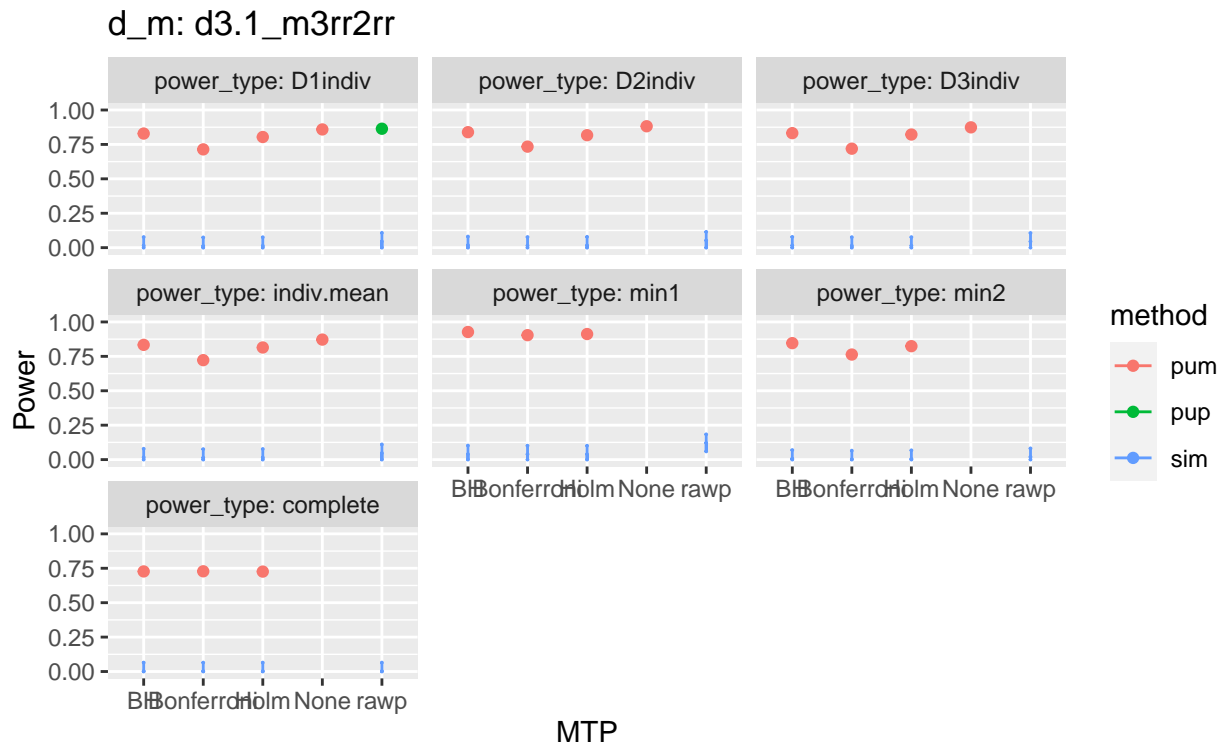# Validate Power: d3.1

December 25, 2021

Design: Blocked RCT, with 3 levels, and randomization done at level 1 (individual level).

Models: random treatment effects.

