CEP Group Meeting

Update on *paper 3* of my PhD

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Overview

- **Aim**: to research the *short-term* effects of childhood exposures to non-persistent EDCs on neurodevelopment in childhood, and how the metabolome **might** *mediate* these effects.
- **How**: by making use of the principles and criteria of triangulation.
- **Population**: the HELIX sub-cohort, consisting of N $= 1200$ mother-child pairs.
- **Exposures**: non-persistent EDCs (phenols, phthalates, and organophosphate compounds), measured in childhood in a pool of two urine samples.
- **Outcome**: Attention Network Test, to provide a measure of the efficiency of three different functions of attention.
- ***Mediators***: urine metabolites (focus on corticosteroids).

The Research Questions

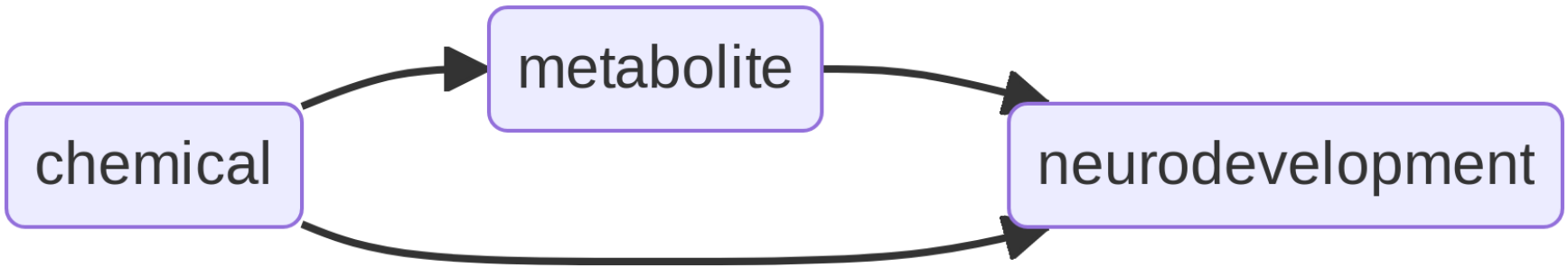


Figure 1: Simplified *DAG*.

Issues and limitations:

- The effect of exposure to these chemicals on neurodevelopment has been studied already, although there are clear issues with that study (e.g., wrong model, DAG **not** tailored to the exposures of interest).
- The effect of exposure to these chemicals on these **newly** measured metabolites could be identifiable, although they were measured in the same samples. This question poses some challenges since they were all measured in urine (inter-individual variability in urine dilution).
- The effect of these **newly** measured metabolites on neurodevelopment could be identifiable, since they were measure in the urine samples (which aliquot?) collected before the visit.

