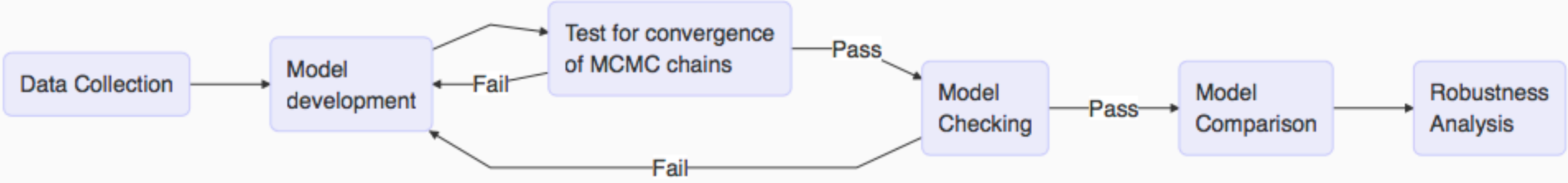
Analysis: Mapping onto modelling workflows — Bayesian Modelling

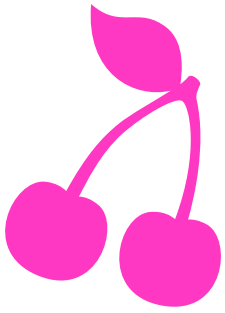

Data Collection
Model development
Test for convergence of MCMC chains
Fail
Pass
Model Checking
Fail
Pass
Model Comparison
Robustness Analysis

Adapted from [@Conn:2018hd]

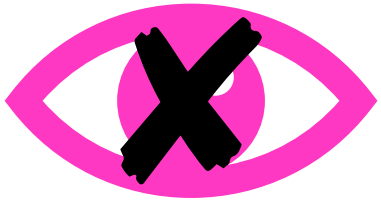
PRIOR SELECTION

- 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



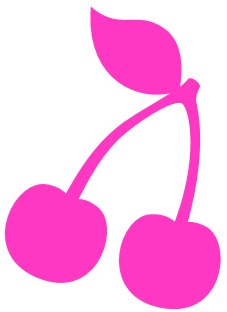
- Failure to undertake and report all model checking



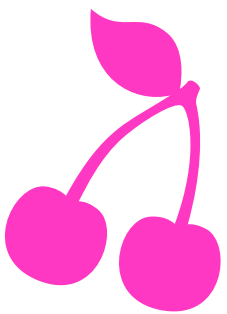
- Failure to check assumptions of model(s) is/are not violated, failure to report

- Hacking model checking statistic in any way

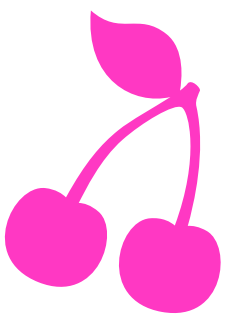
MODEL SELECTION / COMPARISON



- Failure to report all fitted models, including null and alternative models



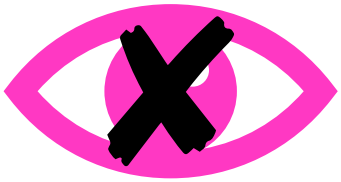
- Failure to report all conditions

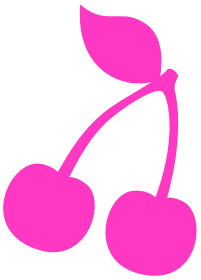


- Failure to report all covariates for each model

ROBUSTNESS ANALYSIS

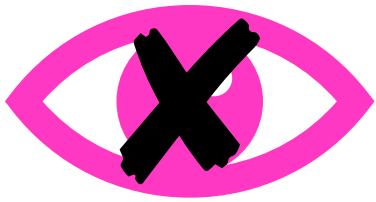
(prior sensitivity analyses, simulation analyses where assumptions violated etc.)



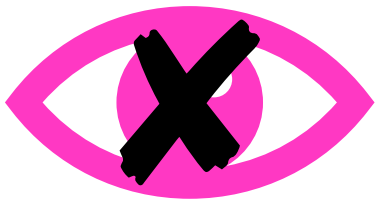


- Failure to report <u>all</u> analyses undertaken

- Hacking analyses until desired result obtained



HARKing



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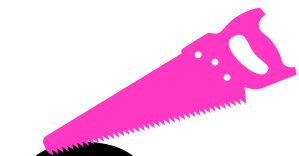
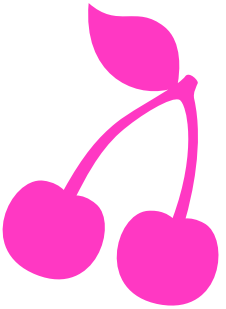
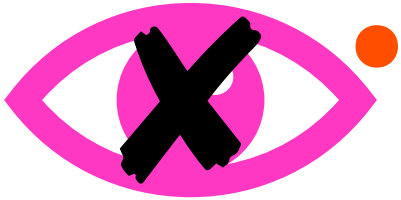


S

MCMC CONVERGENCE



- Failure to check and report all attempts



- Selective debugging

STOPPING RULES

- Failure to *a priori* specify stopping rule and data-peeking

Key themes and summary of issues
— Researcher Degrees of Freedom

- Many steps in the modelling process, and often multiple choices to be made at each step.

- *When to stop collecting data? What prior to select? What goodness of fit test should I use?*

- QRPs can occur multiple times in the entire process, at each decision point

- The same class of QRP can occur at multiple points in the modelling process

- Multiple QRPs can occur at each decision point

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STOPPING RULES

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MCMC CONVERGENCE

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MODEL SELECTION / COMPARISON

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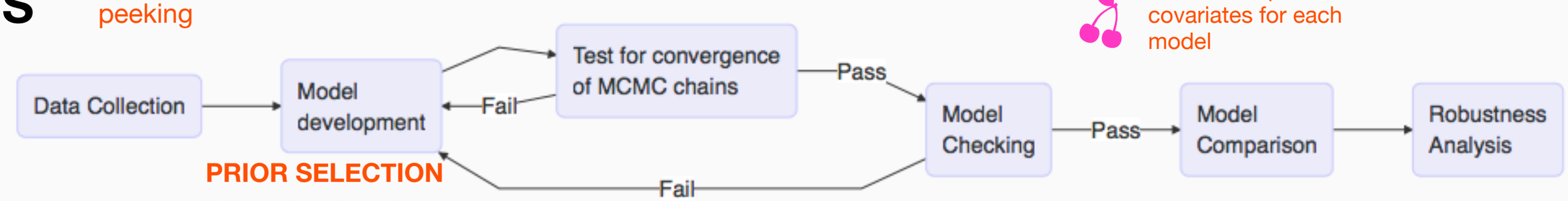
- Failure to report all conditions
- Failure to report all covariates for each model



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