

Validate Power: d3.1

April 08, 2022

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

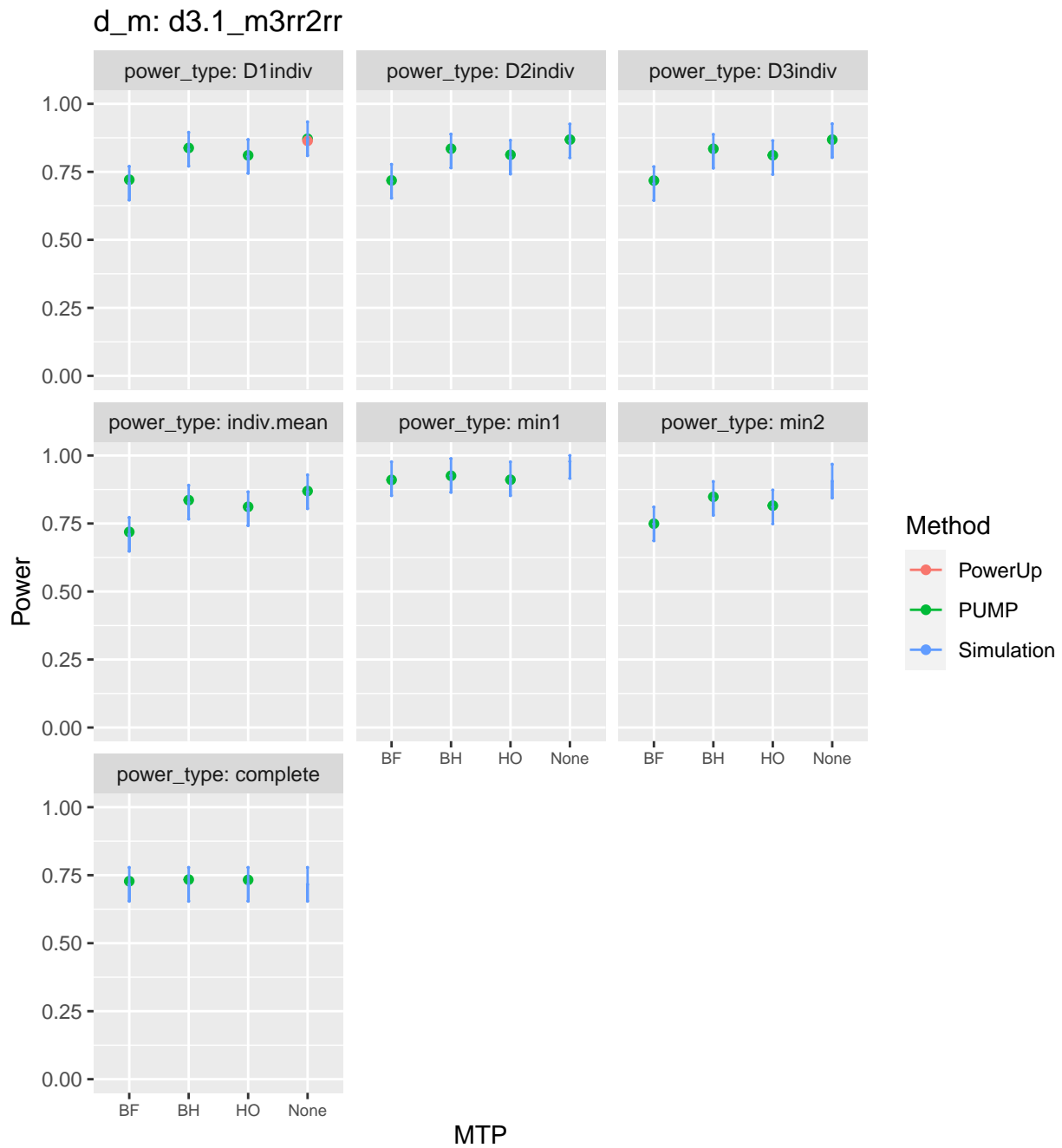
Models: random treatment effects.

d_m codes: d3.1_m3rr2rr

- $M = 3$
- $J = 30$
- $K = 15$
- $\bar{n} = 100$ (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: $ICC_2 = 0.2, 0.2, 0.2$, $ICC_3 = 0.2, 0.2, 0.2$
- Omega: $\omega_2 = 0.1, 0.1, 0.1$, $\omega_3 = 0.1, 0.1, 0.1$