- M = 3
- J = 30
- K = 15
- $\bar{n} = 100$ (unless otherwise noted)
- rho: $\rho = 0.5$
- MDES = 0.125, 0.125, 0.125
- R2: $R_1^2 = 0.1, 0.1, 0.1$
- ICC: $\mathrm{ICC}_2 = 0.2, 0.2, 0.2, \mathrm{ICC}_3 = 0.2, 0.2, 0.2$
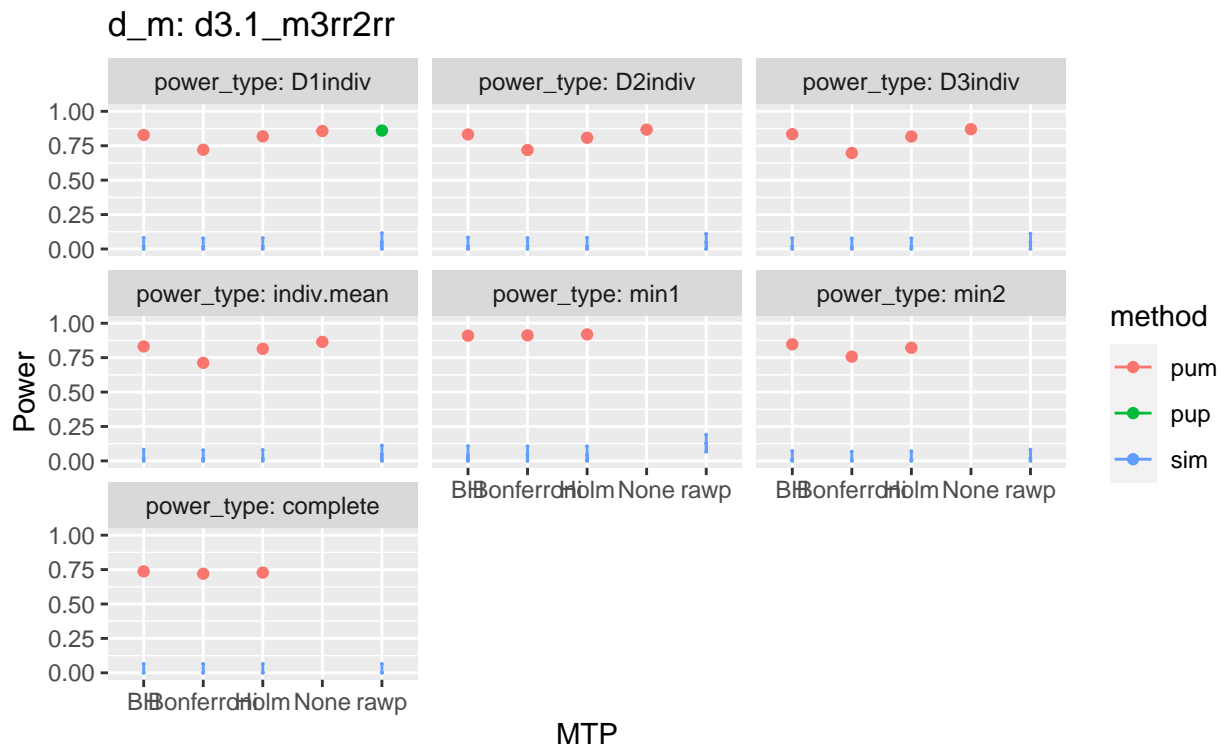- Omega: $\omega_2 = 0.1, 0.1, 0.1, \omega_3 = 0.1, 0.1, 0.1$
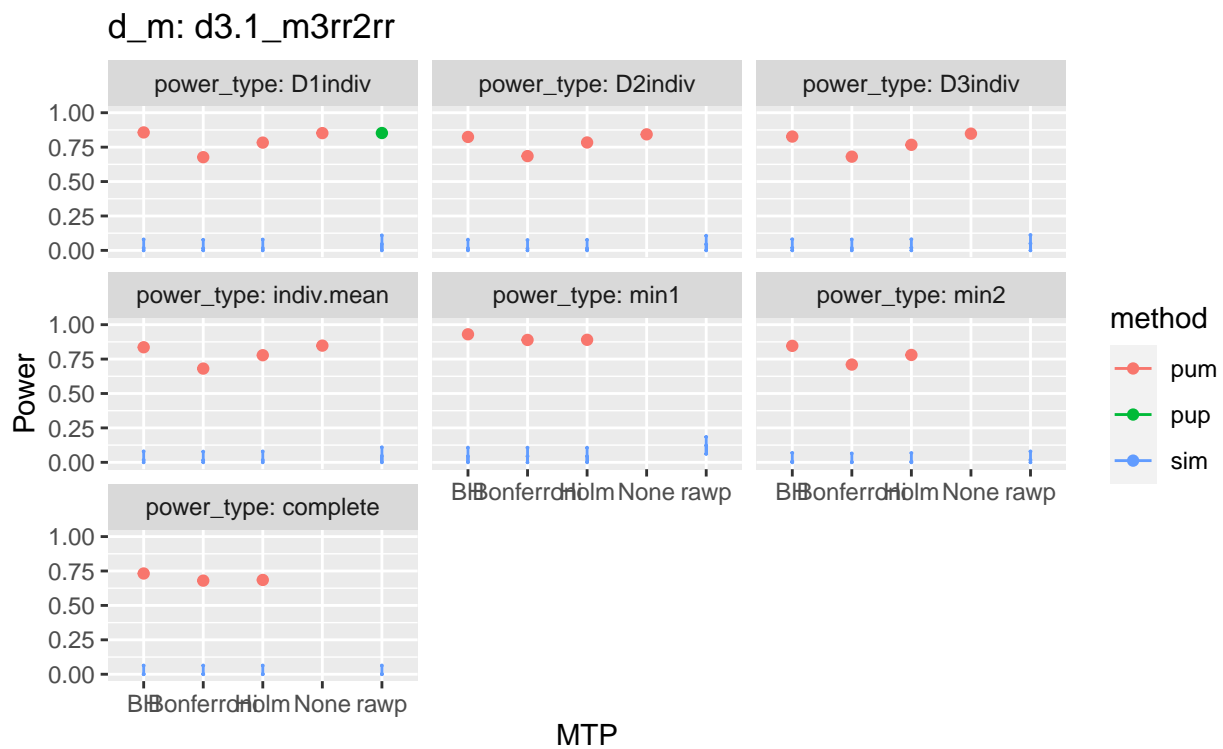
Power Validation

