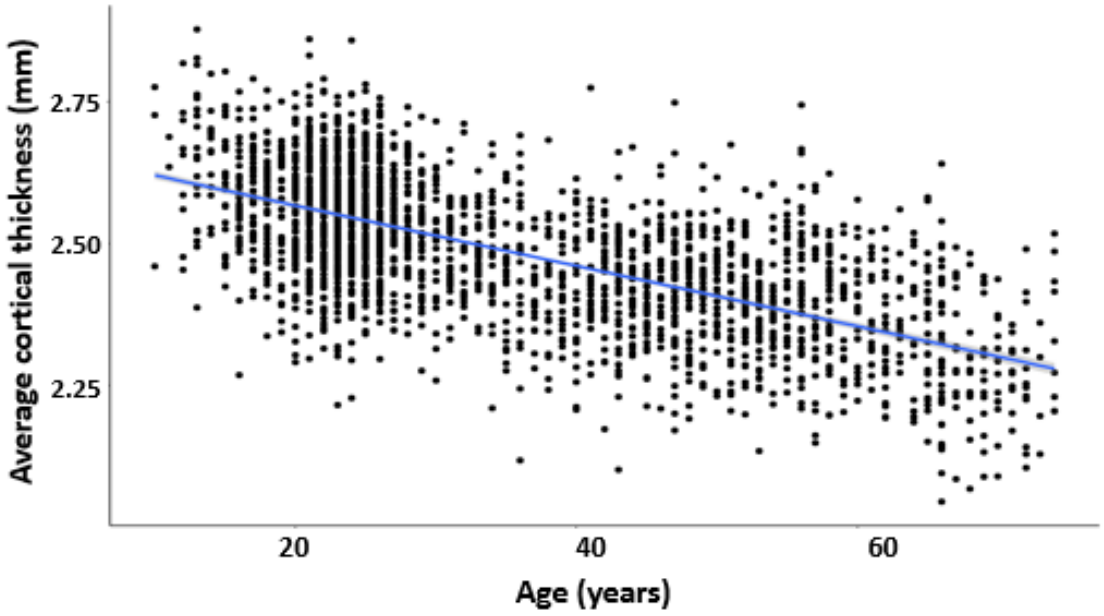
SITE EFFECT CORRECTION USING NORMATIVE MODELLING