Power Validation

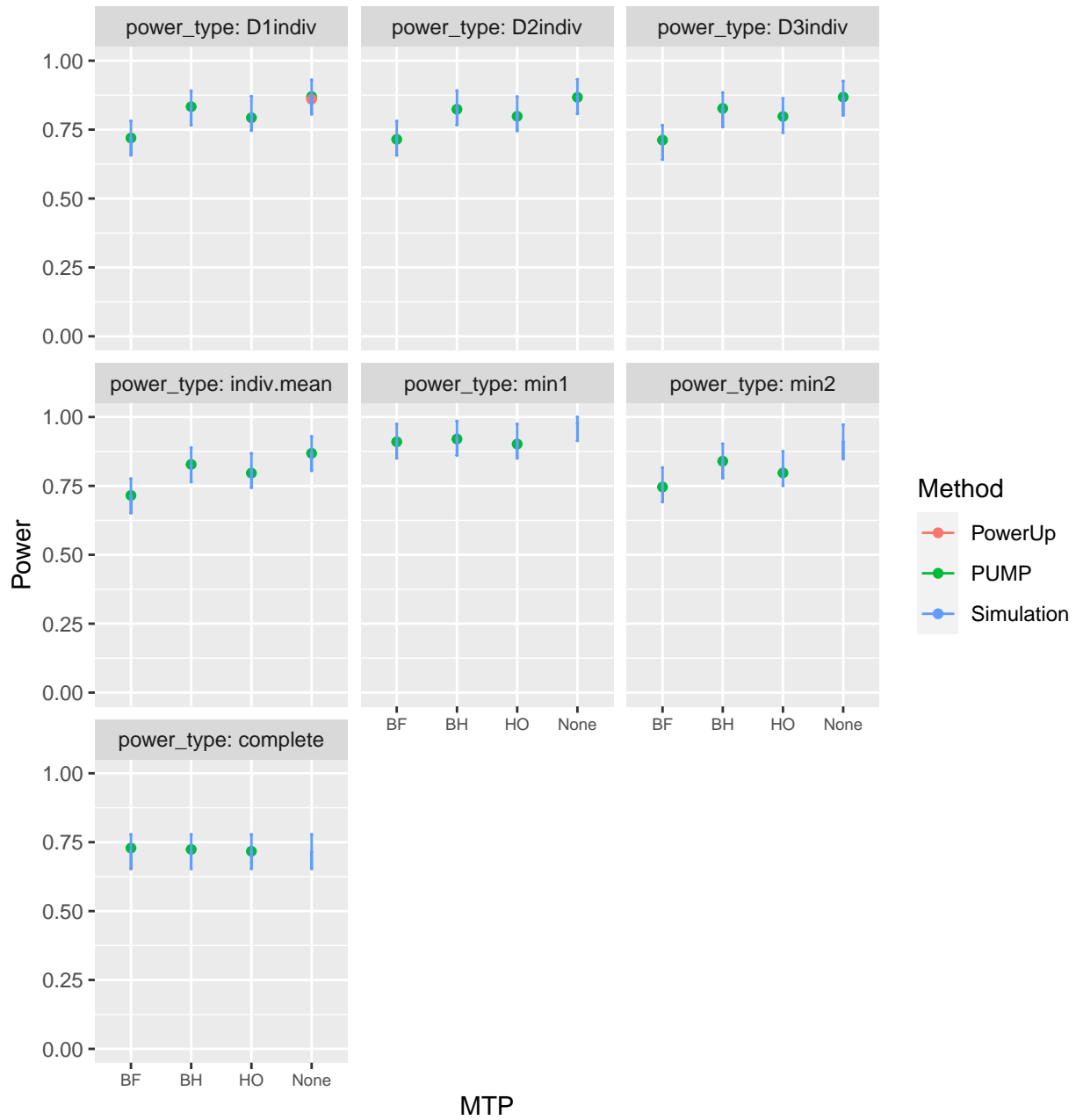
Base case



Varying school size

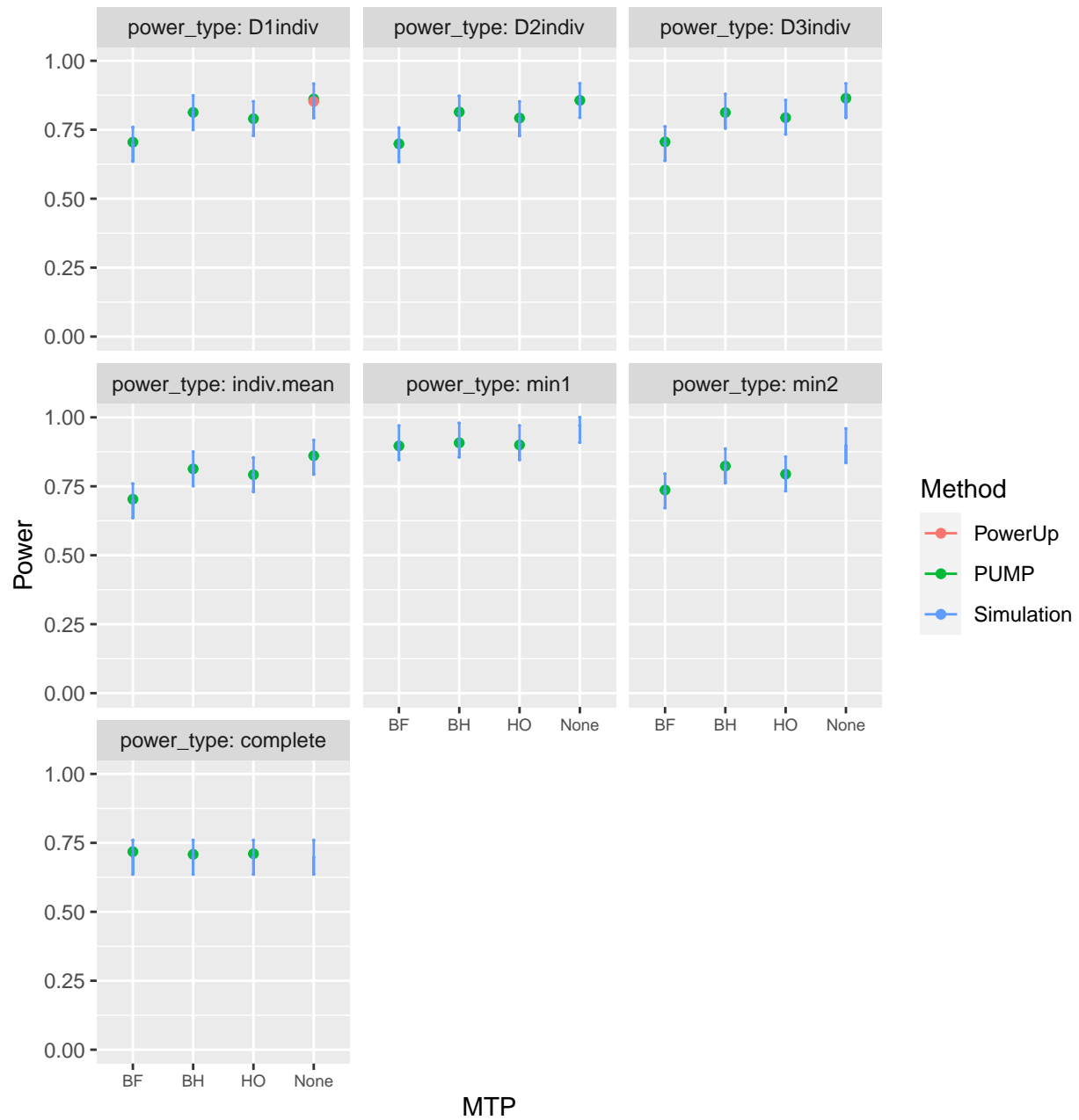
$\bar{n} = 75$

d_m: d3.1_m3rr2rr