Base case

Varying school size

$\bar{n} = 75$

d_m: d3.1_m3rr2rr

$\bar{n} = 50$

d_m: d3.1_m3rr2rr

Varying R2

$R_1^2 = 0.6, 0.6, 0.6$

d_m: d3.1_m3rr2rr

$R_1^2 = 0, 0, 0$

d_m: d3.1_m3rr2rr

Varying rho

$\rho = 0.2$

d_m: d3.1_m3rr2rr

$\rho = 0.8$
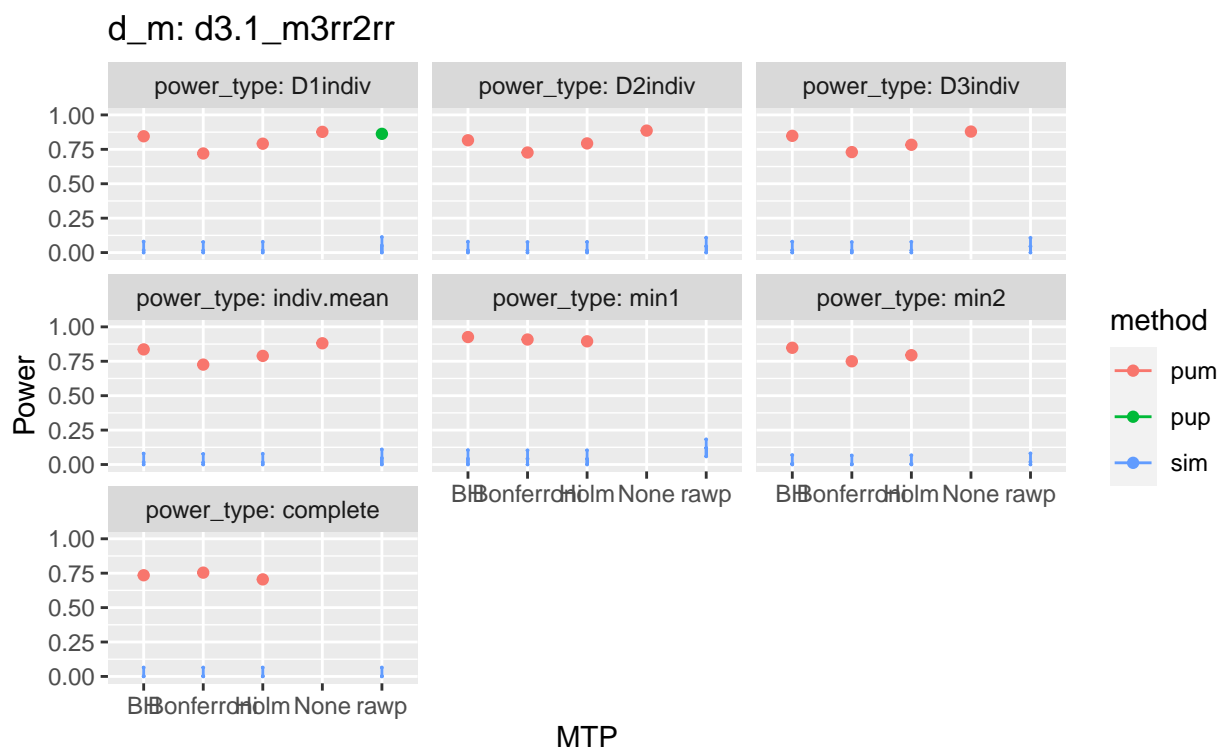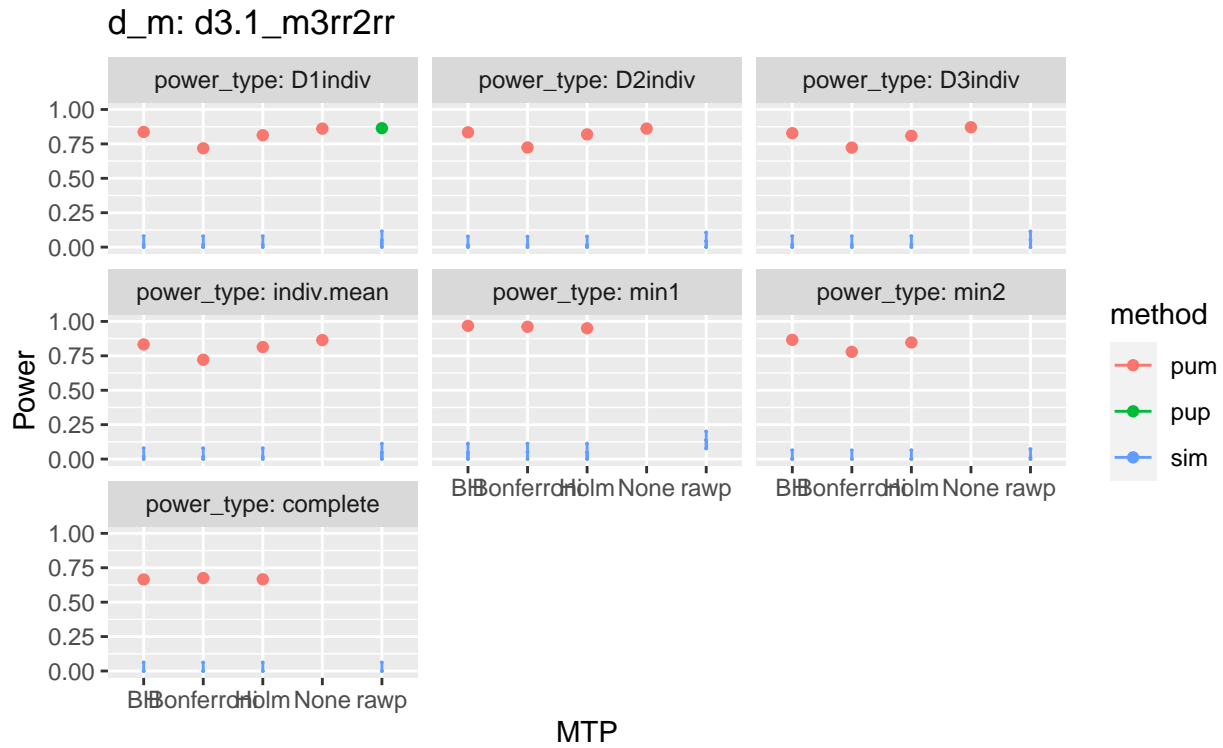
d_m: d3.1_m3rr2rr