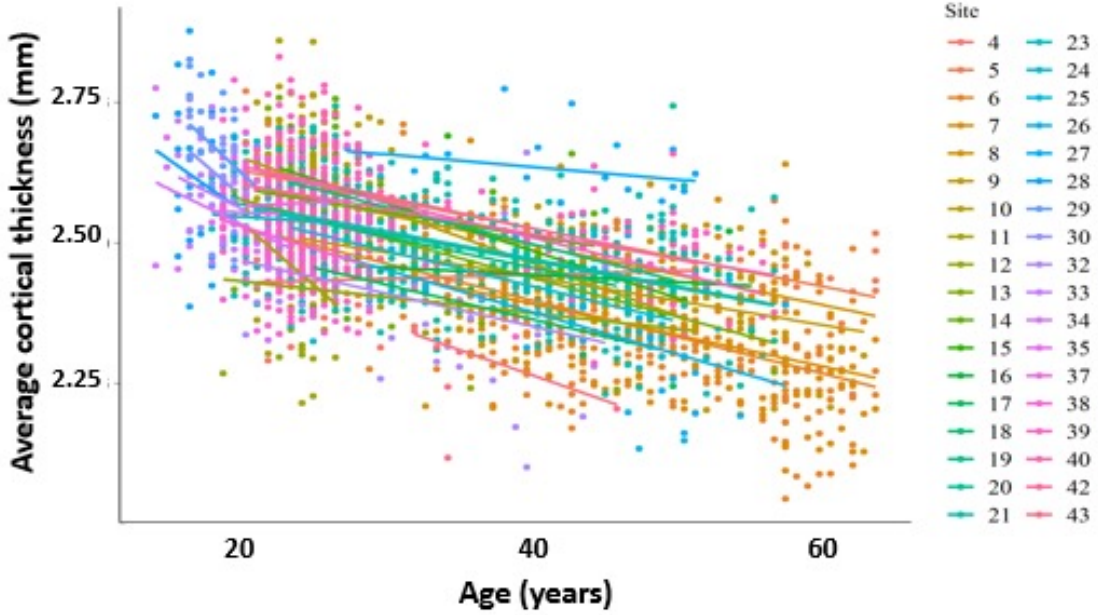
Normative modelling educational course

OHBM 2024, Seoul

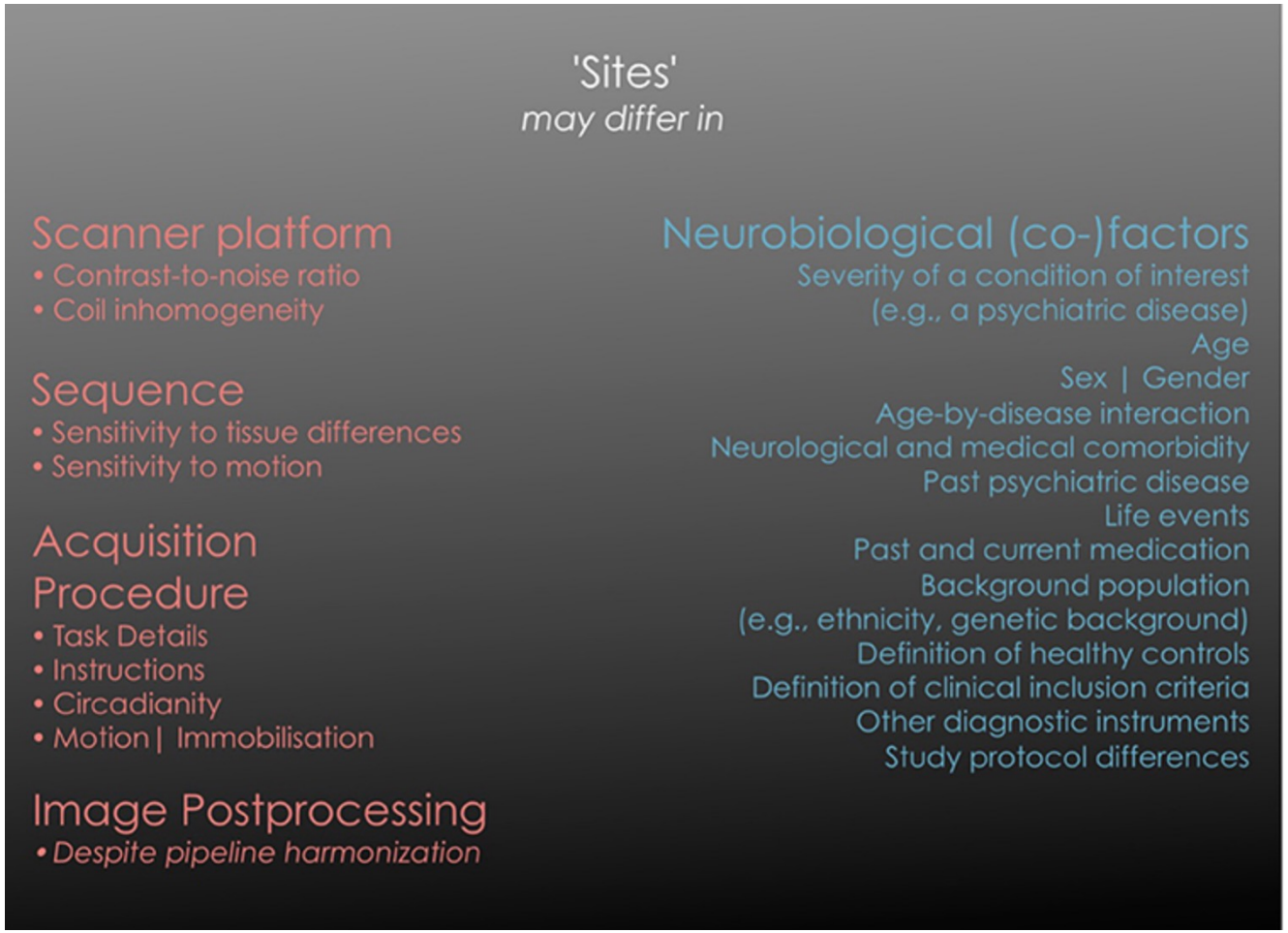
Dr. Johanna Bayer

THE SITE EFFECT PROBLEM





ORIGINS OF SITE EFFECTS



Bayer et al. 2022

METHODS TO CORRECT FOR SITE EFFETCS

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Check for updates

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EDITED BY
Maxime Descoteaux,
Université de Sherbrooke, Canada

REVIEWED BY
Paul Gerson Unschuld,
Université de Genève, Switzerland
Muhamed Barakovic,
University of Basel, Switzerland