$\bar{n} = 50$

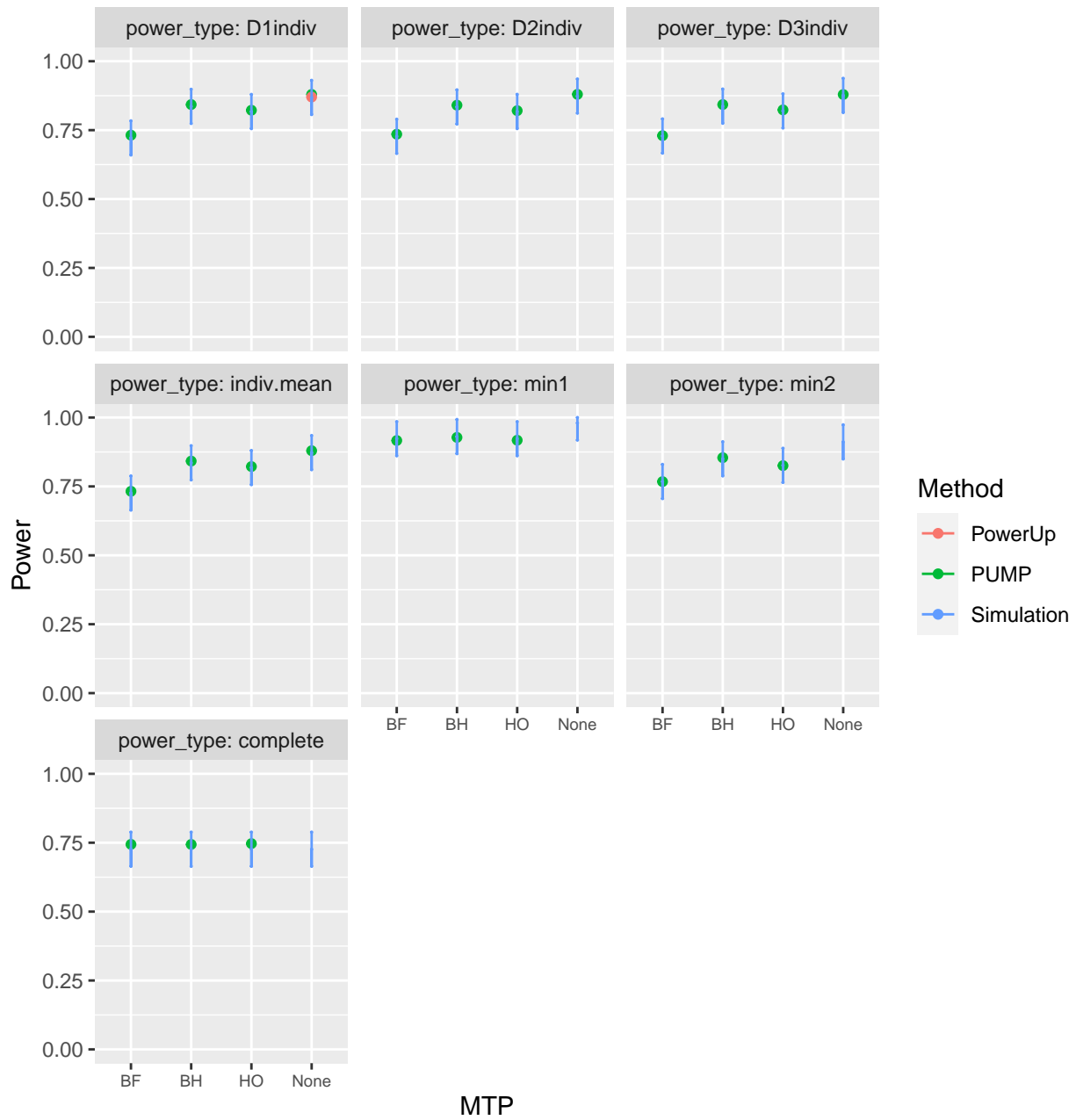
d_m: d3.1_m3rr2rr



Varying R2

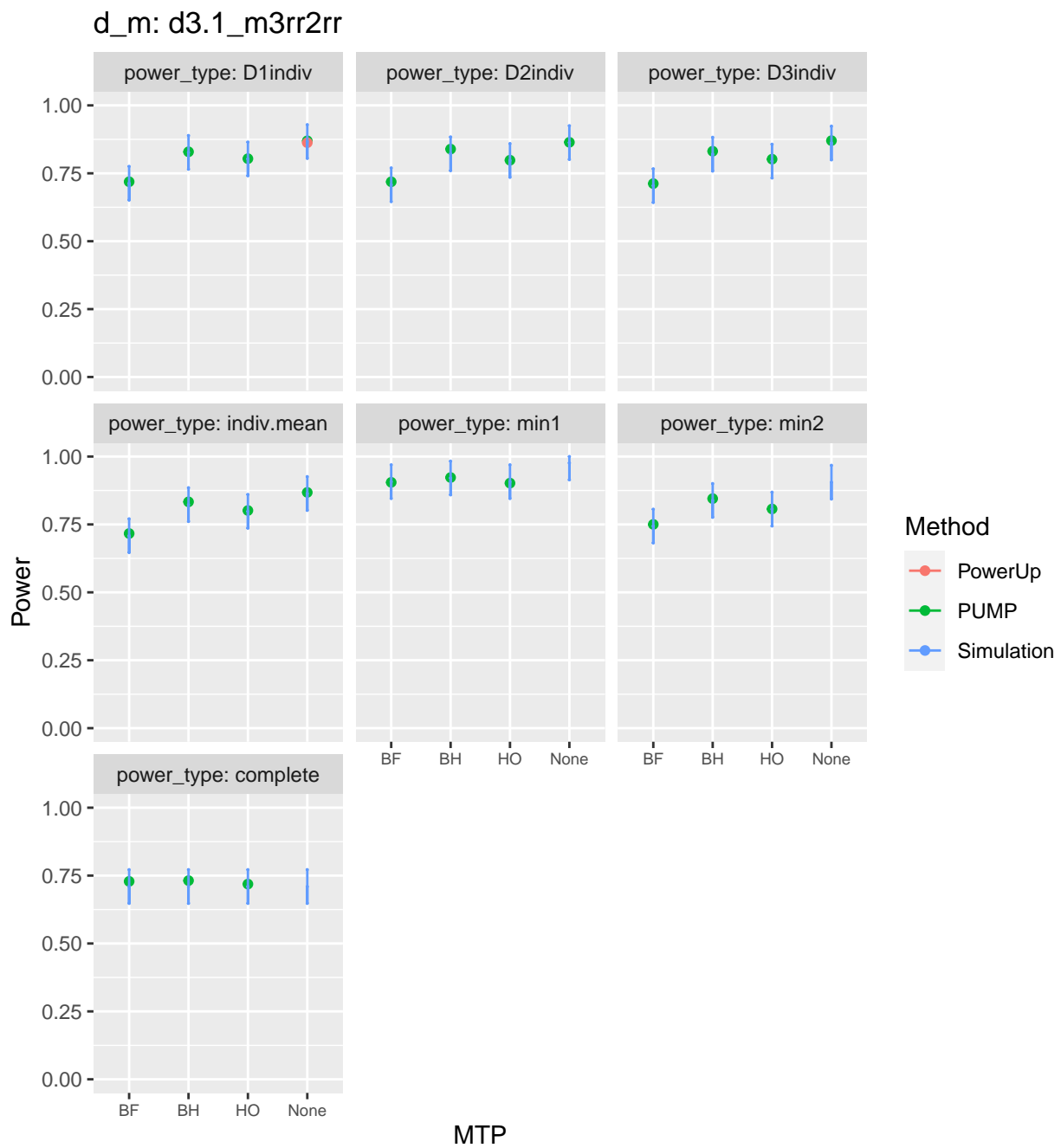
$$R_1^2 = 0.6, 0.6, 0.6$$

d_m: d3.1_m3rr2rr