Varying true positives

MDES = 0.125, 0, 0

d_m: d3.1_m3rr2rr

Varying ICC

ICC_2 = 0.7, 0.7, 0.7

d_m: d3.1_m3rr2rr
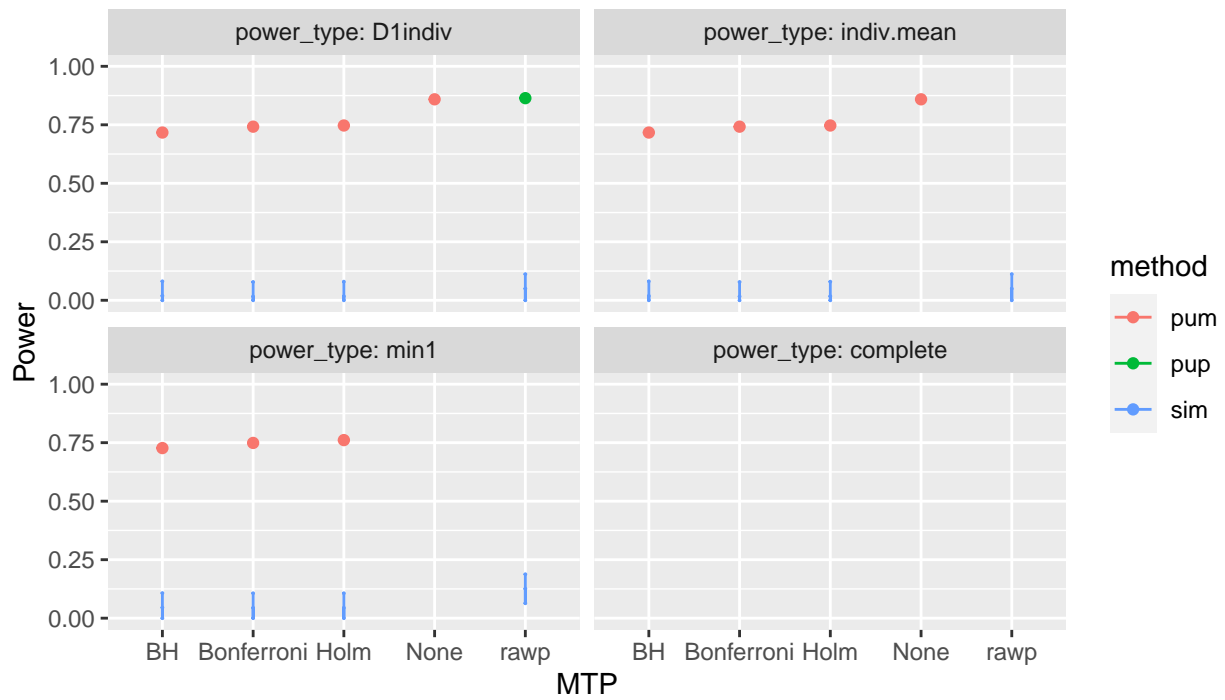
$\text{ICC}_3 = 0.7, 0.7, 0.7$