*CORRESPONDENCE
Johanna M. M. Bayer
bayerj@student.unimelb.edu.au

†These authors share last authorship

SPECIALTY SECTION
This article was submitted to

Site effects how-to and when: An overview of retrospective techniques to accommodate site effects in multi-site neuroimaging analyses

Johanna M. M. Bayer[1,2*], Paul M. Thompson[3], Christopher R. K. Ching[3], Mengting Liu[4], Andrew Chen[5,6],

Review

Image harmonization: A review of statistical and deep learning methods for removing batch effects and evaluation metrics for effective harmonization

Check for updates

Fengling Hu[a,*], Andrew A. Chen[a], Hannah Horng[a], Vishnu Bashyam[b], Christos Davatzikos[b], Aaron Alexander-Bloch[c,d,e], Mingyao Li[f], Haochang Shou[a,b], Theodore D. Satterthwaite[c,d,g], Meichen Yu[h,#], Russell T. Shinohara[a,b,#]

[a] *Penn Statistics in Imaging and Visualization Endeavor (PennSIVE), Department of Biostatistics, Epidemiology, and Informatics, Perelman School of Medicine, University*

Radboud University

NORMATIVE MODELLING FOR SITE EFFECT CORRECTION

DONDERS INSTITUTE

Accommodating site variation in neuroimaging data using normative and hierarchical Bayesian models

Johanna M M Bayer [1], Ric
Thomas Wolfers [4], Jinglei

Affiliations + expand

PMID: 36272672 PMCID:

RESEARCH ARTICLE | Open Access

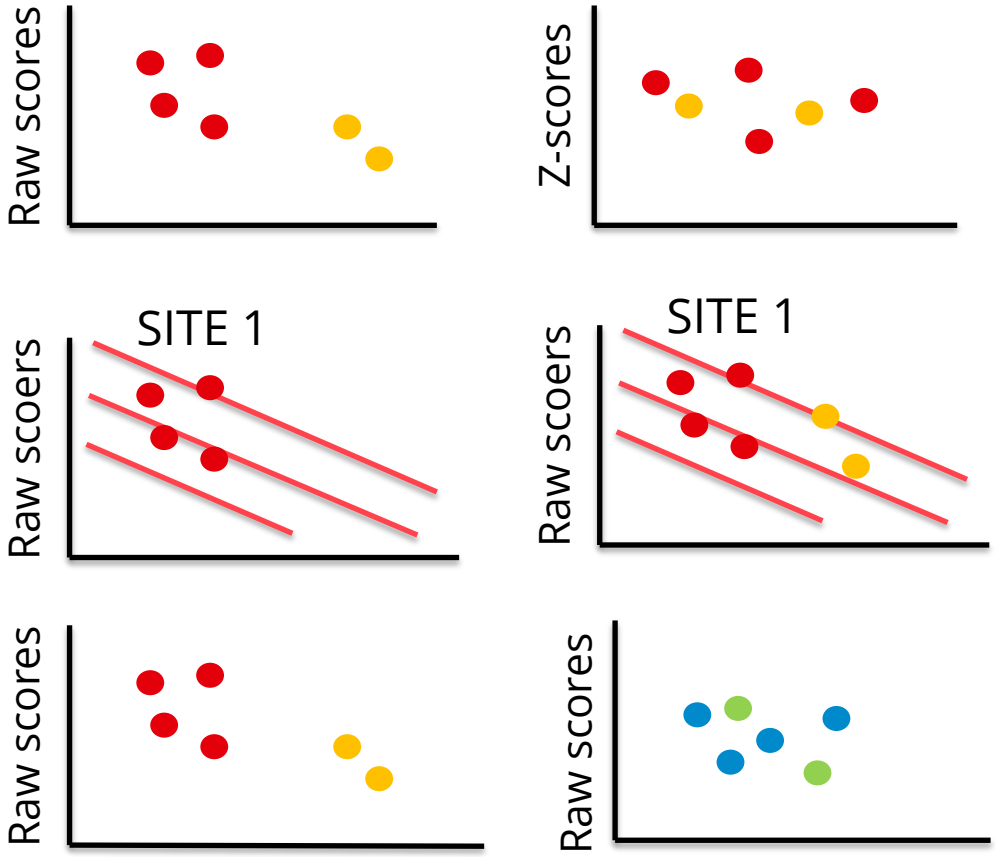
Estimating cortical thickness trajectories in children across different scanners using transfer learning from normative models