Triangulation

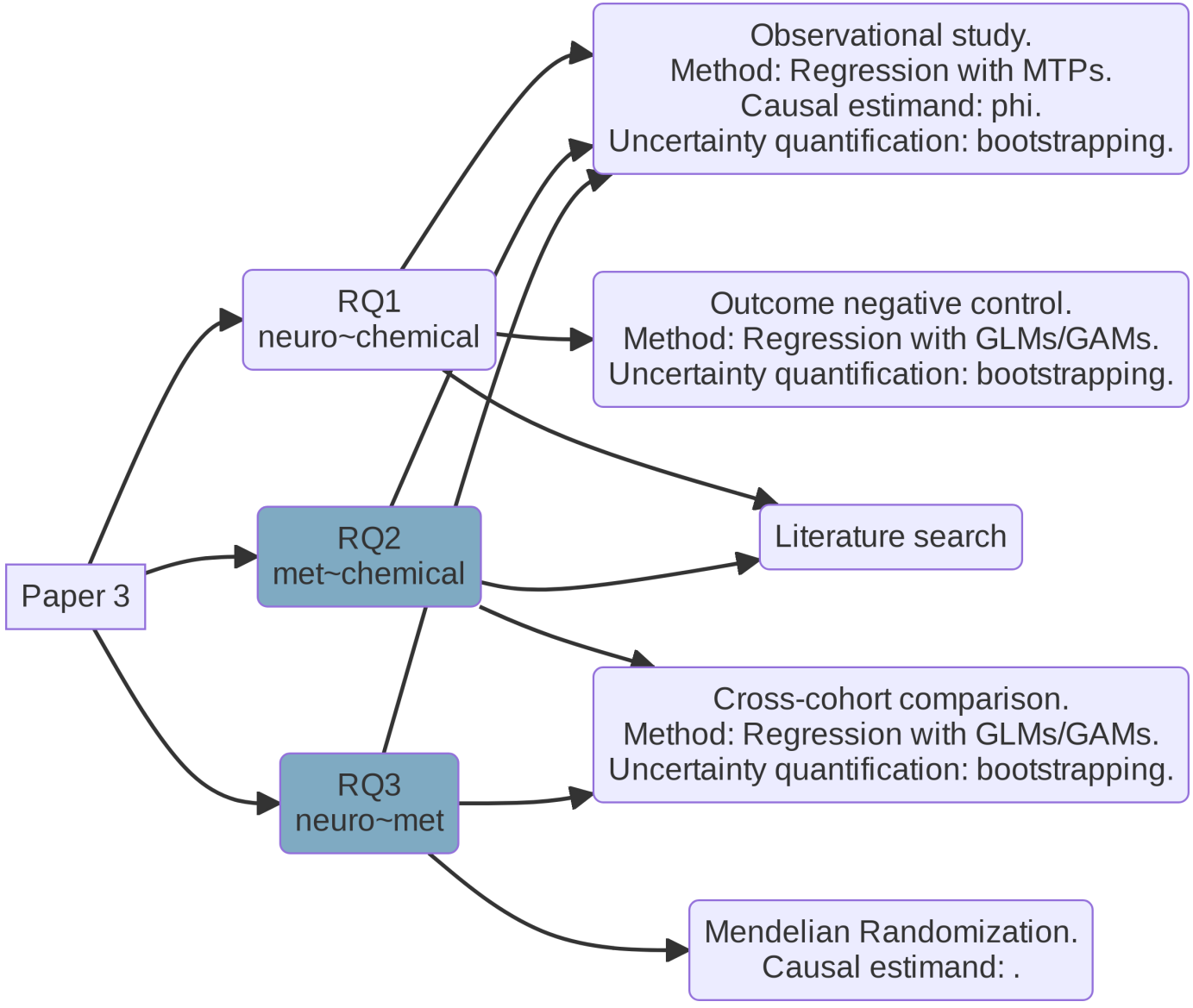


Figure 2: Diagram summarizing research questions and methods.

myphd R package

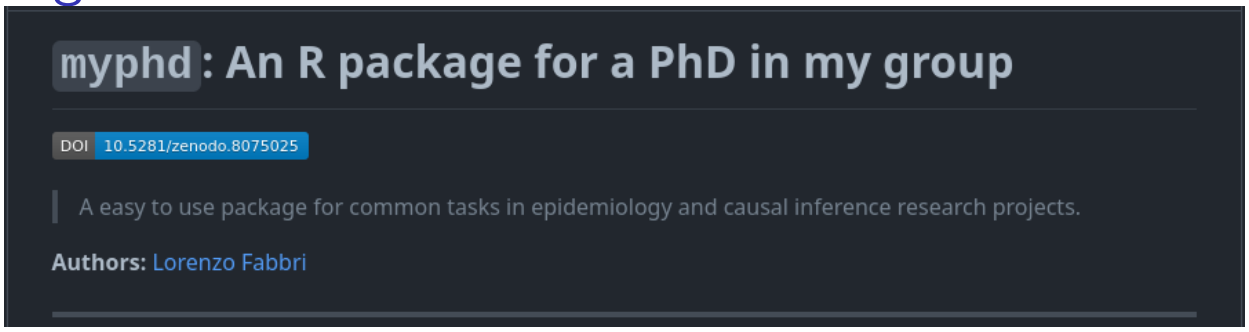


Figure 3: myphd

- URL manual: https://isglobal-cep.github.io/myphd/
- To install it: `remotes::install_github("isglobal-cep/myphd")`

```
myphd::create_formula(
  dat,
  outcome,
  exposure,
  covariates,
  method,
  add_inter_exposure,
  add_splines_exposure,
  df_splines,
  threshold_smooth,
  threshold_k
)
```

```
myphd::describe_data(
  dat,
  id_var,
  grouping_var
)
```

```
myphd::preproc_data(
  dat,
  outcome = NULL,
  dic_steps,
  id_var,
  by_var
)
```