d_m: d3.1_m3rr2rr
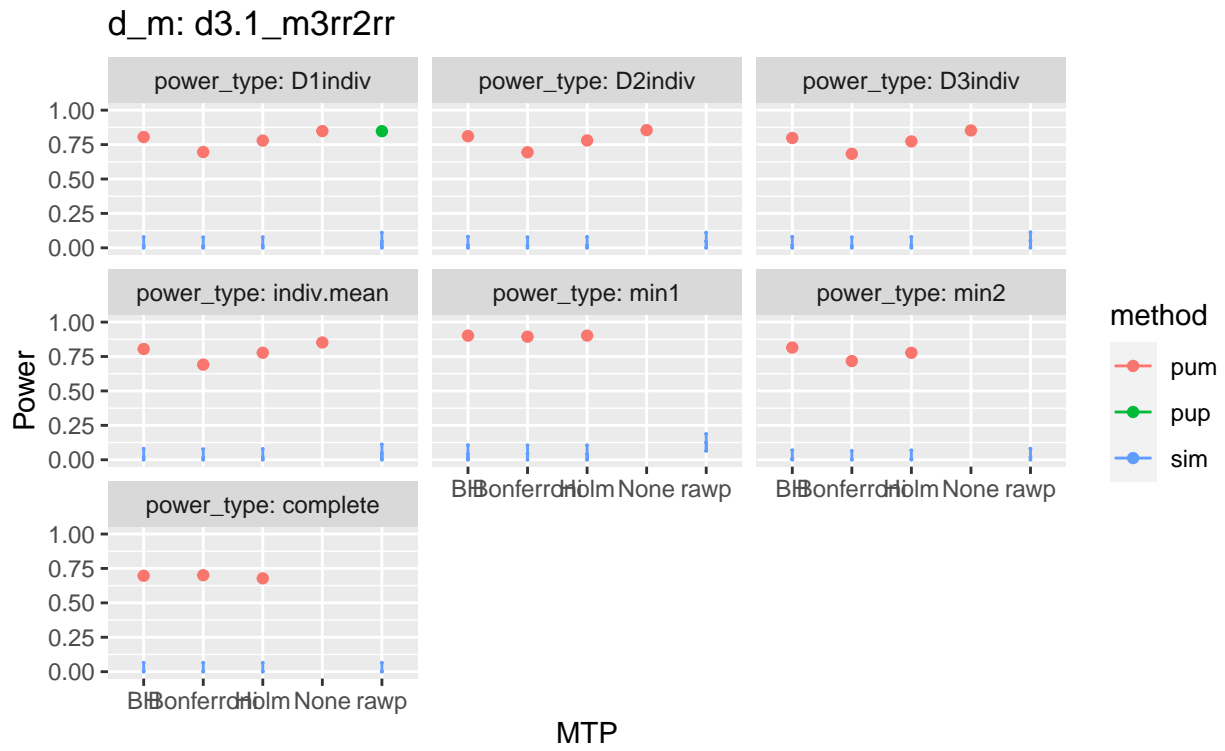
$\text{ICC}_2 = 0, 0, 0$

d_m: d3.1_m3rr2rr
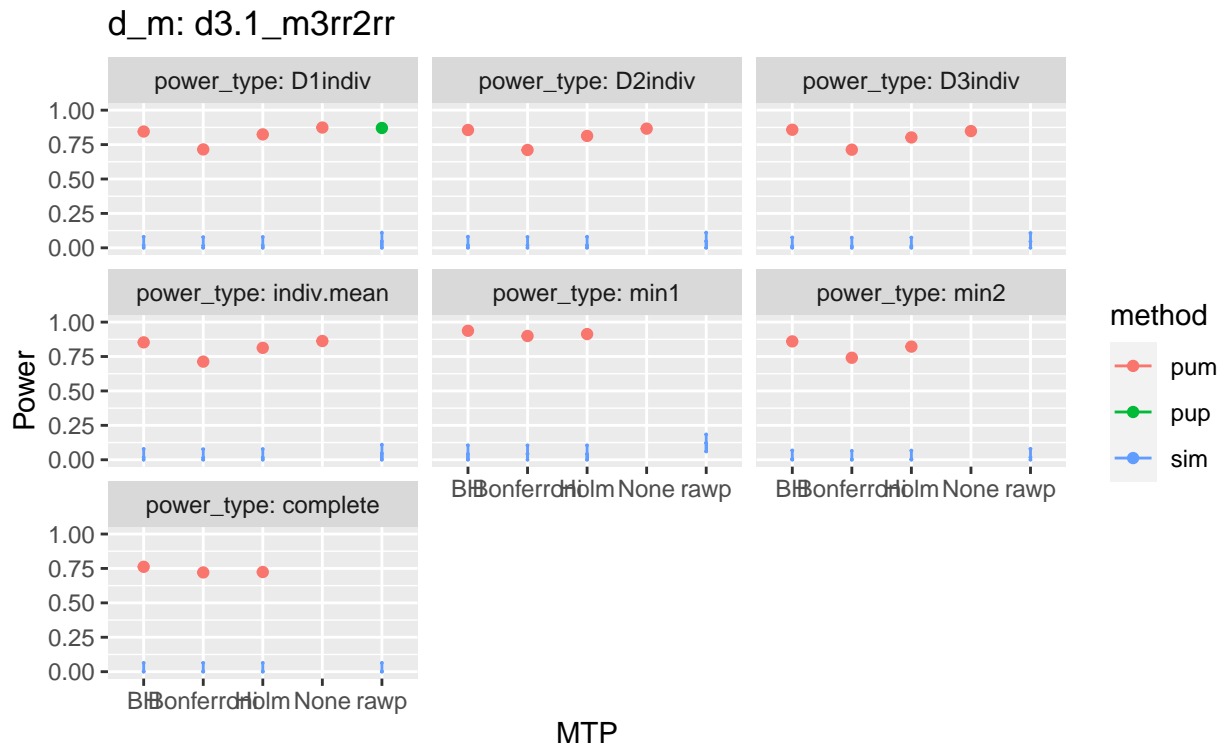
$\mathrm{ICC}_2 = 0.2,\ 0.2,\ 0.2$