C. Gaiser, P. Berthet, S. M. Kia, M. A. Frens, C. F. Beckmann, R. L. Muetzel, Andre F. Marquand

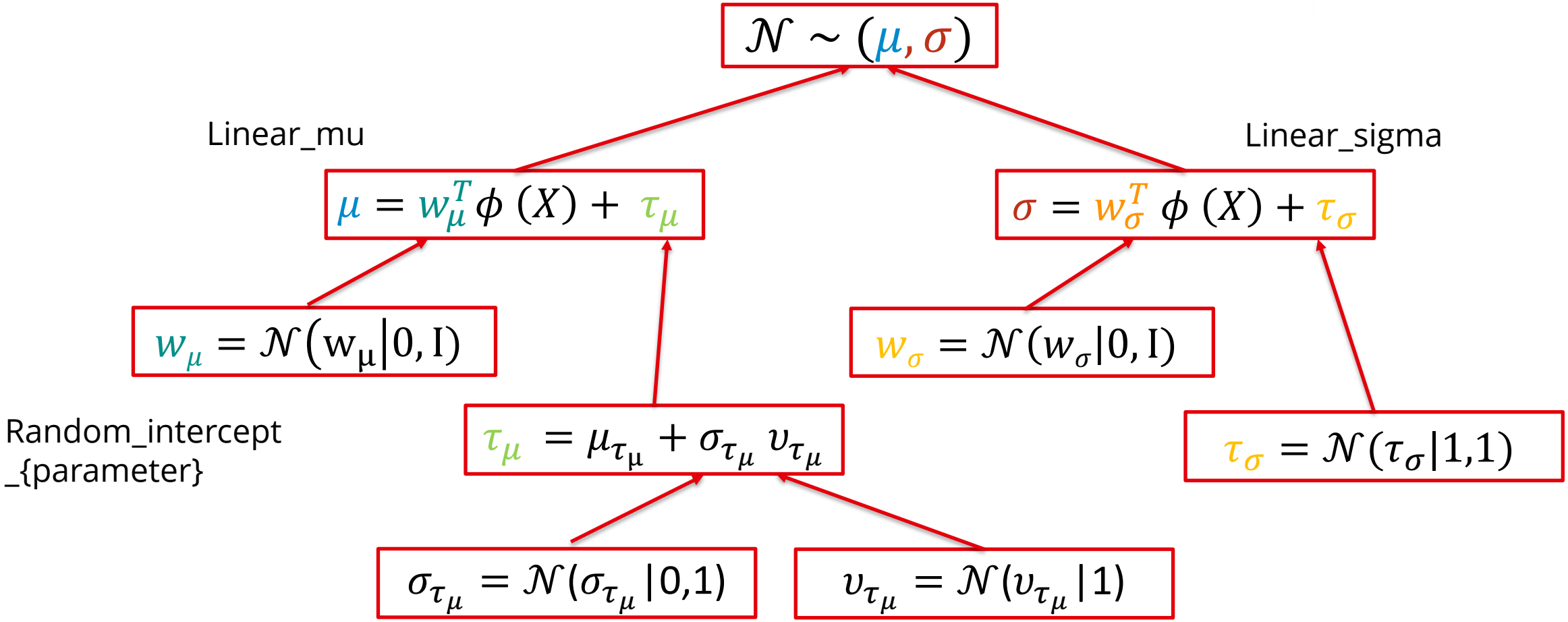
First published: 05 February 2024 | https://doi.org/10.1002/hbm.26565

USE CASES FOR NORMATIVE MODELLING FOR SITE EFFECT CORRECTION

- 1. Site effect correction: Making predictions for a site that is already in the training set.
- 2. “Translating” between z-scores and raw scoers, between sites.
- 3. Out of site prediction: Adjusting the site effect difference to data (sites) that are not in the training set.
  - Posterior of fitted data set will be used as priors for fitting new (unseen) sites in an adaptation set
  - Predictions in a transfer test set.



HIERARCHICAL BAYESIAN REGRESSION MODEL



Spoiler: linear_delta and linear_epsilon for skewness and kurtosis also possible

HBR PAPER:

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Imaging Neuroscience

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Non-Gaussian normative modelling with hierarchical Bayesian regression

Augustijn A. A. de Boer, Johanna M. M. Bayer, Seyed Mostafa Kia, Saige Rutherford, Mariam Zabihi, Charlotte Fraza, Pieter Barkema, Lars T. Westlye, Ole A. Andreassen, Max Hinne, Christian F. Beckmann, Andre Marquand

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