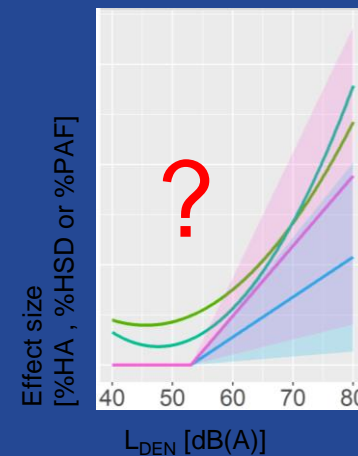


Exposure-response functions for traffic noise: Implementation of “FAIR” data and alternative fit functions?



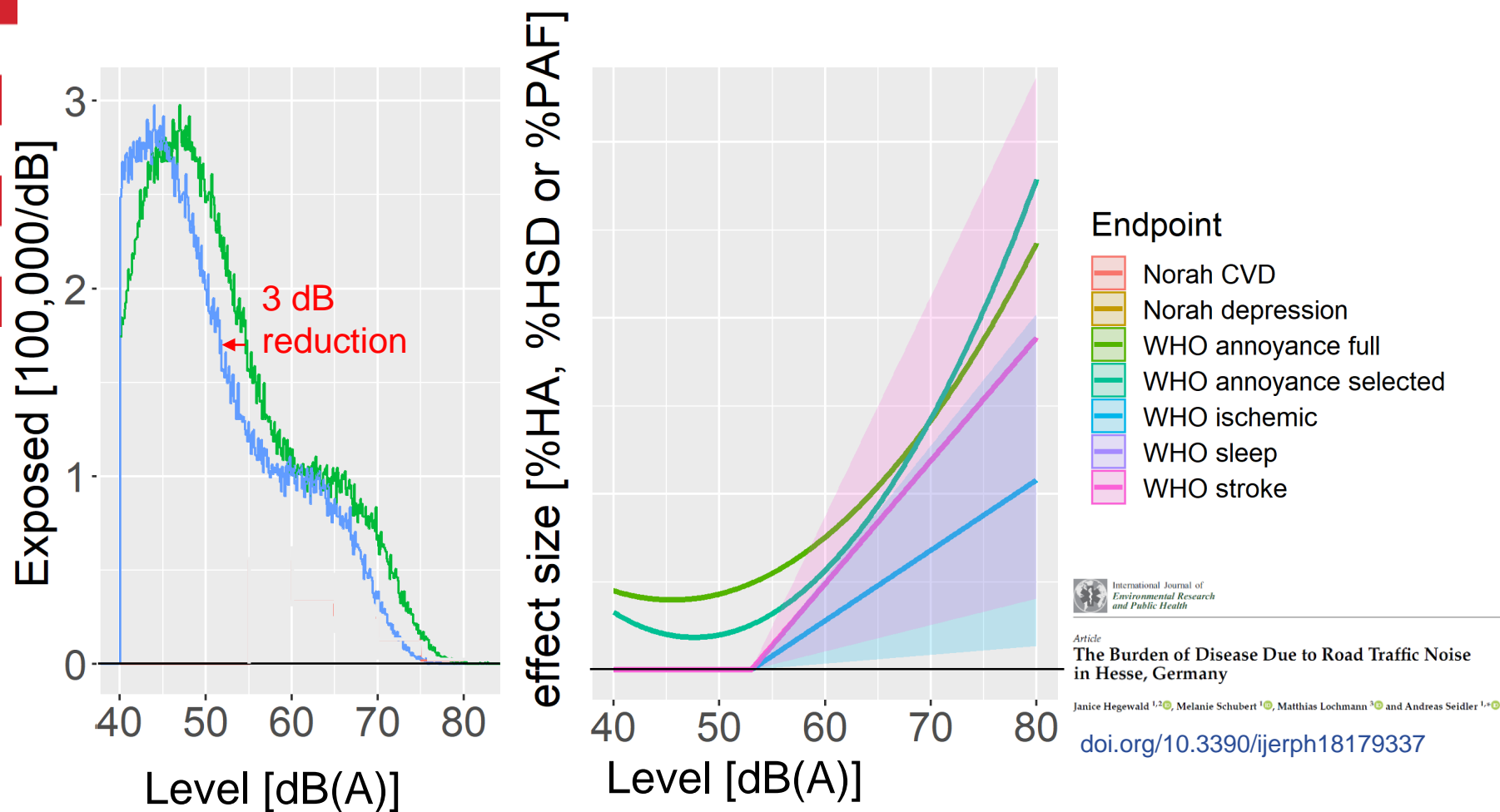
Dr. Matthias Lochmann

Dez. I4 “Lärm, Erschütterungen, Abfall, Luftreinhaltung: Anlagen”