MTP

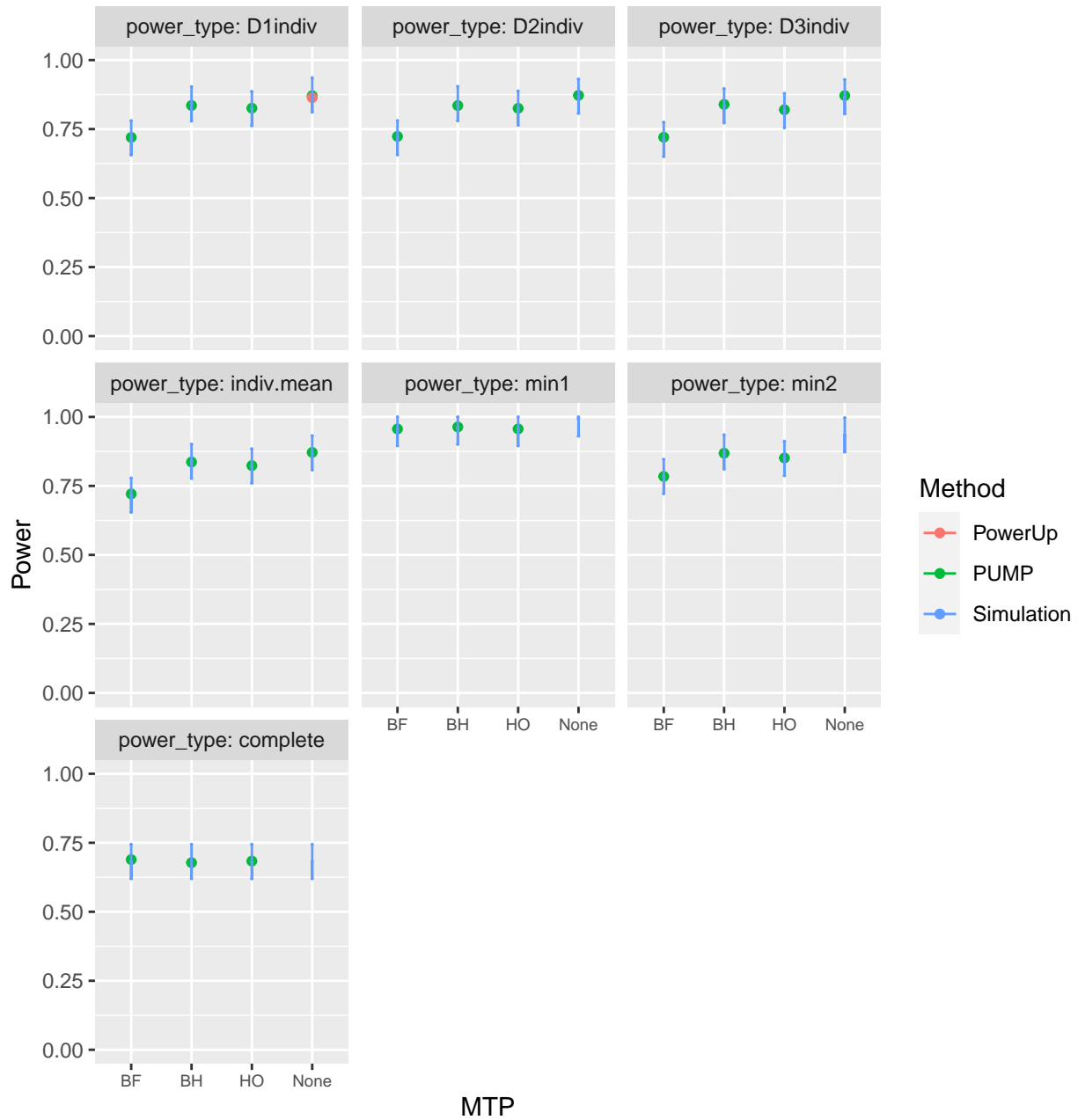
$$R_1^2 = 0, 0, 0$$



Varying rho

$\rho = 0.2$

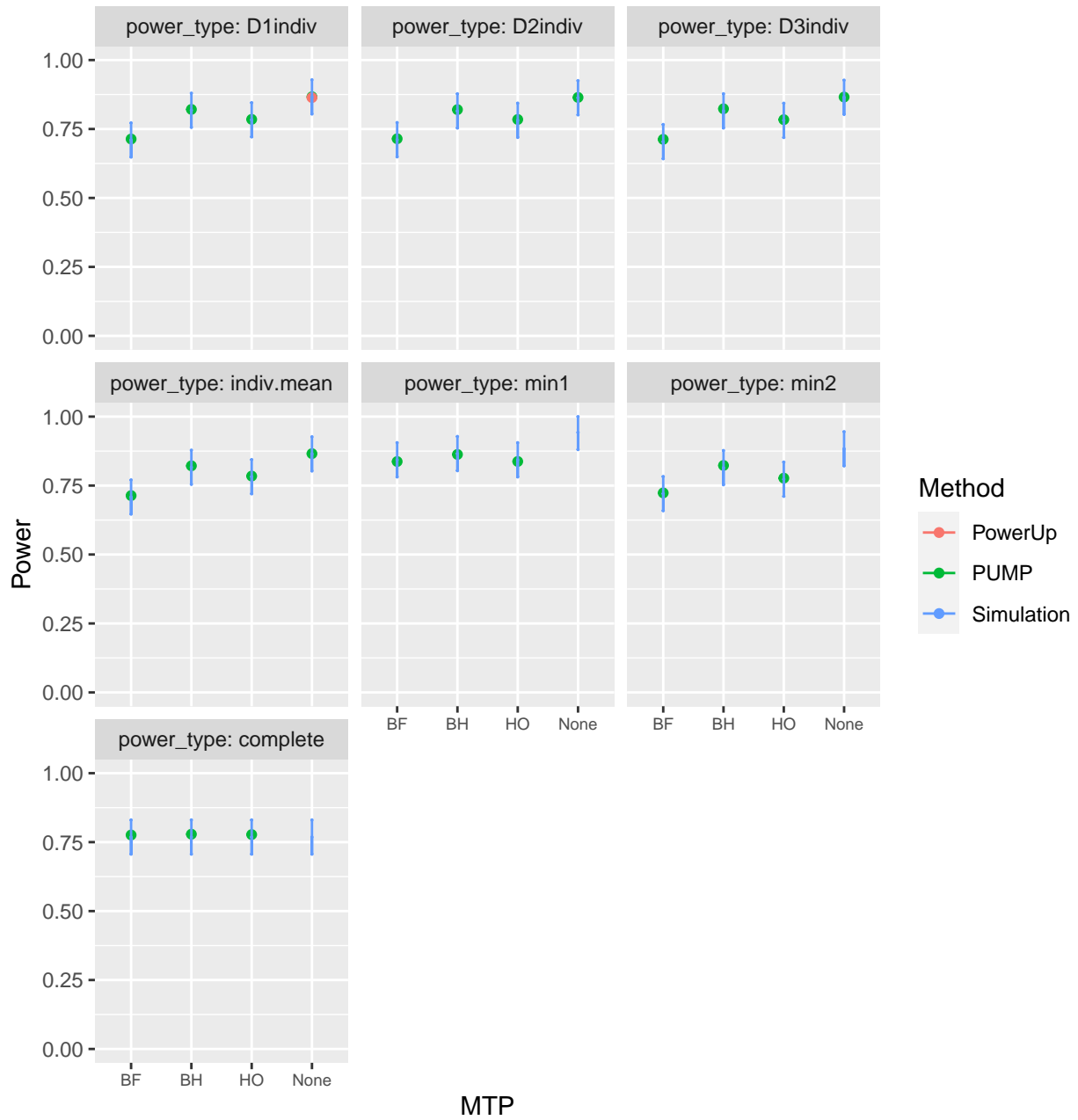
d_m: d3.1_m3rr2rr



MTP

