.

'Reward' may be a more suitable word than 'recompensate'

We changed that.

Sentence beginning 'Randomization of these trials…' - the words 'was used' at the end are too far from their object - suggest amend to 'later a soft drink machine was used'.

Agreed, it is easier to read that way.

Suggest 'to increase interest, everyone received Swiss chocolate' should be its own sentence. At the moment the reader may well read 'to increase interest' as referring to the trial information bit just before that.
We changed that.

Suggest you could remove 'specially designed'.
'(either categorical or scaled from 0 to 10)' could be removed - it seems too much detail for the abstract (and doesn't actually help understand exactly what your survey covered - for that, I think people need to read the paper).
Agreed.

Results - 'median 9 (7;9)' - we might presume the other numbers are interquartile range, but they aren't labelled as such - suggest this is made totally clear.
We changed that.

'The categorical rated motivation' is not clear. I think this specifically refers to the proportion of people saying they did not feel they could be more motivated than they were. (I think it's important to be clear and specific about this, as it's not quite the same as people saying they were highly motivated, though we could interpret it that way.)
What we wanted to say with categorial rated motivation, was that the residents did not rate their motivation from 0 to 100 % but that they chose from different categories (highly motivated, not motivated, motivation can be improved by...). But we realize you are right to object to the sentence, since it concerns a main aspect of our paper, the motivation of the resident, and it was obviously not written clear. We changed the manuscript accordingly.

'The recruitment rates ranged from 72 to 90%'. This is not clear. It could be interpreted in a number of ways, e.g. range of all monthly recruitment figures - I think you should be more specific, and also present something that is relevant to the argument your paper is making.
Thank you. We tried to shorten the abstract down and unfortunately lost necessary information on the way. Therefore we rewrote this paragraph to clearly display the findings of our trial.

○ '24% of residents stated to be motivated by the gratifications.' I think it would be more true to say that 24% agreed that their motivation could be increased through receiving gratifications. (It is a slight problem with the survey that this could be interpreted in different ways - perhaps somewhat depending on the native language of the respondents - as either 'my motivation can be increased AND has been...' vs 'my motivation could in theory be increased if I were to receive more gratifications...' - but best to report it in line with the questions that were asked)
We changed that.

Conclusion: this claim seems too strong (as the previous draft of the paper was). I wonder if words like 'suggests' might be better.
We rephrased the conclusion addressing your concerns.

Introduction, paragraph 3: thank you, this now reads more clearly. However, a couple of remaining things: 1) it should say 'possible reasons given were...'. It currently says 'where' instead of 'were', and 2) in the same sentence, the point about lack of benefit is clearer now, but I suggest even clearer still would be to say 'due to a perceived lack of benefit for the resident'. I think it's the perception that is the important point.
Thanks, we changed that. You are right that of course the perception of the resident is the key point.

Introduction, p5 in tracked copy - 'Our hypothesis is…' - I had suggested this change to 'was', and you had agreed, but it hasn't changed in the copy I'm looking at. You are right, we must have missed this and changed it now.

Introduction, final paragraph - thanks for clarifying some aspects of this - the sentence starting 'Consequently' is now very long, however, and pretty hard to take in. You might consider dropping some of the newly-added words if they are covered in the Methods. Otherwise, please re-work this all so it is clearer, splitting the sentence up if need be. We believe all these information to be necessary at this point. We have however splitted the sentence up as we agree it was too long. Thank you for your critics.

It's OK to use the abbreviation 'ED', but you should use the full words the first time the term is used, which I think is early in the Methods section. You are absolutely right, this is something we must have missed during first revision.

Methods, Trial One - I have some suggestions for the new sentence at the start: 1) the first sentence should start 'The goal…'; 2) 'an easier' should be changed to the adverbial 'more easily'; 3) the indefinite article (a/an) is probably not required there nor in the last part of the sentence as I suspect 'wound care' is an uncountable noun in English; 4) a suggestion only, but the last few words might read more naturally as 'a shorter period of time off work'.

Methods, Trial One - some suggestions for the new content starting 'Simple 1:1 randomization': 1) I think the first 5 words could be their own sentence; 2) I think 'initially' or 'at first' might be better than 'first', and there should be a comma after this or else it can be confusing (I initially read as if you were talking about the first randomisation); 3) on the third line I think should be the word 'envelopes', not 'enveloped'; 4) 'collected' instead of 'collect; 5) 'were prepared', not 'where prepared'; 6) 'described', not 'describerd'

Thanks. We changed that.

Trial One - additional work of 15 minutes' - your changes have helped, but I think you can only use 'measured' if you say how you measured it - it seems like 'estimated' might be better. If it really was measured, please briefly clarify how. We changed it to estimated.