„Noise, Vibration, Waste, Air Quality Management: plants“

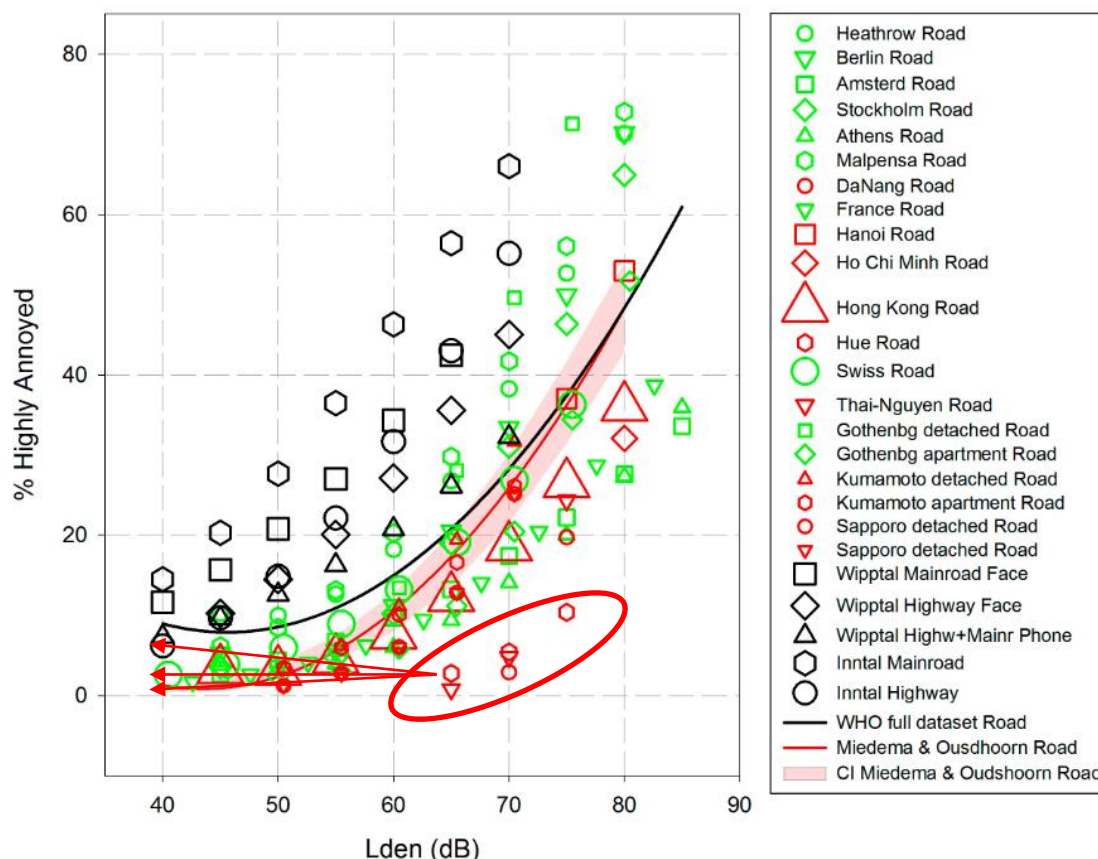
2. Meeting Task Force Air Pollution and Noise, 17.01.2023