$\rho = 0.8$

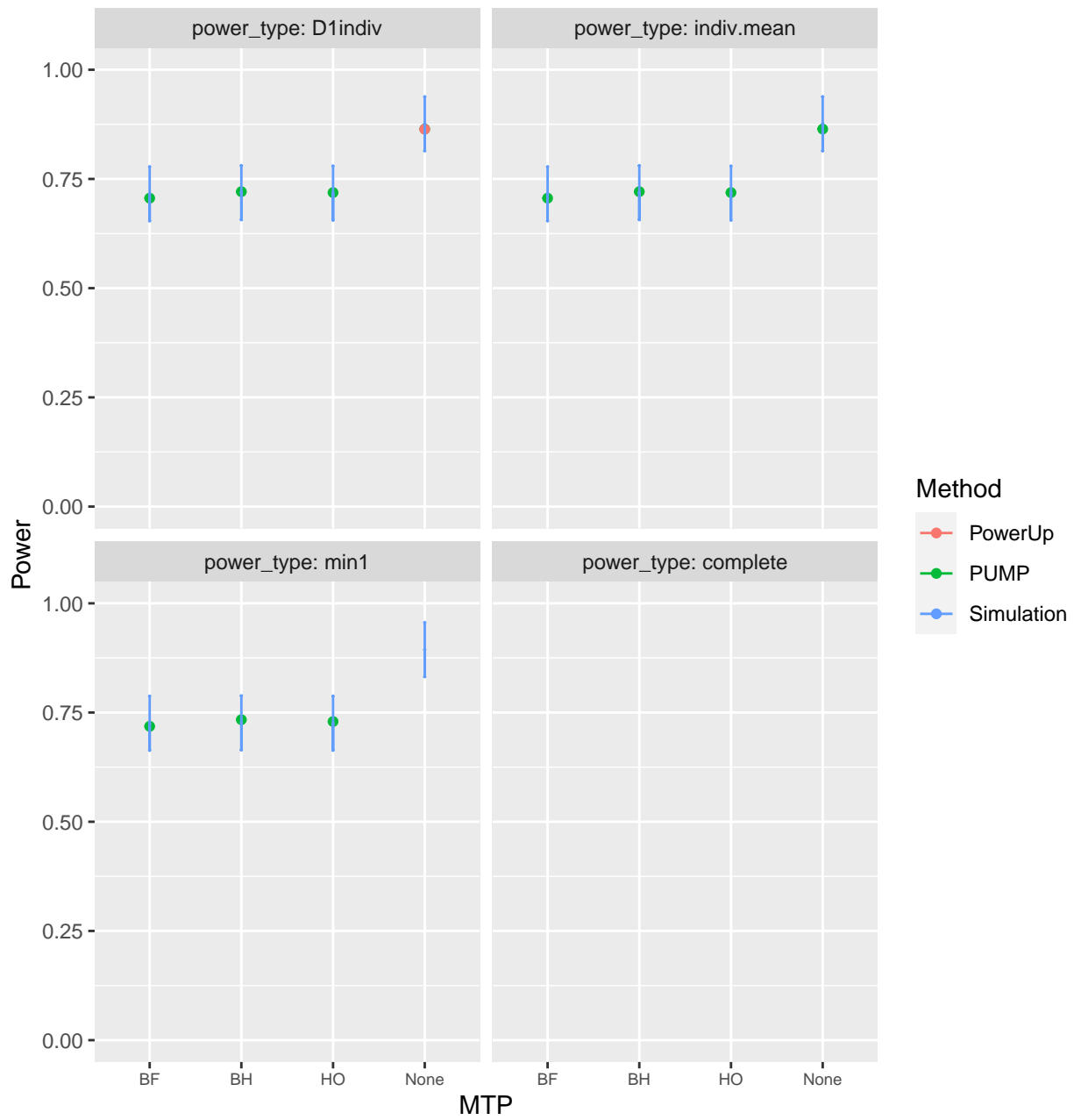
d_m: d3.1_m3rr2rr



Varying true positives

MDES = 0.125, 0, 0

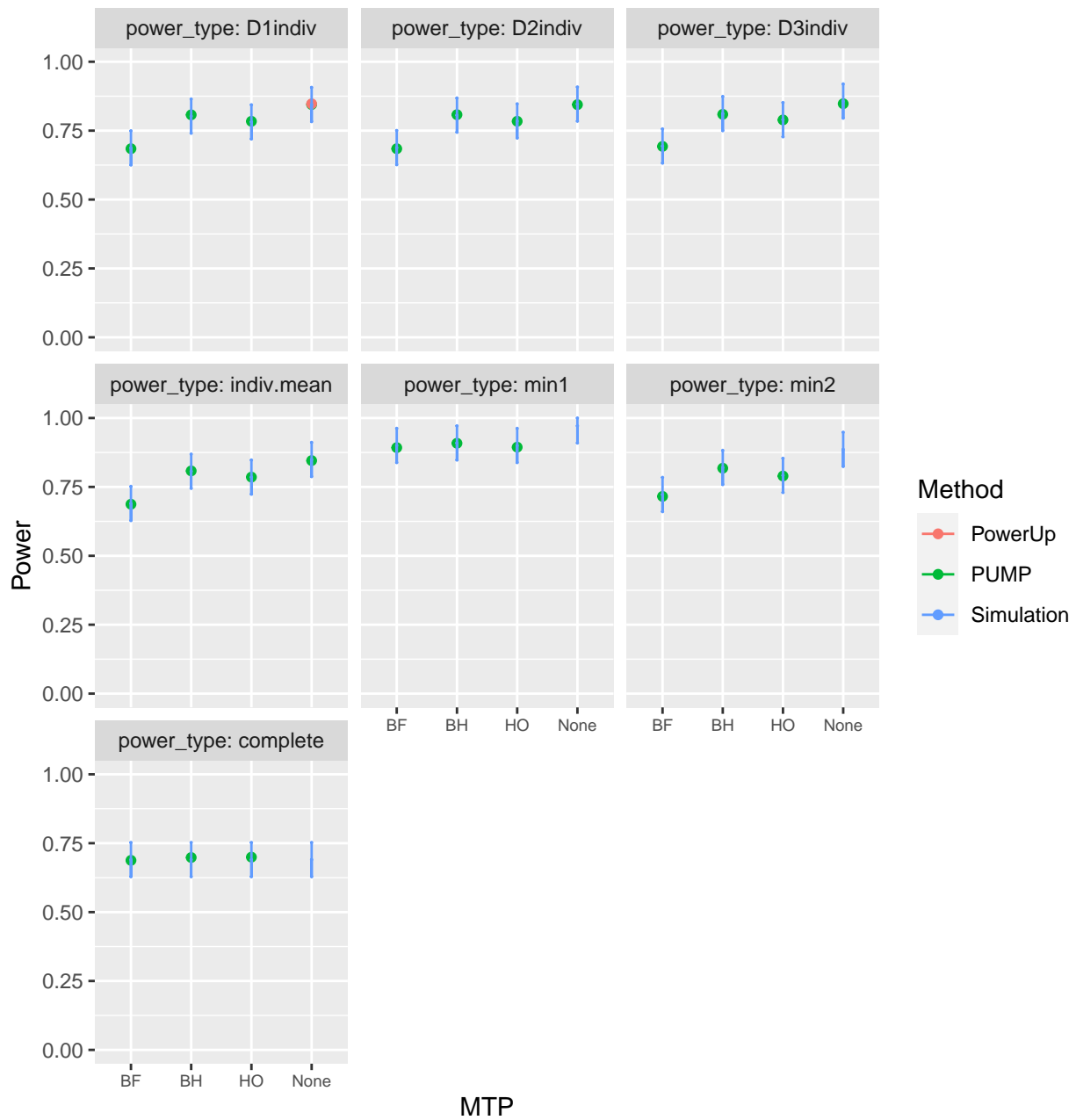