d_m: d3.1_m3rr2rr

Varying Omega

$\omega_2 = 0.8,\ 0.8,\ 0.8,\ \omega_3 = 0.1,\ 0.1,\ 0.1$

d_m: d3.1_m3rr2rr

$\omega_2 = 0.1, 0.1, 0.1, \omega_3 = 0.8, 0.8, 0.8$

d_m: d3.1_m3rr2rr
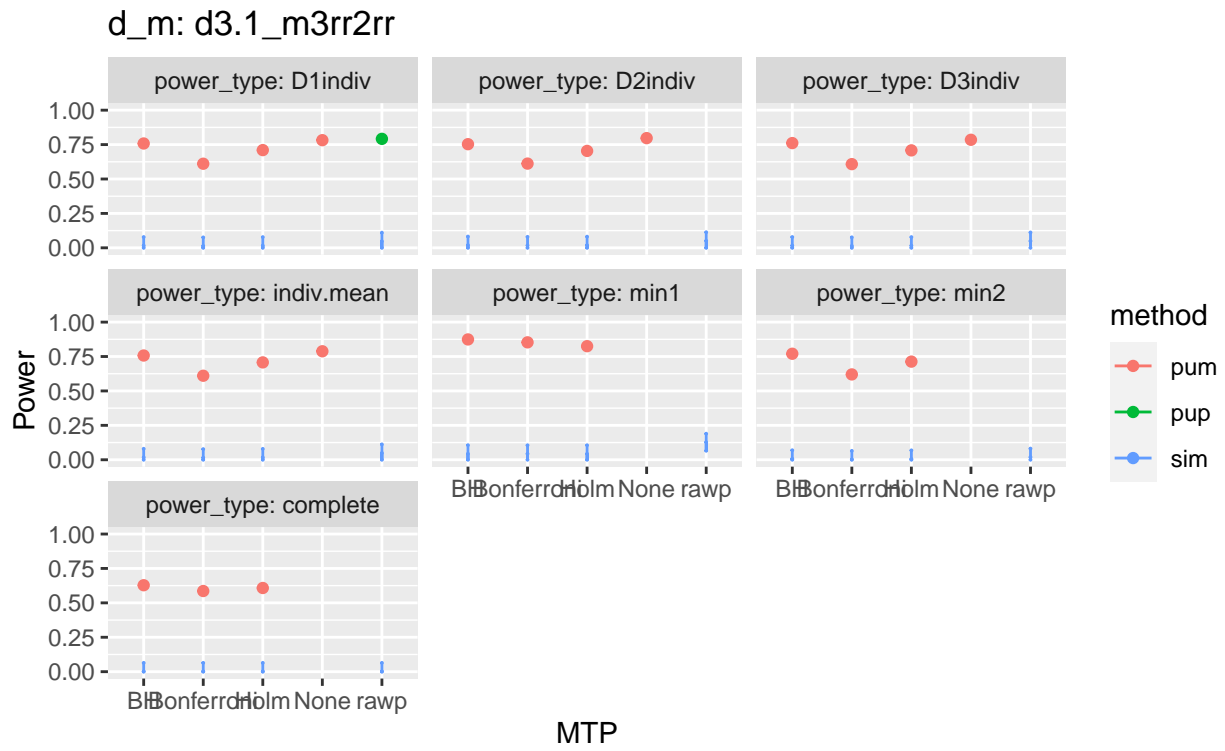
$\omega_2 = 0.8, 0.8, 0.8, \omega_3 = 0.8, 0.8, 0.8$
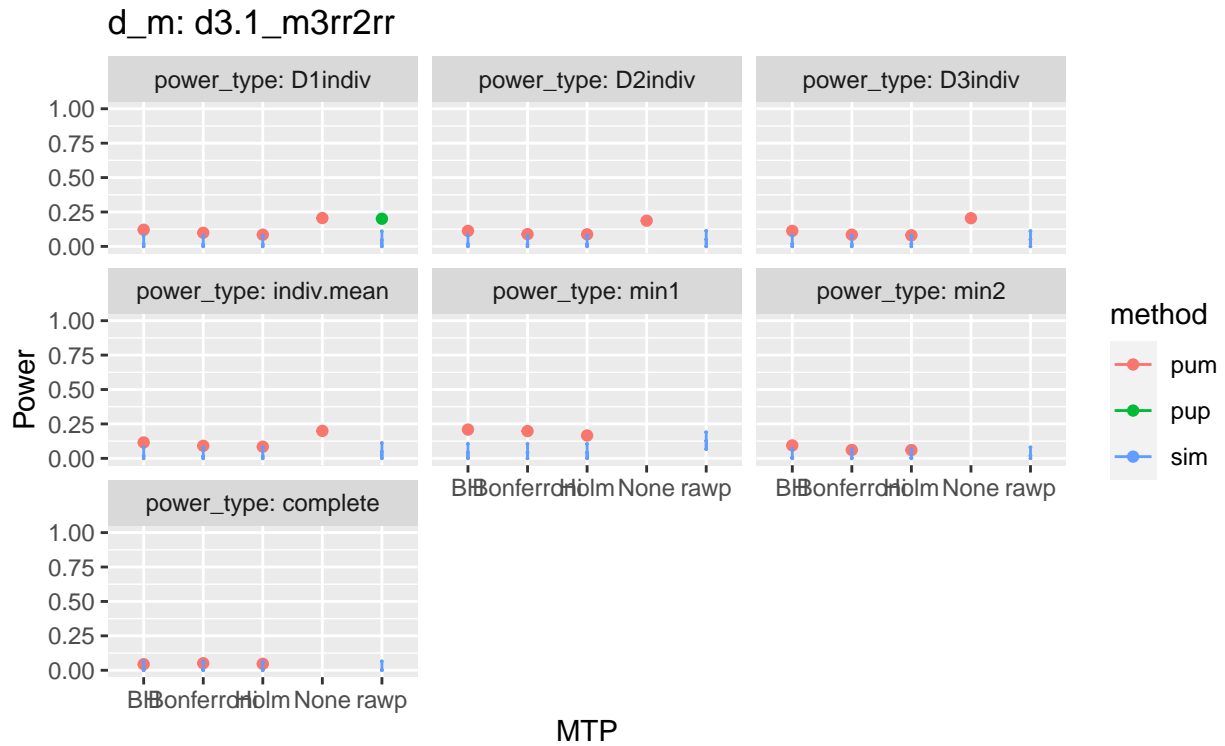
d_m: d3.1_m3rr2rr

