Re-analysing the data from Moffatt et al. (2020): A textbook illustration of the fallacy of the null hypothesis

Ladislas Nalborczyk[1]

[1] Univ. Grenoble Alpes, CNRS, Grenoble INP, GIPSA-lab, 38000 Grenoble, France

Author Note

Correspondence concerning this article should be addressed to Ladislas Nalborczyk, GIPSA-lab, CNRS, Univ. Grenoble Alpes, 11 Rue des Mathématiques, 38400 Saint-Martin-d'Hères, France. E-mail: ladislas.nalborczyk@gipsa-lab.fr

Abstract

Moffatt et al. (2020) reported the results of an experiment (N = 26 in the final sample) comparing the facial (surface) electromyographic correlates of mental rumination and distraction, following an experimentally induced stressor. Based on an absence of significant difference in the perioral EMG-amplitude between the rumination and distraction conditions, Moffatt et al. (2020) concluded that (the *self-reported*) inner experience was unrelated to peripheral muscular activity as assessed using surface electromyography. We suggest this conclusion is hasty and based on waggly evidence. Indeed, concluding on the absence of an effect based on a low-powered statistical test is strongly problematic/uninformative. Moreover, there relation between self-reports and physiological measures… Although the question Moffatt et al. (2020) pursued is of interest, and mehods… Given these limitations, it is unclear whether the target article really adds to the current knowledge. Complete source code, reproducible analyses, and figures are available at https://github.com/lnalborczyk/inner_experience_EMG.

Keywords: NHST, Bayesian, fallacy, reanalysis, inner speech, rumination, electromyography

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Introduction

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Some thoughts on the data

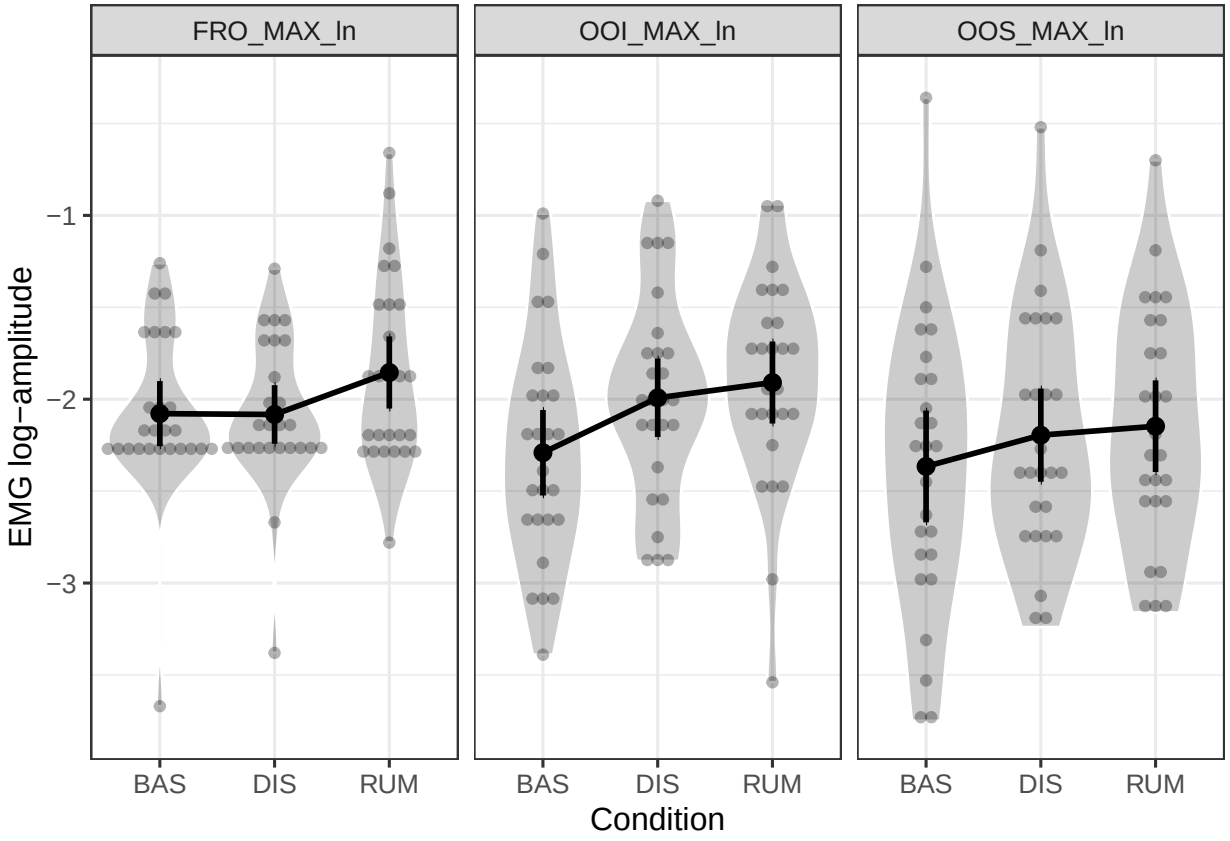

Figure 1. General plot (N = 26)...