d_m: d3.1_m3rr2rr



Varying ICC

$ICC_2 = 0.7, 0.7, 0.7$

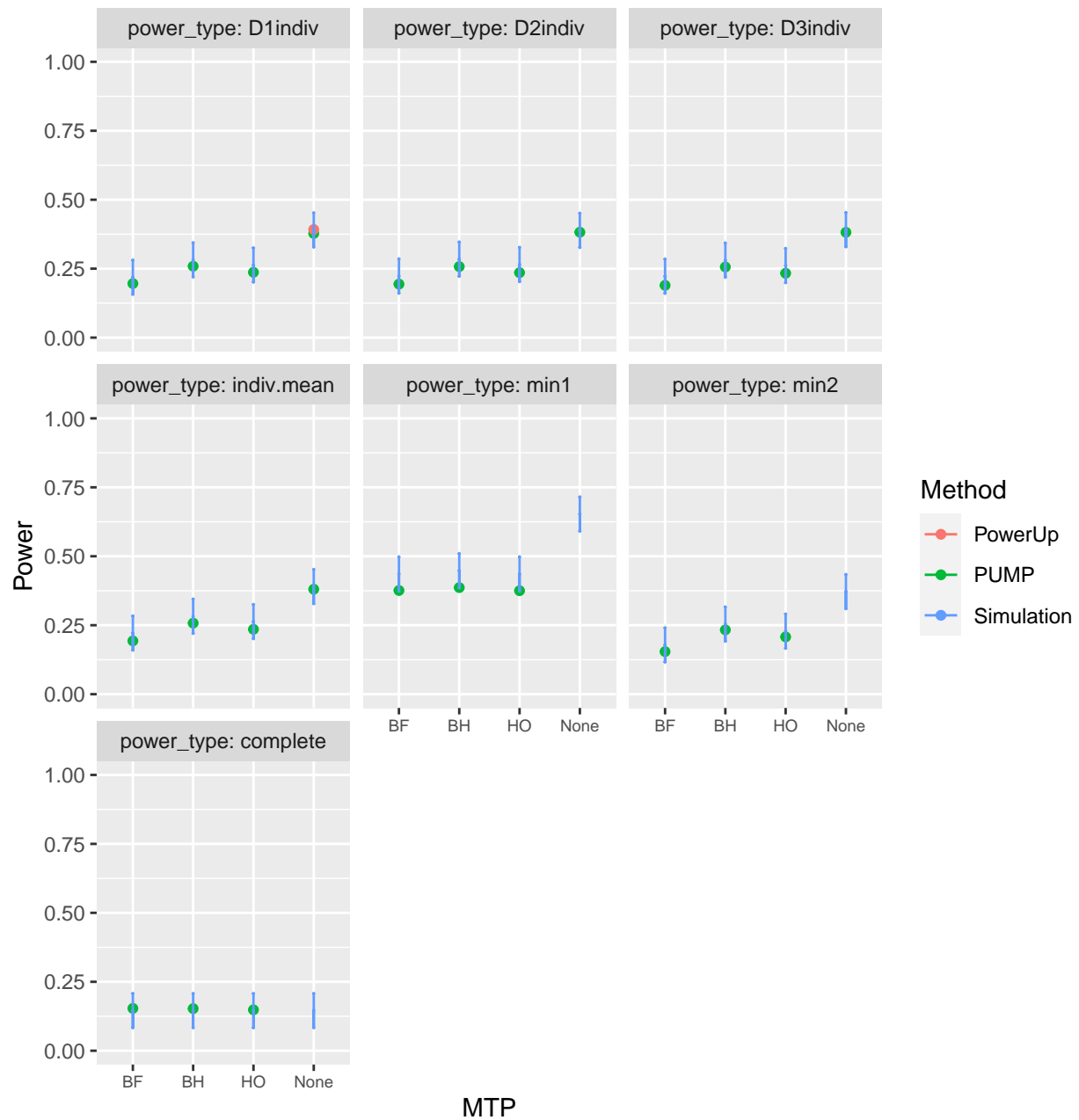
d_m: d3.1_m3rr2rr



MTP

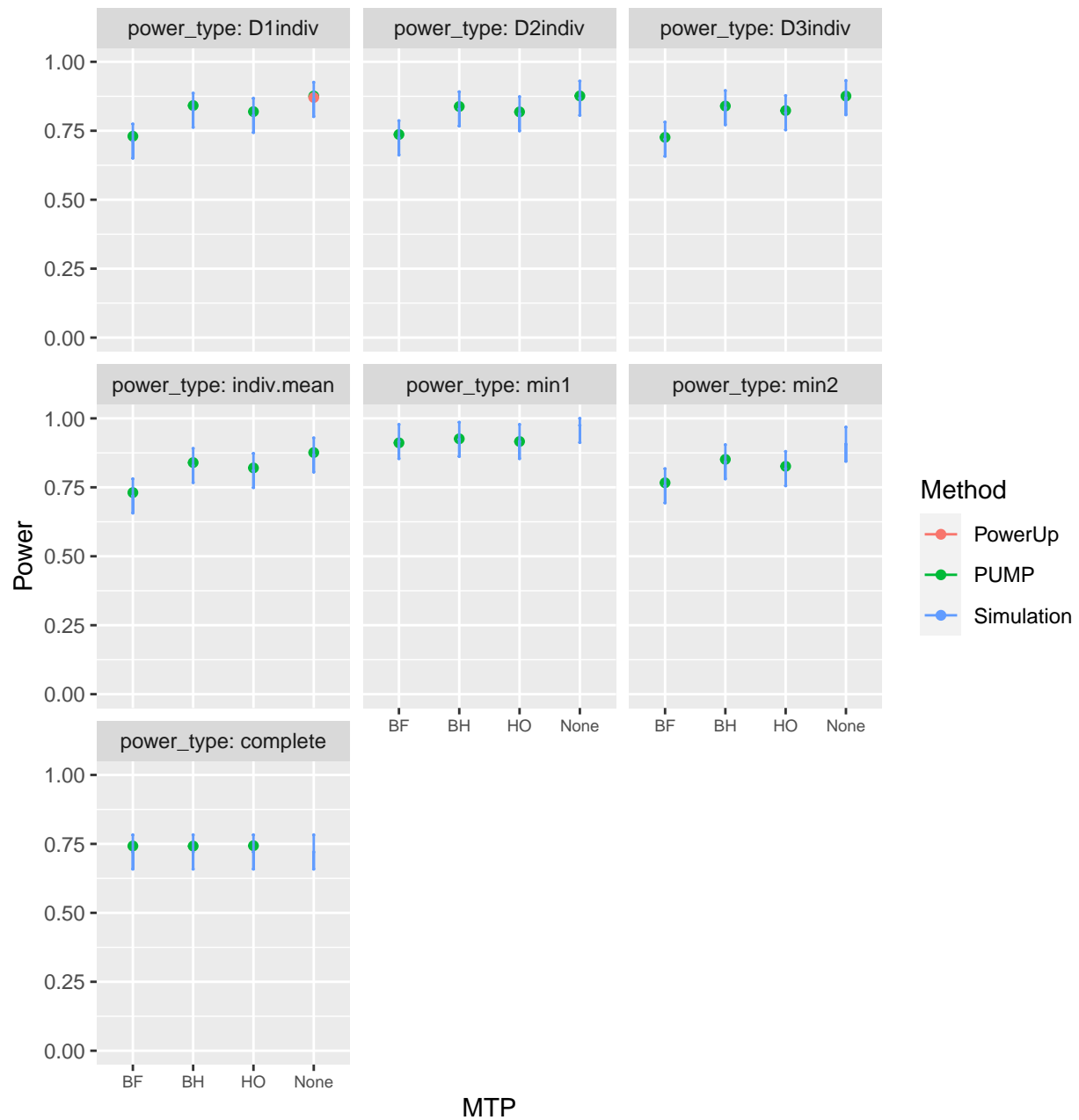
