

# Using mediation analysis to evaluate the role of expectations in taste and flavour perception

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## Why?

...To investigate and quantify the relationship between product-related cues, expectations, and sensory perception in the context of reduced-alcohol beer

## How?

In a mixed design experiment, participants ( $n = 87$ ) viewed label-based sensory information ("bitter," "standard" and no label) and tasted beer samples differing in colour and alcohol content. Participants first rated samples without any visual cues (blind). Subsequently they examined visual cues (label and beer colour), rated expected, and after tasting, perceived bitterness, refreshment, liking and body of beer. Samples were rated on a 0-100 VAS. The procedure, beer labels and samples are illustrated below in Figures 1, 2 and 3. We used the `bmlm`<sup>1</sup> R package to perform Bayesian within-subjects mediation analysis.



Figure 1: Example of fictitious beer labels used in the experiments.

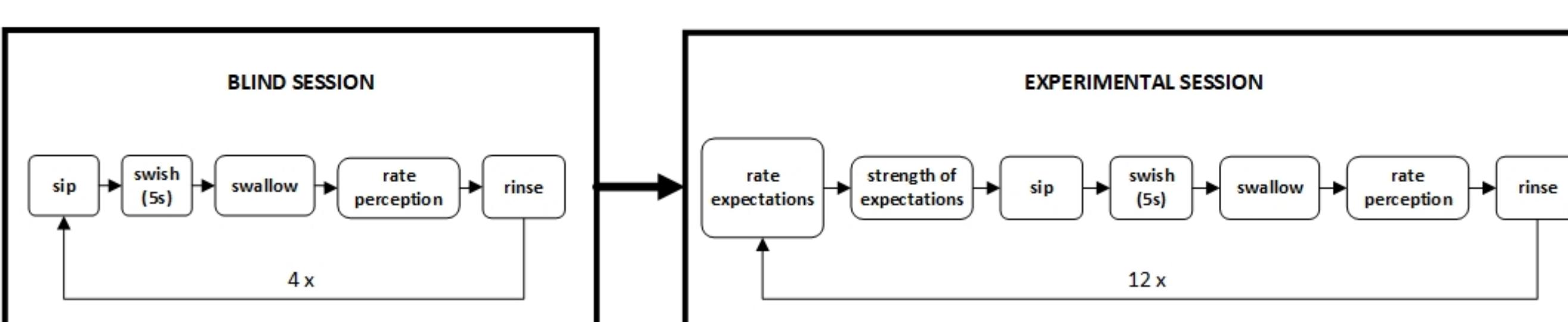
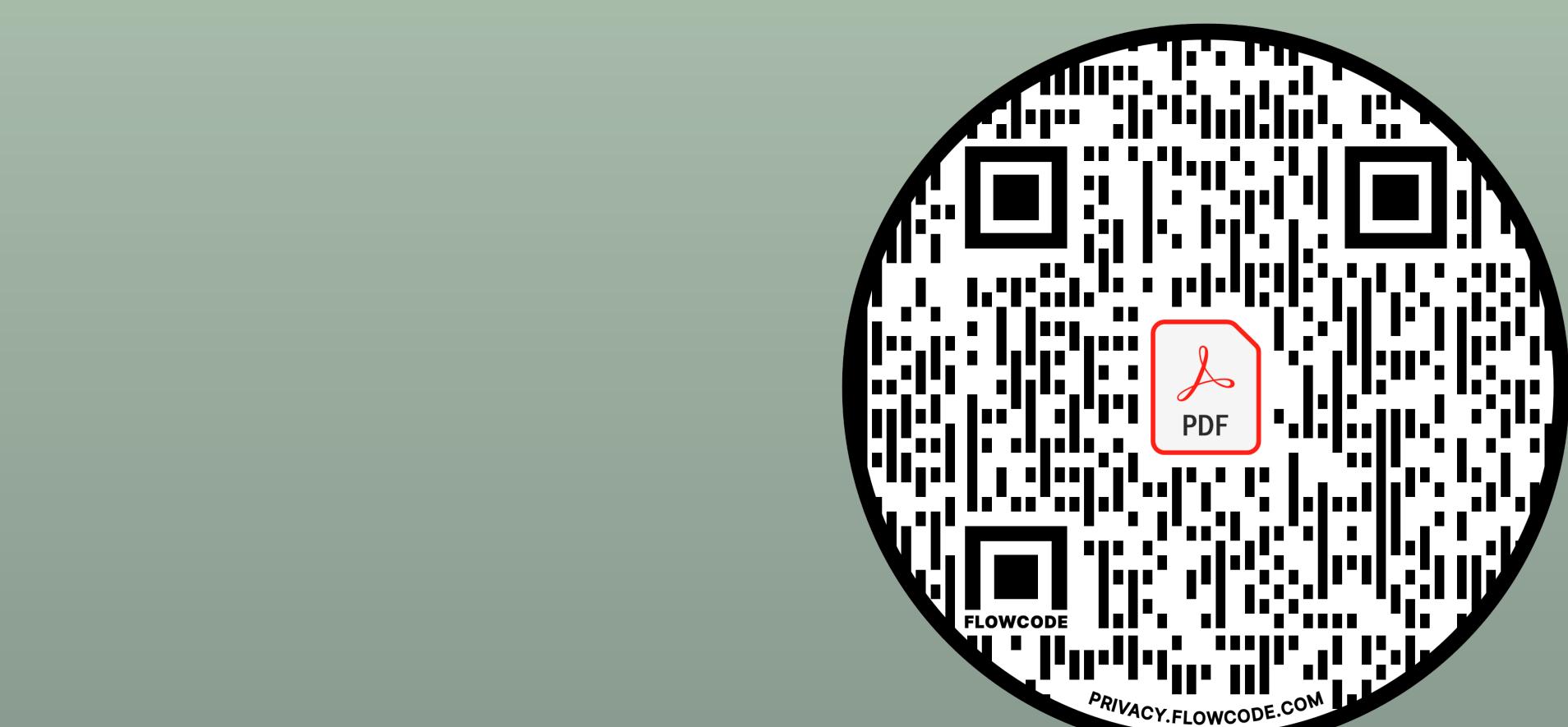