- Trial Two - suggest you add 'the' to the start of this first sentence ('the aim…')
- Trial Two - 'where less extensive' should be 'were less extensive'
- Trial Two - 'Again 1:1 randomization was used' - you should mention this was simple randomisation if that is the case.
- Trial Two - 'describerd' should be 'described'
- Trial Two - sentence starting 'The mentioned…' - add 'the' before 'operation' and 'background'

3.2 - minor correction required: 'to participate in a trial' rather than 'at a trial'

We made the requested changes.
Methods, section 'Soft drinks' - this is already a lot clearer than before. However - just trying to be totally clear - you've described soft drink cans which were 'filled randomly into the...machine', which sounds like it was done by humans, who are prone to bias. Did a truly random method define the order of the cans?

An equal number of cans for the randomization groups were prepared but were not filled in the machine in any order. Since the resident was able to choose from different drinks, we believed that there was no sense in putting the cans into the machine in any order, since it was not foreseeable which button of the machine would be pressed next.

- Methods, Soft drinks section - 'Timeline...' should be 'The timeline'; and in the same sentence, should be 'displayed' not 'display'; 'figure 2' should probably be 'Figure 2'

Thanks.

3.4 - the paper now has lots of detail about what was in the survey, but I wonder if this could be reduced (if the detail is all in the Figure/attachment)

Since during the first review there seemed to be questions regarding the survey we thought it to be helpful describing it in the text. But you are right, that this lengthens the manuscript. Therefore we assured to provide a PDF file of the Survey as an attachment and shortened the manuscript accordingly.

Figure 3 - this is clearly a screenshot and has a little tooltip/helptext box visible on it covering question 7. I'd suggest it would be better as an attached Word/PDF document, but if it needs to be an image, make sure it is the best quality it can be.

We make sure to provide the survey as a PDF file.

Statistics - you should be clear where this is referring to the survey analysis rather than anything else (e.g. recruitment rates)

Statistics - thanks for the clarification (in your replies) to the questions of what is prospective and what is post hoc. I was thinking in terms of the survey itself, and the analysis of the survey - was any of the analysis plan developed before you launched the survey? Or was it all done once you had the results? Clarification in the paper would be helpful.

We rewrote the statistics part to address this matter, the statistical analysis was planned and carried out after the completion of the survey.

Statistics - regarding my previous comment on the 0.05 p-value threshold - sorry if I was not clear. My understanding is that this can be used as a reasonable threshold for an unlikely result - something that is unlikely enough that there is less than 1/20 chance of it happening by chance. But if you run, say, 20 or more tests, then it becomes increasingly likely that your unlikely result HAS happened by chance, as you have many tests. So you can design your experiment around a primary outcome and only really look at the p-value associated with that, or - if you want to do many tests, you can adjust for the multiplicity (by using a lower threshold for significance) or, as may apply best here, use the p-values only in an exploratory sense (to show what looks to be an unlikely result). If you use this third approach, you are unlikely to be able to use your results to make any strong claims. I think it would be useful to explain your approach a little more: if you are trying to make a definitive claim, then say which outcome measure is your primary; if you
adjusted for multiplicity, say how; or if this is all exploratory and you won't try to make definitive claims, make this clear. Thank you for clearing this up.

Thank you for this indeed statistically absolute correct comment. As you might already assume correctly we have not adjusted for multiple testing and thus the significance level was not used to reinforce any argumentation. The statistics were primarily performed to present results in an exploratory / descriptive dimension. Especially as we have not performed any correlation analysis (e.g. regression analysis, statistical correlation) the presented p-values were not related to statistical conclusion.

Nevertheless, no multiple testing in the proper statistical sense was performed and thus no increased risk for false positive results are to be expected. We have clarified on this in the statistics section 3.6.

Results: thank you for clarifying that the groups completing the first and second surveys were not the same. This is somewhat clearer in the manuscript now (with the addition to the methods). However, I think you should make clear that it was not possible to link individuals' results in the two surveys (I appreciate this is mentioned in Discussion, but I think it should be in Methods as well). If it's possible to estimate the proportion of people invited to complete the second survey who had also been invited to complete the first, this might be useful to know (i.e. so we can tell if they are the same group or a totally different group or something in between).

We agree and changed the methods section accordingly. However in the results section, we do not think that this needs to be mentioned again, since it is discussed in the discussion.

Results - '[Question 2] was answered unanimously' - this would indicate every single person gave the same answer. Is this the case? The result you report is that everyone said "performing clinical trials...are necessary for ... clinical improvement as a doctor", but this isn't one of the multiple choice answers. I suggest you report a more precise result here, i.e. report the percentage of respondents giving particular answer(s).

You are right, we changed this paragraph.

Results, new paragraph beginning 'Missing data...' - suggest the last sentence could be reworded to '...that less scientifically motivated colleagues might have chosen not to complete the survey.'

Thank you for your concern.