$\omega_2 = 0, 0, 0, \omega_3 = 0.1, 0.1, 0.1$

d_m: d3.1_m3rr2rr

$\omega_2 = 0.1, 0.1, 0.1, \omega_3 = 0, 0, 0$

d_m: d3.1_m3rr2rr
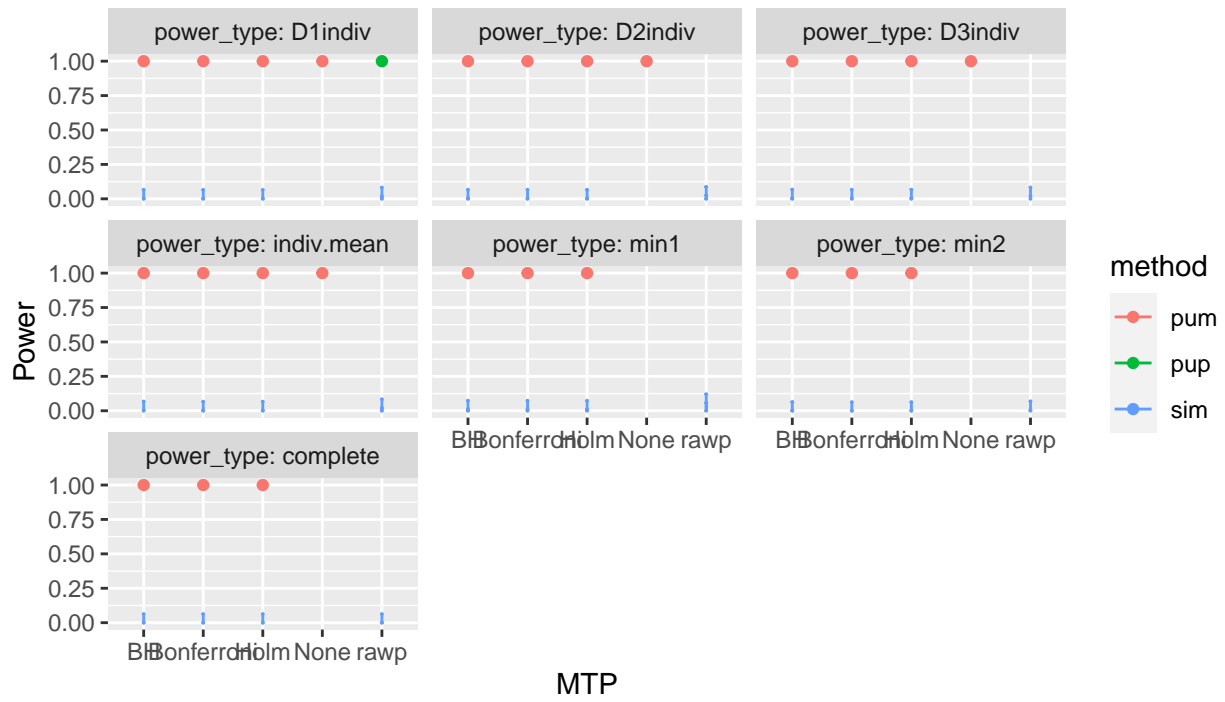
$\omega_2 = 0, 0, 0, \omega_3 = 0, 0, 0$

d_m: d3.1_m3rr2rr

Kappa

$\kappa = 0.4$

d_m: d3.1_m3rr2rr

MDES validation

```
## 
## 
## +------------+--------------+---------------+-------------+
## |    MTP     | Adjusted MDES | D1indiv Power | Target MDES |
## +============+==============+===============+=============+
## | Bonferroni |    0.124     |     0.714     |    0.125    |
## +------------+--------------+---------------+-------------+
## |     BH     |    0.124     |     0.824     |    0.125    |
## +------------+--------------+---------------+-------------+
## |    Holm    |    0.126     |     0.812     |    0.125    |
## +------------+--------------+---------------+-------------+
## 
## Table: d3.1_m3rr2rr
```

