Analysis: Mapping onto modelling workflows — Bayesian Modelling

Data Collection → Model development → Test for convergence of MCMC chains

Test for convergence of MCMC chains → (Fail) → Model development

Test for convergence of MCMC chains → (Pass) → Model Checking

Model Checking → (Pass) → Model Comparison

Model Checking → (Fail) → Model development

Model Comparison → Robustness Analysis

Adapted from [@Conn:2018hd]

PRIOR SELECTION

- Fail to check and report influence

- Post-hoc rationalisation

- Fail to ensure measured on same scale as likelihood

- Data-peeking "SPARKing": specifying priors after results are known

MODEL CHECKING

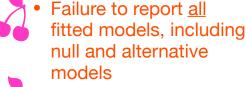- Failure to undertake and report <u>all</u> model checking

- Failure to check assumptions of model(s) is/are not violated, failure to report

- Hacking model checking statistic in any way

MODEL SELECTION / COMPARISON

- Failure to report <u>all</u> fitted models, including null and alternative models

- Failure to report <u>all</u> conditions

- Failure to report <u>all</u> covariates for each model

ROBUSTNESS ANALYSIS

(prior sensitivity analyses, simulation analyses where assumptions violated etc.)

- Failure to report <u>all</u> analyses undertaken

- Hacking analyses until desired result obtained

HARKing

HARKing

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MCMC CONVERGENCE

- Failure to check and report all attempts
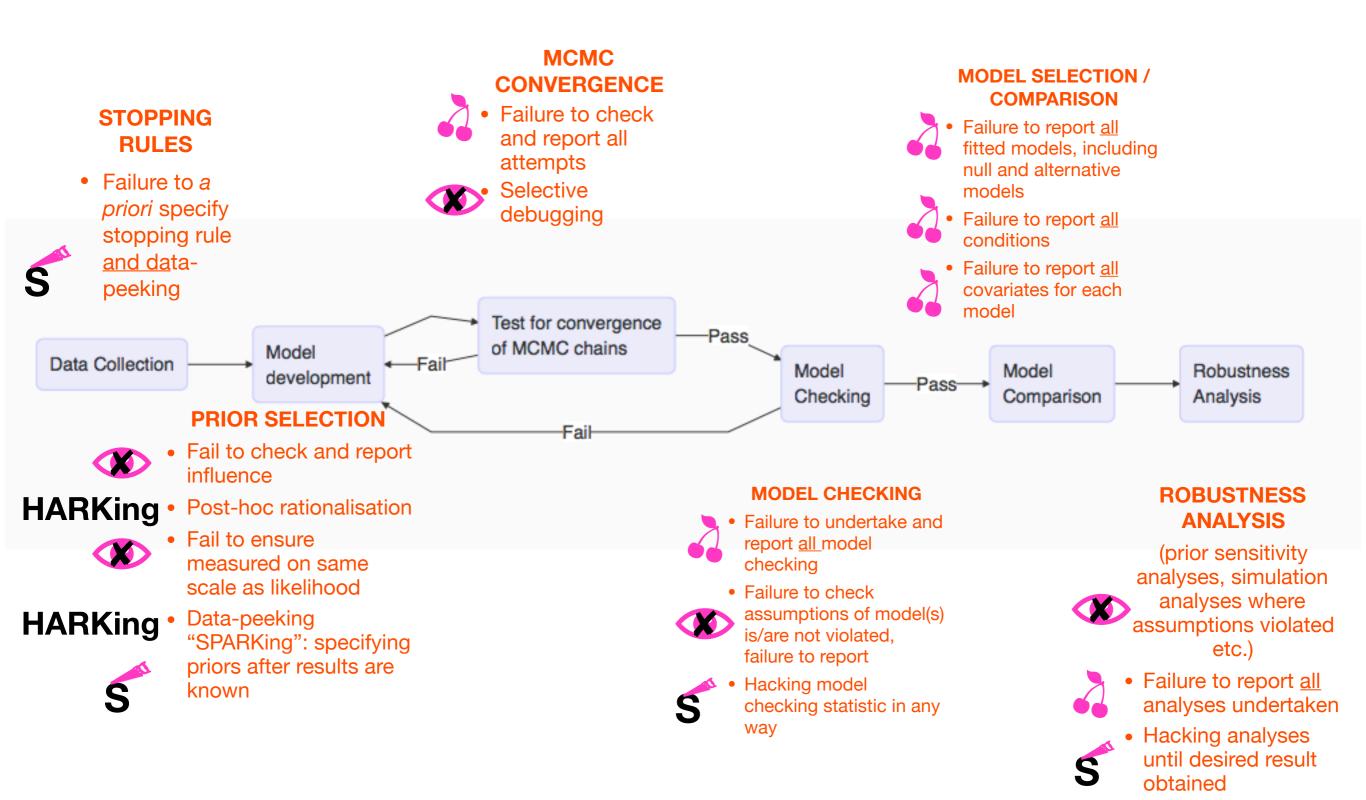
- Selective debugging

STOPPING RULES

- Failure to *a priori* specify stopping rule <u>and</u> data-peeking

S

Analysis: Mapping onto modelling workflows — Bayesian Modelling

STOPPING RULES

- Failure to *a priori* specify stopping rule <u>and data</u>-peeking

S

MCMC CONVERGENCE

- Failure to check and report all attempts
- Selective debugging

MODEL SELECTION / COMPARISON

- Failure to report <u>all</u> fitted models, including null and alternative models
- Failure to report <u>all</u> conditions
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Data Collection → Model development → Test for convergence of MCMC chains —Pass→ Model Checking —Pass→ Model Comparison → Robustness Analysis

Model development ←Fail— Test for convergence of MCMC chains

Model development ←Fail— Model Checking

PRIOR SELECTION

HARKing
- Fail to check and report influence
- Post-hoc rationalisation

HARKing
- Fail to ensure measured on same scale as likelihood
- Data-peeking "SPARKing": specifying priors after results are known

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MODEL CHECKING

- Failure to undertake and report <u>all</u> model checking
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