$ICC_3 = 0.7, 0.7, 0.7$

d_m: d3.1_m3rr2rr



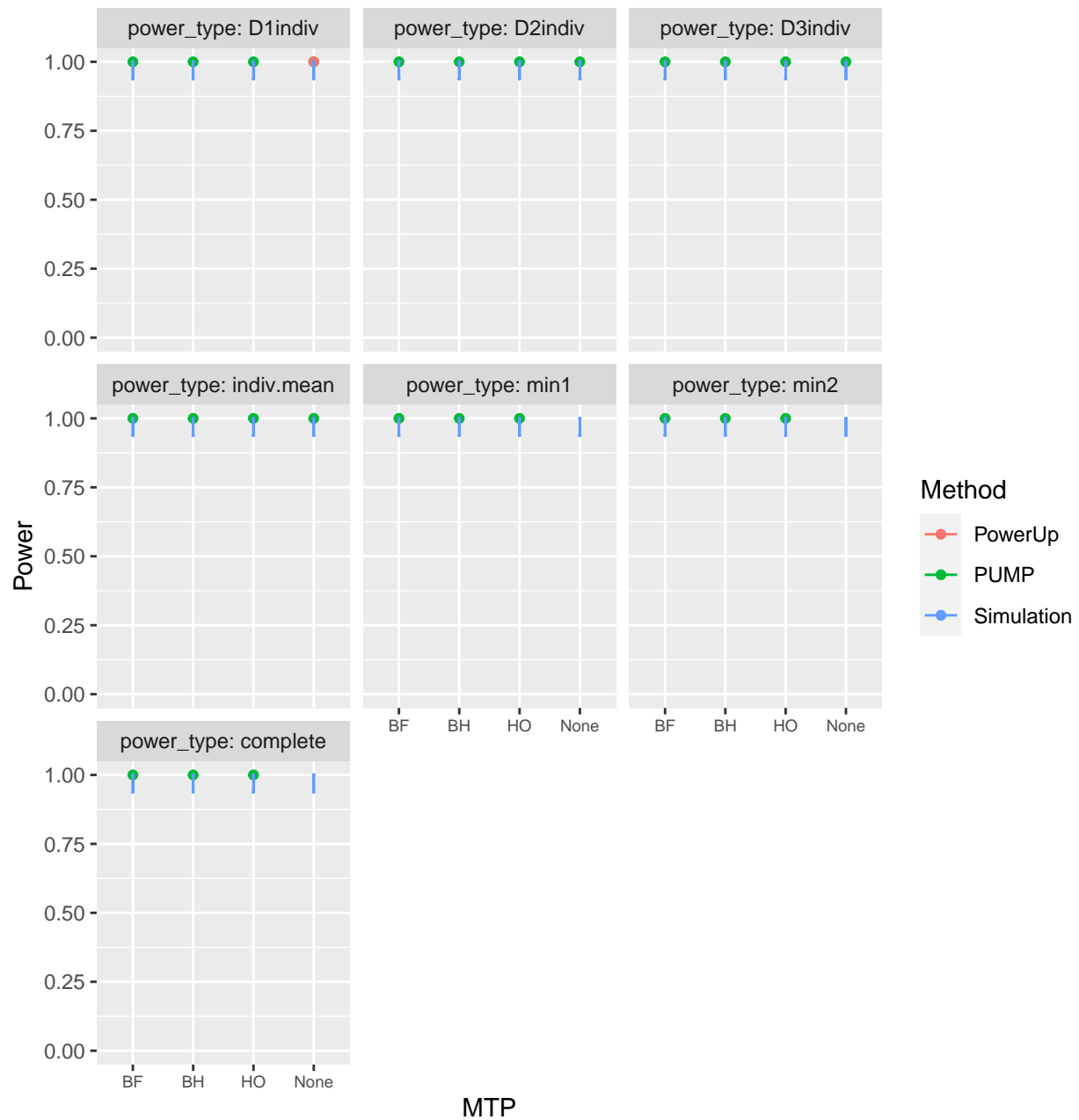
$ICC_2 = 0, 0, 0$

d_m: d3.1_m3rr2rr



$ICC_2 = 0.2, 0.2, 0.2$

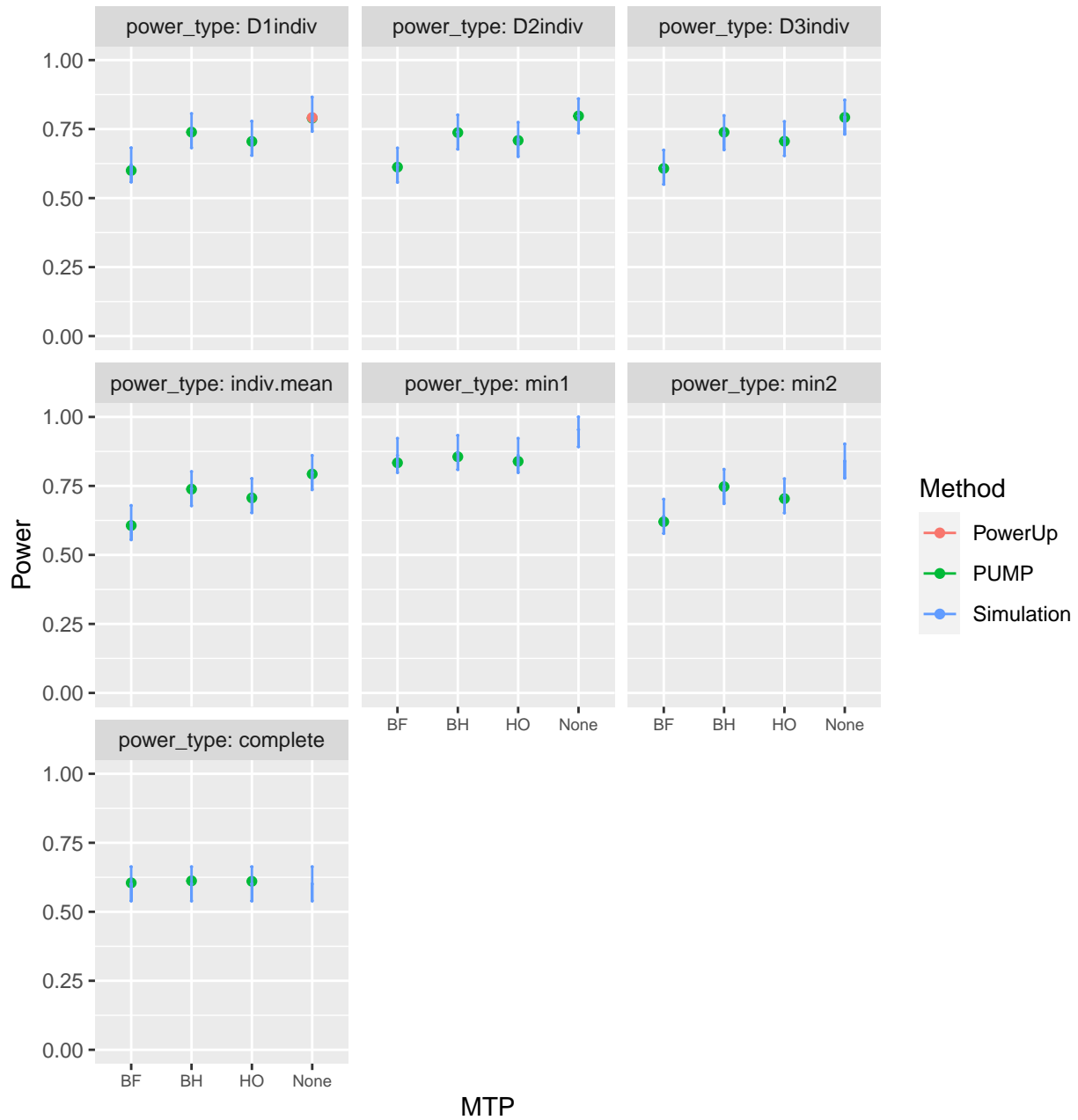