Results, new heading 'Where the trials acknowledged...' should be 'Were...' Thank you, of course this needed to be changed.

Results: thank you for clarifying the section on reasons for preferring one or the other of the trials. I note you have not reported the number who said they preferred the trial because of the free soft drinks - though this seems core to your manuscript. Might you add this?

No resident stated during the first survey, that the soft drink was a direct motivator to prefer trial 2 over trial 1. This is compatible with the response of the residents during the first survey.
answering if they think gratification would increase their motivation. No resident believed to be influenced by gratification (therefore no resident stated the gratification with the soft drinks would influence them). Interestingly regarding the motivation; 20% of residents stated to be influenced by the gratifications. Since during the second survey both trials had the soft drink machine, the question whether trial 2 was preferred due to the soft drink was not applicable anymore. We updated the manuscript in the results and discussion section accordingly and hope to made this more clear and transparent.

Results: the section on motivation is clearer, thank you. However, Figure 6 is a bit difficult to interpret. I think there are different numbers in the 1st and 2nd period columns, so I think you should make clear the denominator in each. I am also not sure why the 'no increase' answers are in this illustration of reasons for increase in motivation, as these are presented in Figure 5 (aren't they? If not, then I'm not sure what 'no increase' means here).

Thank you for your concerns, we do realize figures 5 and 6 to be not clear enough. They both display the responses to question 10 of the survey with is a multiple choice answer. We believed it to be easier to interpret designing to graphs out of the responses but realize through your concerns that this is not the fact. Instead we decided to discard both figures and display the data with one table (Table 2) that holds all the information to the responses given to question 10. Accordingly the manuscript was changes. We hope this helps understanding our data.

- Results, section on motivation: 'Interestingly, this number dropped'. It didn't - it remained constant (7 in first round, 7 in second), but the proportion did drop.
- Results, 'Did the trials run…' - add 'The' before the start of the paragraph '...inclusion period of trial one…'

Changes were made according to the review.

Discussion: 'Only few studies exist on trial recruitment' - I'm not sure this is true - is the intended meaning that there are only a few studies like yours, looking at motivating hospital staff? Our research in Pubmed, google scholar and the orcca database you kindly suggested during the first review showed, as we wrote there is literature concerning the influence of the recruitment period but existing literature focusses on trial design, material design, patient contact, patient influence and there is not much literature addressing the motivation of recruiters. We rewrote the paragraph to make this more clear.

- Discussion: you say recruitment rates in surgical trials may be less than 50%, but the reference is from 2006. Is there anything more recent? If not, might you soften this claim a bit?

Unfortunately we were not able to find more recent data. Often, recruitment rates are not reported so the literature we refer to and the experiences we made is all we can consider. We altered the paragraph and added that the data is not to date.

Discussion: new text on p20 of the tracked change version, a sentence beginning 'Regarding out data' I think should say 'Regarding our data…'

Another typo, thank you very much.

Discussion, sentence 'It should be mentioned…' - suggest splitting this sentence after 'participate in a trial' - it is otherwise too long and the clauses are not correctly linked.

Sounds better now, you are right.
Conclusion: I'm not sure what is meant by 'loosening of the randomization process' - this might not be the right word, as it suggests not controlling randomisation as tightly.

We meant something like to pep up / spice up the randomization (or better randomization delivery) process with the display of the randomization result on a free soft drink. We wanted to emphasize that a simple tool like the soft drink machine in our experience helps pepping something up that usually is experienced as quite boring. Our residents told us, that they liked the use of the soft drink machine, since it helped making the randomization (of course the soft drink machine did not randomize itself, as we discussed previously, but the residents experienced it like this) trivial and fun. We changed this to spicing up of the randomization delivery process.

- You seem to have accepted my comments on Table 1, but the version I have still shows the previous issues -perhaps you have already uploaded a new version of this (please ignore this comment if so)
  Ok.

Reviewer #2: The quality of the paper has been greatly improved. Some minor comments:

Abstract: the misuse of "randomization" and "delivery of randomized assignment" is confusing in the method.
We changed that, thank you.

Abstract: It is not clear whether the report of median 9(7; 9) stands for confidence interval or interquartile range?
It is IQR, we changed that in the manuscript.

Result: figure 4 should be described in the main text.
Thank you, we change the manuscript accordingly and also included the percentage in the figure for better understanding.

Conclusion: the recruitment rate in the first and second period in trial one has no difference. It is possible that the gratification helps preventing the recruitment rate from declining over time, but the conclusion statement about "high recruitment rates are partly due to the fact that the randomization delivery tool is motivating the residents" is not accurate.
We changed it to improve the recruitment period, which we believe can be said based on our results with stable high recruitment rates and motivated residents. But you are right, we have no baseline, our data is not strong enough to make a strong claim. But as you said we think that the gratifications helped preventing a decrease of the recruitment rates over time.