Author's response to reviews

Title: Leading during change: the effects of leadership on sickness absence in a Norwegian health trust

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Author's response to reviews: see over
Dr Angelique de Rijk
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Re: Leading during change: the effects of leadership on sickness absence in a Norwegian health trust

Dear Dr. Rijk,

Thank you for a second opportunity to improve our paper and have it re-evaluated.

We appreciate the added comments from editor and the new reviewer. We believe that the new changes have made the methods and results more valid and transparent.

In the new version of the manuscript we have redone the analyses weighted by department size, we have given more information about the data and how the dataset was treated, and further discussed some of the studies limitations. We hope these changes adequately address the concerns raised.

In the attachment to this letter we provide a detailed point-by-point response. The reviewer’s and editor’s comments are given in black, and the authors’ responses are given in red.

Sincerely yours,

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Authors response to Reviewer’s and Editors report

Response to Inge Houkes’s report:

Major Compulsory Revisions
1. P. 13: The authors report a response rate of 40% on the organizational questionnaire. These data were aggregated to department level in order to be able to perform regression on sickness absence data which were provided on department level only. My question is now whether these sickness absence data were based on 100% of the employees of each participating department or only on the data of the employees who responded to the questionnaire? I assume that the sickness absence data were built in the total group of employees for each department? This would imply that the independent variables in the regression analysis (i.e., leader behavior) were based on another group of respondents/participants than the dependent variables (sickness absence in this case). Please make this more explicit in the manuscript and discuss how this affects your results.

Yes, the sickness absence data is based on 100% of the employees. We have now specified this in the text and added it to the discussion

“Our dependent variable is the total absence level at each department, yet our independent variable (leader behavior) is based on the responses of 40% of the employees at the given departments. In the analyses, we therefore assume that the respondents adequately represent their entire departments [...] the results generally support the representativeness of the respondents. It is nevertheless important to keep in mind that errors could arise because the samples used for the independent and dependent variables were different.” Page 22 - 23

2. Methods and results: Given the research question and the structure of the data it would have been very interesting to use a nested design and perform multi level analyses (individual and department level). MLA has many advantages over analysis on individual level alone and analysis on an aggregated level. However, as sickness absence data are and will only be available on the aggregated level this is not possible. Instead I would recommend performing a weighted regression analysis (weigh for department size in the analysis). This can easily been done in SPSS by first computing a weight variable (i.e., department size divided by average department size) and then perform the command “weight cases” (by the weight variable) prior the regression analyses. This would be a more efficient solution than considering department size merely as a confounder and correcting for it in the regression analysis (as you did in the current version of the manuscript).
Thank you for this suggestion. We agree that it gives a more valid result. All analyses are now redone weighted by department size. We have also rewritten the text were appropriate to adapt to the new analyses. Of main changes we no longer find a significant effect of negative leadership, and all VIF values are below 4.

“The analyses were weighted by department size to avoid giving small departments disproportionately high influence.” Page 16 paragraph 1

Minor Essential Revisions
1. P. 14: There is a mistake in a sentence at the bottom of this page: “This approach resulted in 10 factors with between two and nine 2 and 9 items.”

Thank you for pointing this out. The sentence have now been corrected.

2. P. 23: Although the discussion of study limitations is already quite extensive, I recommend discussing the limitations of the aggregated data analyses more extensively. You have lost a lot of information by aggregating the data to department level and the analysis has not been very efficient. It would have been very interesting if you would have been able to perform multi level analysis, given the nested structure of the data.

Yes, we agree. A multilevel approach would have been advantageous. We have now stated this more clearly.

“Due to anonymity concerns, it was necessary to perform the analyses at an aggregated level. We would have preferred to use alternative methods, such as multilevel analyses, as we lose information and the analyses become less efficient when we aggregate. Because we are not interested in individual differences, parts of the information lost are of less importance for the present study. Still, it is especially important to remember that absence of evidence (e.g., for the effect of negative leadership) is not evidence of absence [60].” page 22 paragraph 3

3. At several places in the discussion you spell “casual” when you mean “causal”.

Thank you for pointing this out. The words have now been corrected.

Response to Editors comments:

- it is still not explained how variables (both independent and dependent) are aggregated. Units of aggregation might differ in size, and affect the variable characteristics.

Yes, this is important. We have now attempted to clarify how the variables were created. And more clearly show that we use averages, and not absolute values. The department sizes are therefore controlled for in the aggregation process.
“We created a scale for each leader behavior by taking the average of the items included for that specific behavior type (see appendix for a list of items). This was done for each individual. Aggregated department scales were then created by averaging the individual scales, giving five continuous variables ranging from 1 to 5.” Page 11 paragraph 3

“The unit of analysis was all registered sickness absence measured in days of absence, divided by man-days, giving a department average of days missed.” Page 12 paragraph 2

Additionally, as Inge Houkes suggested, we weight the analysis on department size. This should be a more valid analysis as smaller units do not get disproportionate impact on the results.

- it is also not explained how missing values are treated, particularly when aggregating them

To make it more transparent how we have treated missing data we have now added more information, and attempted to clarify this.

“To better control for possible error because of missing data, we used an expectation-maximization (EM) algorithm to compute estimates to replace missing data. The estimates were created before the scales were created and aggregated, and are included in all analyses.” page 14 paragraph 2

- sickness absence is treated as ordinal variable, data on skewness are missing. It can be assumed that multiple regression analysis is not the best way to treat sickness absence as often the variable is severely skewed - this is not sufficiently addressed

Data on skewness for the sickness absence is now presented in table 3, and commented in the text.

“Skewness. We also test for skewness in the data (see table 3) [52]. At the department level, only negative leadership had a significant positive skew value, indicating that there were limited reports of negative leader behavior. Sickness absence, which often suffers from skewness at the individual level, is more normally distributed at the aggregated level used for analysis.” page 15 paragraph 4

- variable characteristics are given for the n=1008 sample, while multiple regression analysis is done for the n=35 sample. The reader cannot judge whether the variables in the multiple regression analysis have the required characteristics

The variable characteristics for the n=35 sample is now presented in table 3.