Thinking about health impact assessment



exposure scenarios ... need ERF

WHO Metaanalysis annoyance - road



Guski et al. stressed 2017 the need for a reanalysis

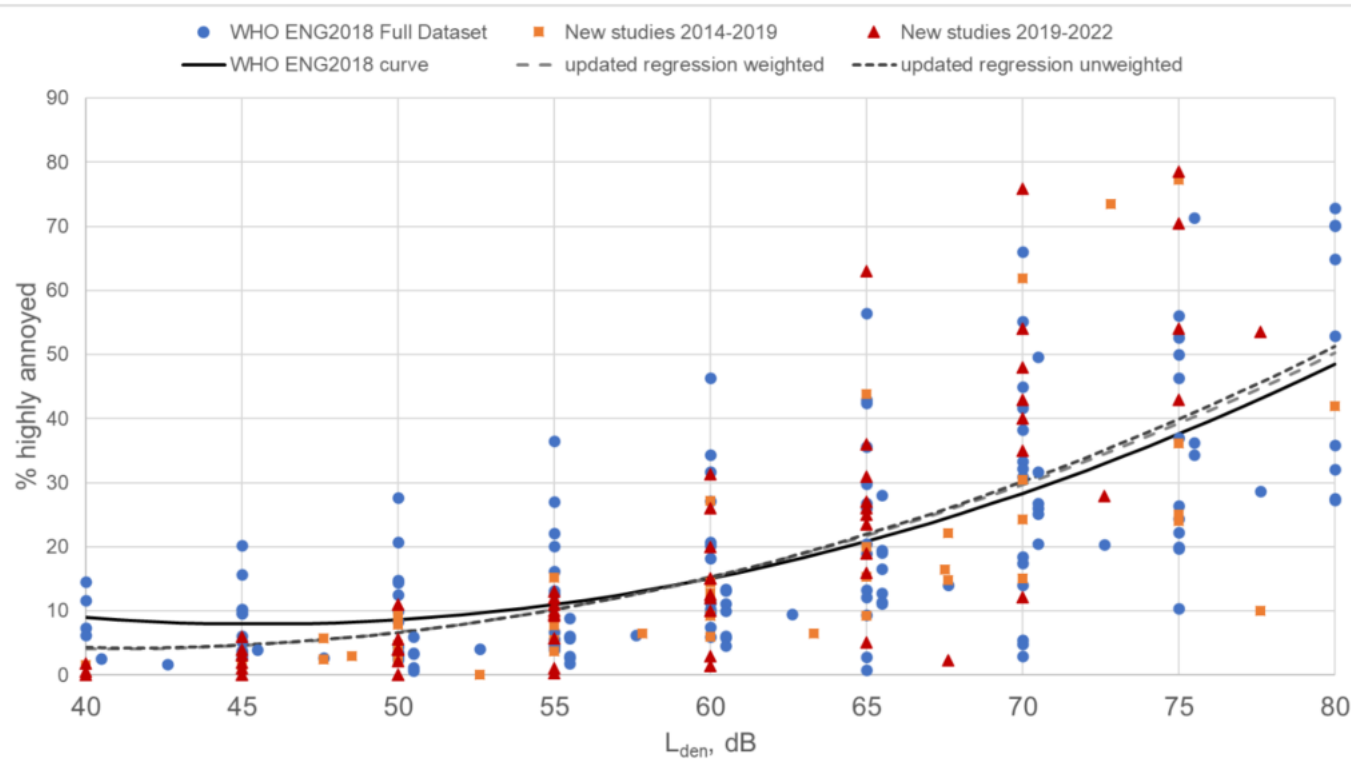
„...before deciding upon a revision of the earlier curve.“

Most functions of primary studies don't show a minimum!

Graph from Guski 2017... with my additions

Graph (adapted) and citation from R. Guski, D. Schreckenberg, and R. Schuemer, "WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Annoyance," International Journal of Environmental Research and Public Health, vol. 14, no. 12, p. 1539, 2017.

Quadratic regression with new data: problem solved?