Current setup

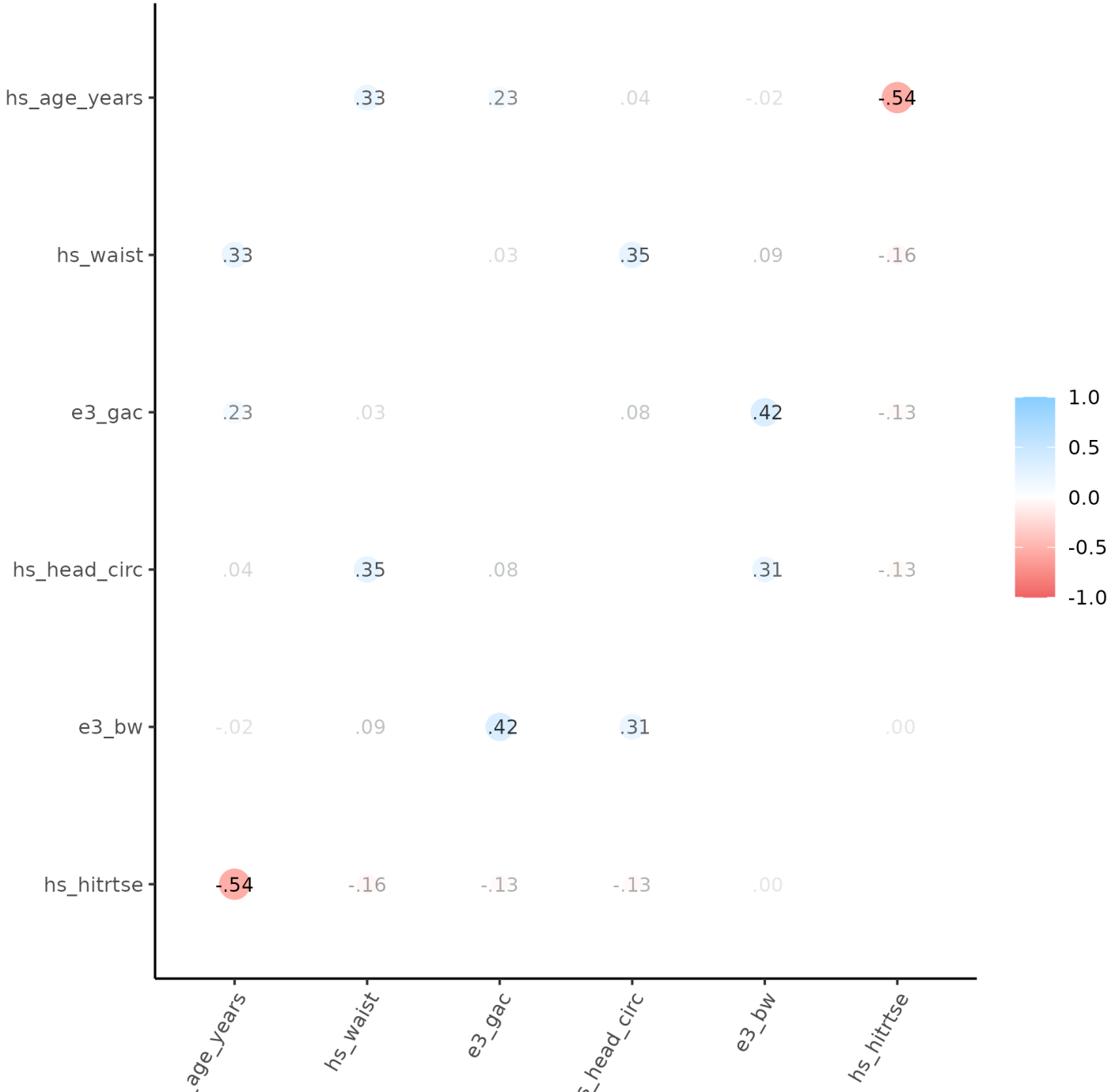
Variables:

- Clinical outcome: Attention Network Test (`hs_hitrtse`, Hit Reaction Time Standard Error).

Methods:

- Weights estimation (`chemical ~ covariates`): energy balancing.
- Effect estimation (`outcome ~ chemical + covariates`): `glm` with natural splines for exposure.

Population description: correlations



Preliminary results

Next steps