Sample size validation

```
## 
## 
## +------------+-------------+-------------+---------------+
## |    MTP     | Sample.type | Sample.size | D1indiv.power |
## +============+=============+=============+===============+
## | Bonferroni |      J      |     27      |     0.714     |
## +------------+-------------+-------------+---------------+
## |     BH     |      J      |     33      |     0.832     |
## +------------+-------------+-------------+---------------+
```
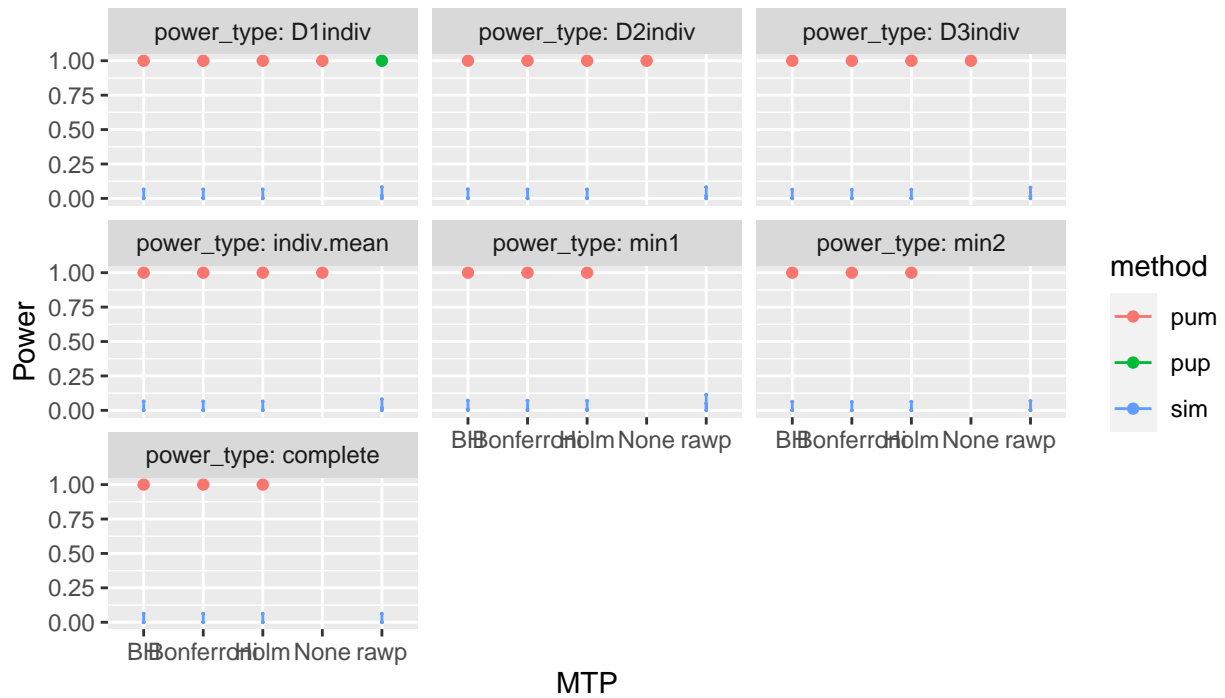
```
## |    Holm    |      J      |     22      |     0.796      |
## +------------+-------------+-------------+----------------+
##
## Table: d3.1_m3rr2rr

##
##
## +------------+-------------+-------------+----------------+
## |    MTP     | Sample.type | Sample.size | D1indiv.power  |
## +============+=============+=============+================+
## | Bonferroni |      K      |     15      |     0.714      |
## +------------+-------------+-------------+----------------+
## |     BH     |      K      |     16      |     0.831      |
## +------------+-------------+-------------+----------------+
## |    Holm    |      K      |     15      |     0.795      |
## +------------+-------------+-------------+----------------+
##
## Table: d3.1_m3rr2rr

##
##
## +------------+-------------+-------------+----------------+
## |    MTP     | Sample.type | Sample.size | D1indiv.power  |
## +============+=============+=============+================+
## | Bonferroni |    nbar     |    79.82    |     0.714      |
## +------------+-------------+-------------+----------------+
## |     BH     |    nbar     |     193     |     0.837      |
## +------------+-------------+-------------+----------------+
## |    Holm    |    nbar     |     62      |     0.798      |
## +------------+-------------+-------------+----------------+
##
## Table: d3.1_m3rr2rr
```