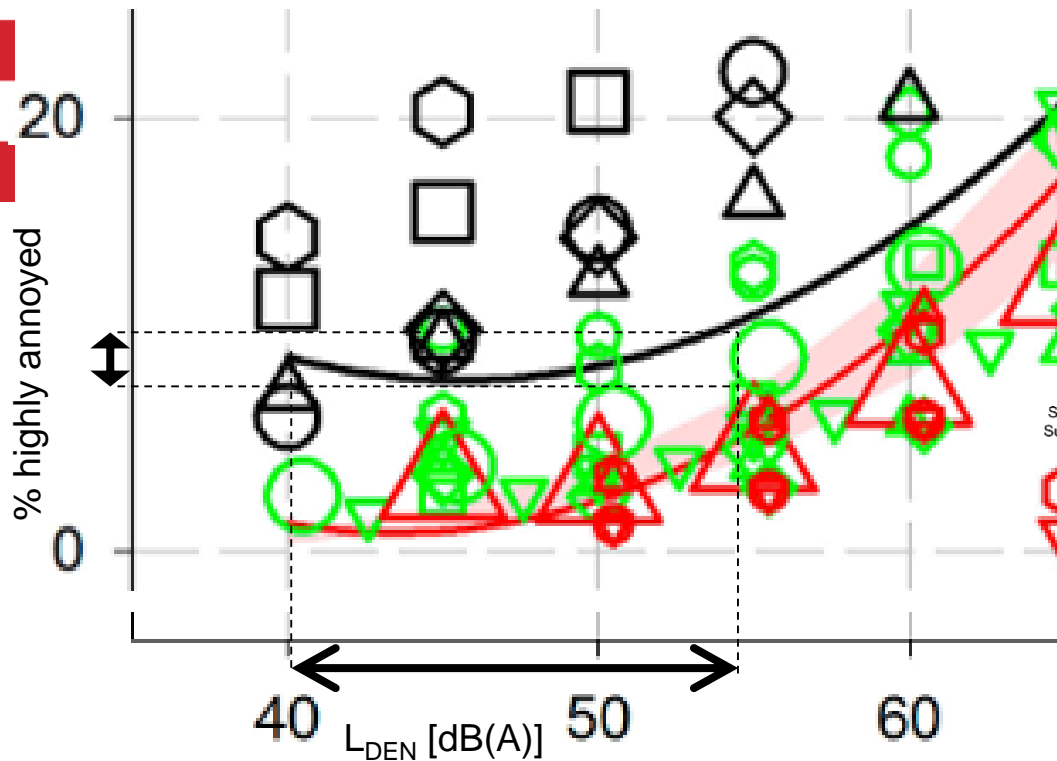
- What about
- confounders?
 - hierarchical (regional) fitting?
 - confidence bands?
 - ...?

Graph of B. Fenech, Internoise 2022.

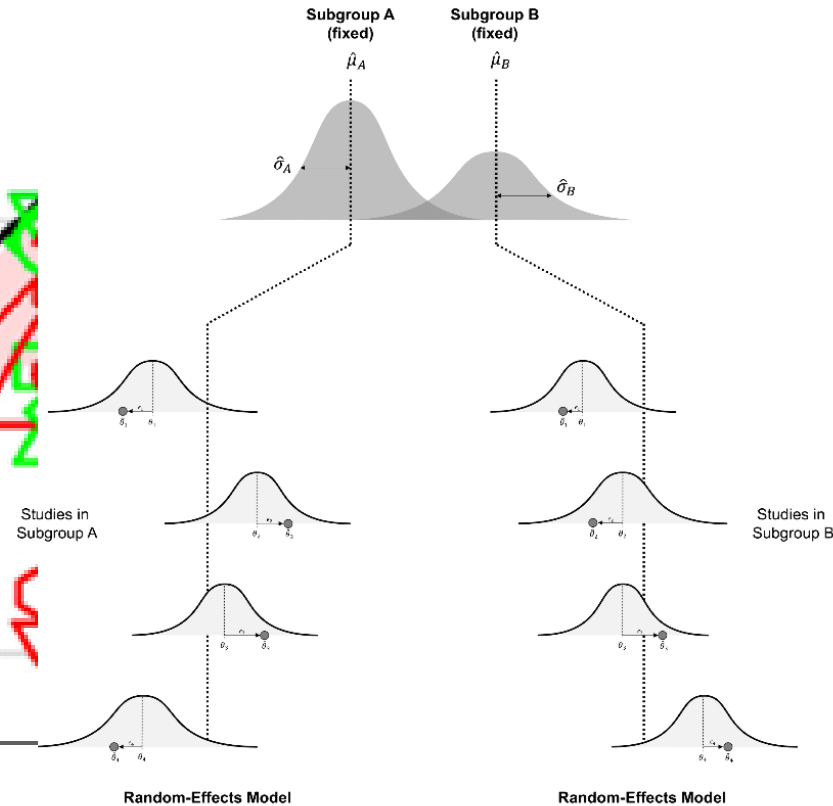
Some material for discussions about how to fit:

Are there reasons for a local minimum in response?

(In meta analysis/ in primary studies?)



Should we perform subgroup analysis? Which groups?



Background graph taken from R. Guski, D. Schreckenberg, and R. Schuemer, "WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Annoyance," International Journal of Environmental Research and Public Health, vol. 14, no. 12, p. 1539, 2017.

Graph taken from: Harrer, Mathias, Pim Cuijpers, Furukawa Toshi A, and David D Ebert. 2021. *Doing Meta-Analysis with R: A Hands-on Guide*. 1st ed. Boca Raton, FL; London: Chapman & Hall/CRC Press.
https://bookdown.org/MathiasHarrer/Doing_Meta_Analysis_in_R/.