Figure 2: The experimental procedure in the blind and experimental tasting sessions



Figure 3: Beer samples presented to participants

# Modifying expectations may be used to improve consumers' experience of reduced alcohol beer



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## What?

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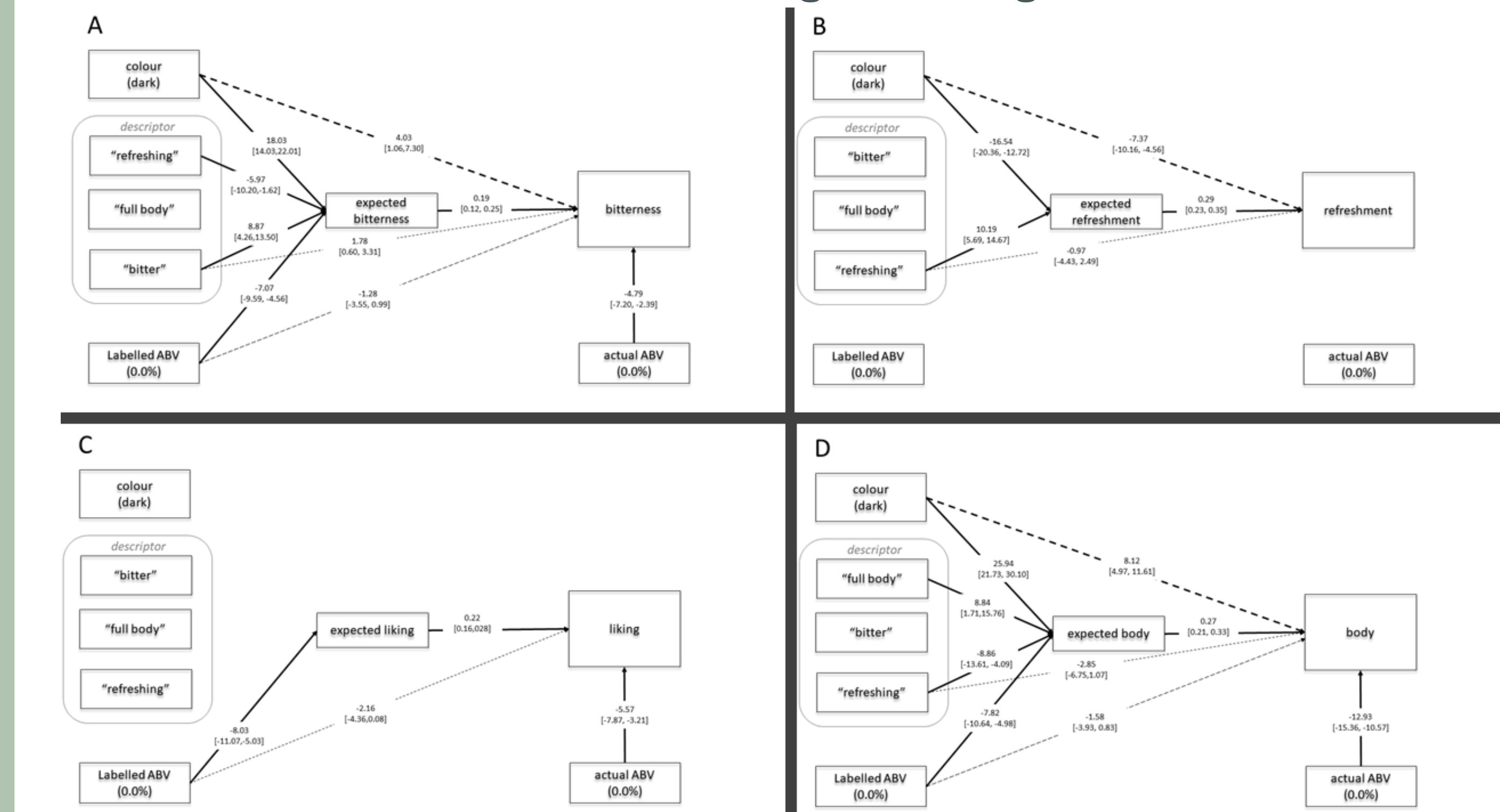