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Concluding on the null from low-powered studies

https://theethicalskeptic.com/2015/08/17/the-four-types-of-null-hypothesis-fallacy/...

Unfortunately, the same line of reasoning applies for testing the effect of the order, which is even less powered than the test of the main effect of interest, rendering it practically uninformative…

> "In order to test this, a Bayesian paired samples t-test was conducted for the peak log values of muscle activity between the rumination and distraction conditions. This revealed strong evidence in favour of the alternative hypothesis for the FRO muscle (B10 = 18.79), and moderate evidence in favour of the null hypothesis for the OOS (B10 = 0.232) and OOI (B10 = 0.278) muscles, according to current guidelines for interpreting Bayes factors [43]."

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Does everyone?

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Huge inter-individual variability… which leads to the next point, what is the relation between self-reports and EMG?

Relation between self-report and EMG correlates

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Discussion and conclusions

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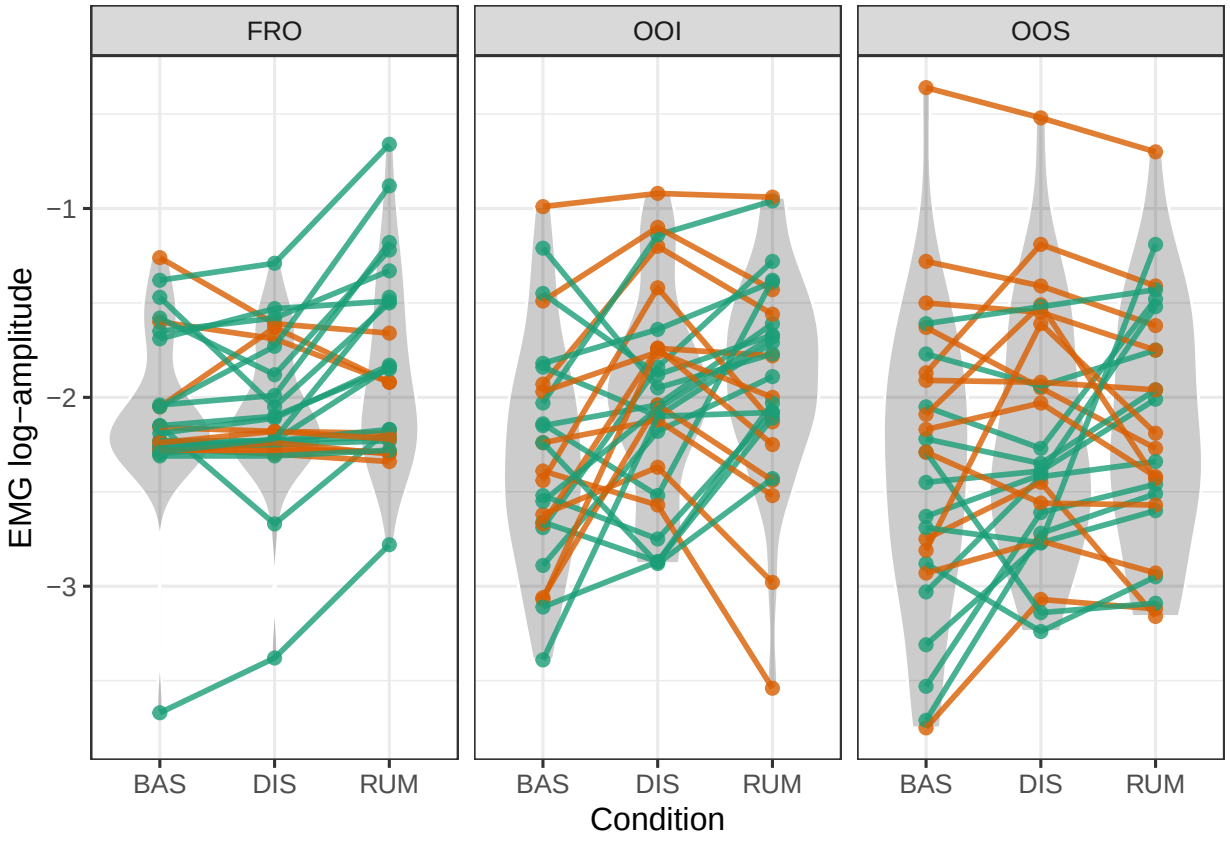

Figure 2. General plot (mean and 95% CI)... showing the inter-individual variability...

Supplementary materials

Reproducible code and figures are available at https://github.com/lnalborczyk/inner_experience_EMG.

Acknowledgements

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