Choices to make before fitting

My initial choices

(any of them should be questioned!)

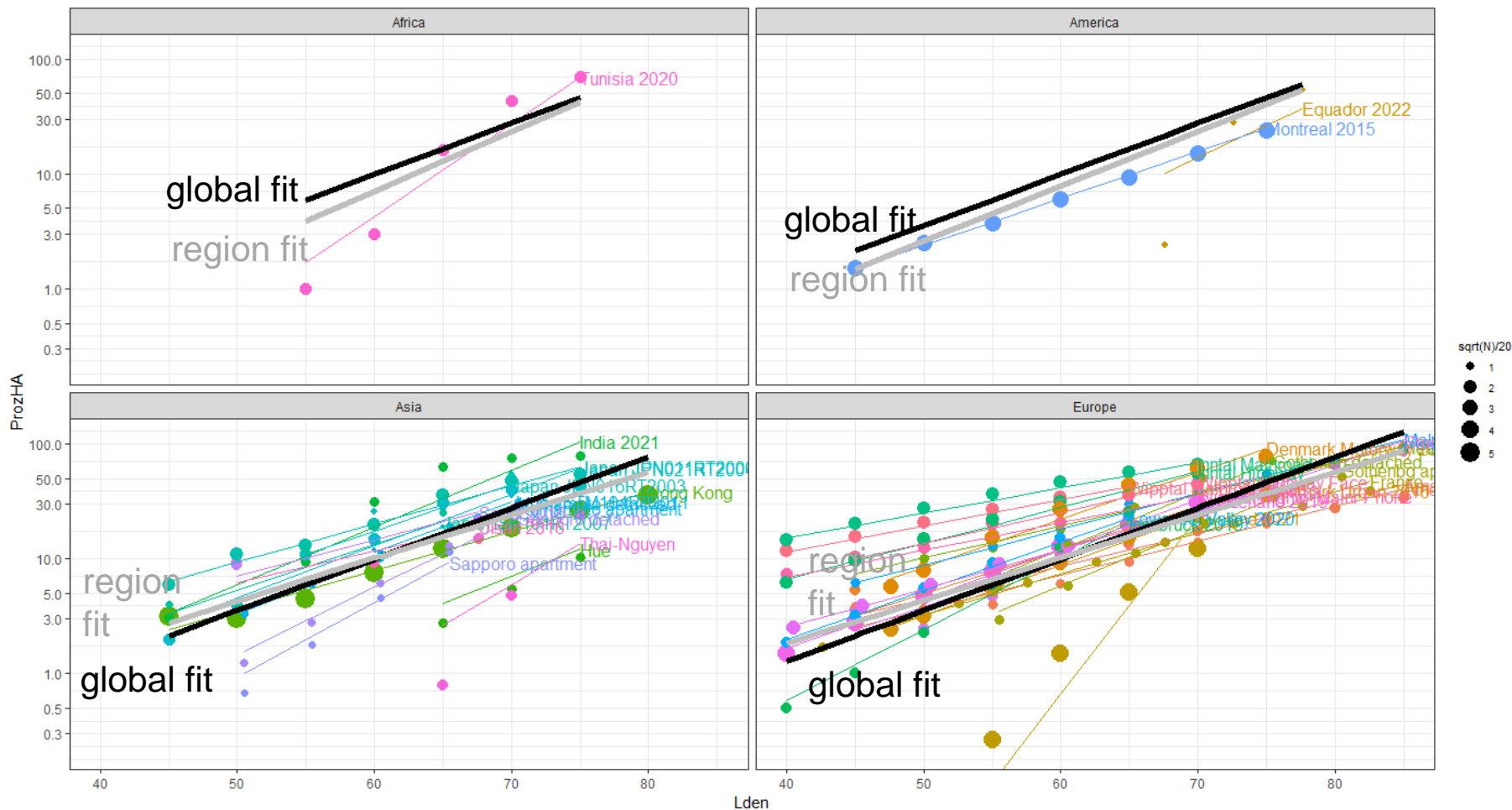
0. Use which data source?