Figure 4: Results of mediation analysis. In The effect of descriptors and beer colour on expected and perceived bitterness (A), refreshment (B), liking (C) and body (D). Numeric values represent estimates of the direct effect with the indirect effect in brackets below. Presence of a line in the mediation model denotes a presence and a nature of a relationship between the variables. Solid:direct effect, bold dashed: indirect and direct effect, dashed: indirect effect

## So what?

We were able to demonstrate that product-related cues, especially beer colour, can significantly influence consumer's perception of taste, flavour and mouthfeel and that this effect is reliably mediated by expectations. Based on the results of the study and underlying theoretical underpinnings<sup>2,3</sup> we conclude that altered expectations may, indeed be a good way to fine tune consumers' experience. However we did not replicate our previous findings<sup>4</sup> in terms of liking, perhaps suggesting that actual and labelled alcohol content are stronger predictors of liking than sensory cues and expectations. Better understanding of expectations, especially in the context of taste and flavour perception, and especially liking is necessary.

## Acknowledgements

This poster was created in RStudio, using `posterdown`<sup>5</sup> and other packages: `rmarkdown`,<sup>6</sup> `rcrossref`,<sup>7</sup> `bmlm`,<sup>8</sup> `bibtex`.<sup>9</sup>

The poster and associated abstract can be found and downloaded [here](#).

## References

- Vuorre, M., & Bolger, N. (2018). Within-subject mediation analysis for experimental data in cognitive psychology and neuroscience. *Behavior Research Methods*, 50(5), 2125–2143. <https://doi.org/10.3758/s13428-017-0980-0>
- Pieters, J., & Verlegh, P. W. S. (2015). Sensory expectations based on product-extrinsic food cues: An interdisciplinary review of the empirical evidence and theoretical accounts. 40. <https://doi.org/10.1016/j.foodqual.2014.09.013>
- Spence, C., & Piqueras-Fiszman, B. (2014). Food Color and Its Impact on Taste/Flavor Perception. Woodhead Publishing. <https://doi.org/10.1016/B978-0-08-100350-3.00006-7>
- Yeomans, M. R., & Hidrio, C. (2021). A taste of things to come: The effect of extrinsic and intrinsic cues on perceived properties of beer mediated by expectations. *Food Quality and Preference*, 104326. <https://doi.org/10.1016/j.foodqual.2021.104326>
- Allaire, J., Xie, Y., McPherson, J., Luraschi, J., Ushey, K., Atkins, A., Wickham, H., Cheng, J., Chang, W., & Iannone, R. (2021). Rmarkdown: Dynamic documents for r. <https://CRAN.R-project.org/package=rmarkdown>
- Chang, W. (2019). Crossref Client for various CrossRef 'APIs'. <https://CRAN.R-project.org/package=crossref>
- Vuorre, M. (2019). Bmlm: Bayesian multilevel mediation. <https://github.com/mvuorre/bmlm/>
- Francois, R. (2020). Bibtex: BibTeX parser. <https://github.com/rmfrancois/bibtex>