1. Include which data?
2. Filter data?
3. Use which function?
4. Use which fitting approach?
5. Subgroup analysis?

0. Calculated data points from Guski and Fenech

1. All primary studies
2. Omit points with HA= 0% and studies with less than 3 datapoints
3. \log_{10}
4. nlme (non-linear mixed effect)
5. Yes; subgroups: Continents

A short glimpse on my preliminary results



More open questions than answers so far 😊

Two problems - one / two solutions:

Problems

1. No „good“ database
2. No „good“ discussion on fit functions



My suggestions/ solutions

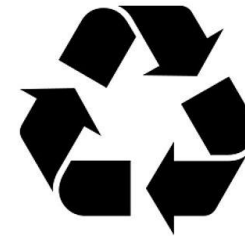
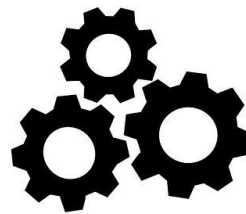
1. I built a (very modest) one.
Let's improve it 😊
2. Let's discuss 😊

My R(Markdown) project
could be a start

<https://github.com/Ma-Loma/RefitAnnoyanceFunctions.git>

What is „FAIR“?

F_{indable} A_{ccessible} I_{nteroperable} R_{eusable}



SCIENTIFIC DATA

Amended: Addendum

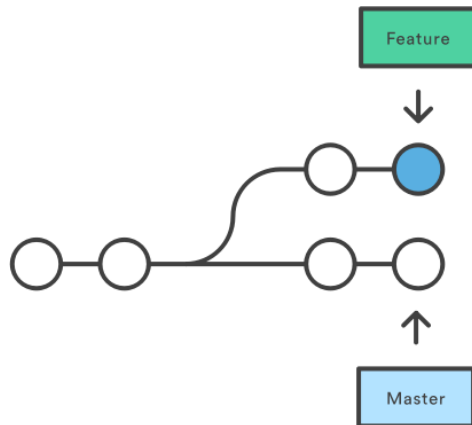
OPEN
SUBJECT CATEGORIES
» Research data
» Publication characteristics

Comment: The FAIR Guiding Principles for scientific data management and stewardship
Mark D. Wilkinson *et al.* [#]

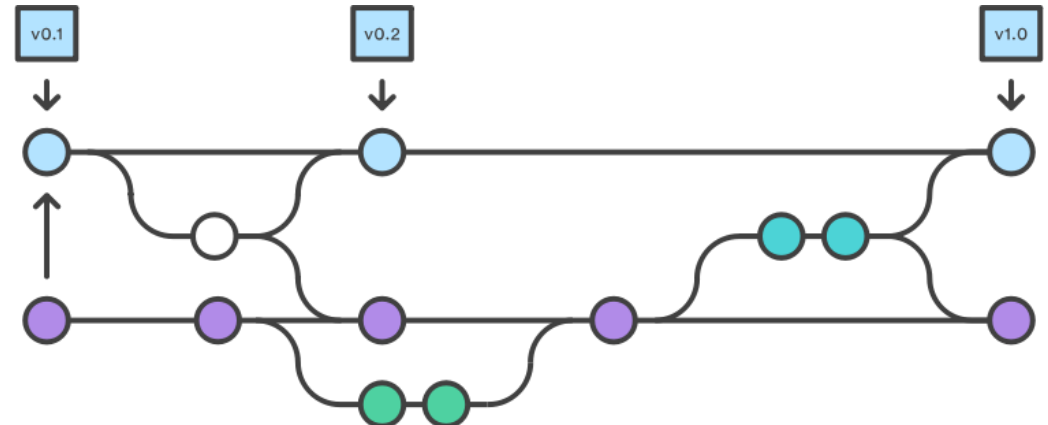
Graph from https://en.wikipedia.org/wiki/FAIR_data
Paper: <https://doi.org/10.1038%2FSDATA.2016.18>

Why working with GIT?

build on others work ... giving others the possibility to profit



<https://openclipart.org/detail/242818/rebase0>



<https://openclipart.org/detail/278048/gitflow>



GitHub is one platform to exchange git-projects.

My invitation/ first draft of possible to do's

1. Work on a database
 - FAIR
 - Add raw data
2. Work on fit methods
 - (review)?/ expert opinion
 - Answer questions: allow minimum?/ Global or individual fit?/...
3. Implement code and paper
 - Choose language (my suggestion R Markdown)
 - Write professional code and paper
4. Extend to other areas
 - Other noise sources (rail, air, industry,...)
 - Other outcomes (IHD, CVD, depression, cognition, ...)
 - Other topics (PM_{2,5}, O₃, NO_x, respiratory diseases, cancer, ...)
5. Spread the news
 - Zenodo (provide a DOI)
 - Conferences/ workgroups: ICBEN, Internoise, WHO?, ...



EBoD (of noise) +
uncertainty assessment

→ informed decision making