d_m: d3.1_m3rr2rr



Varying Omega

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

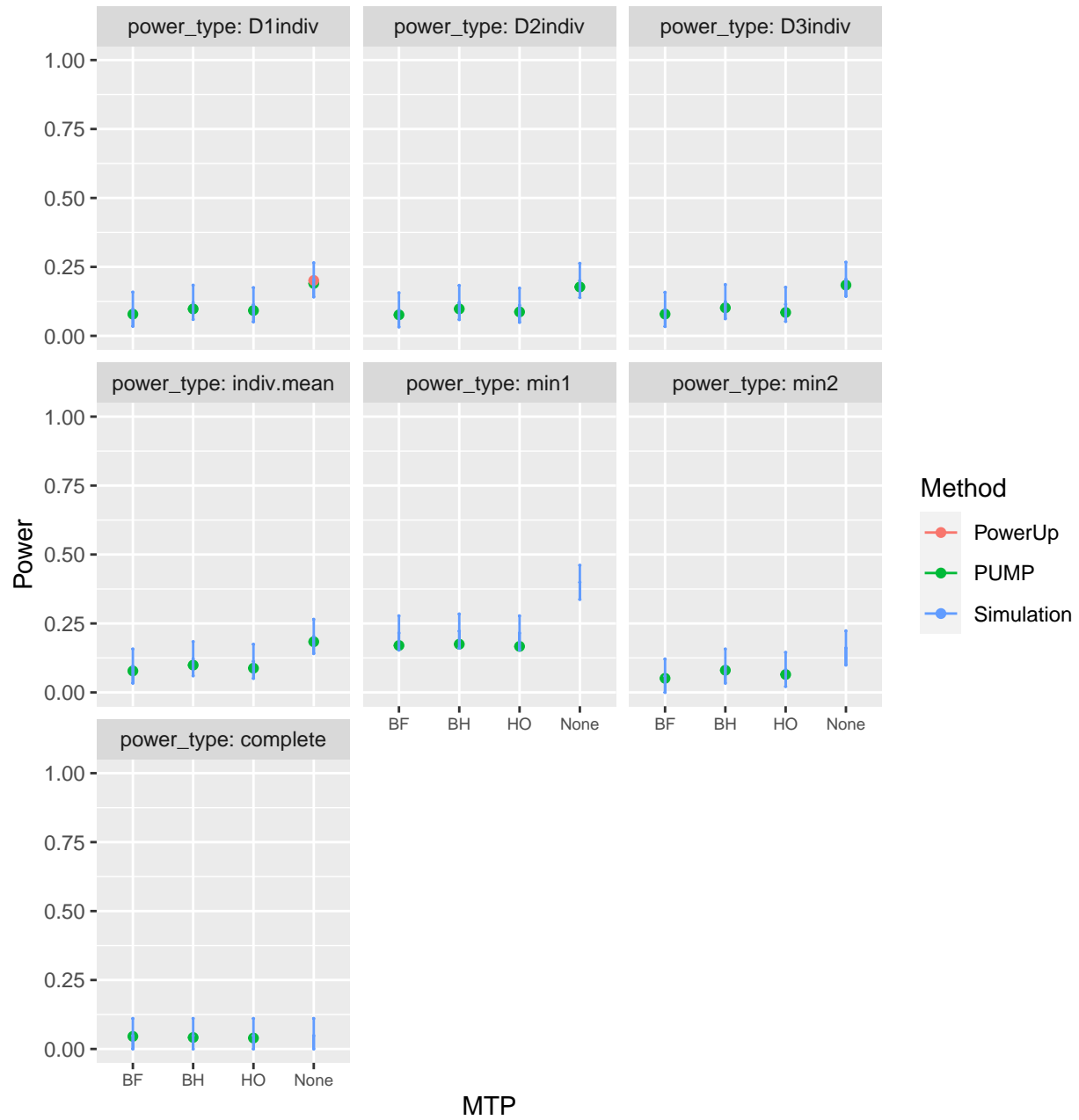
d_m: d3.1_m3rr2rr



MTP

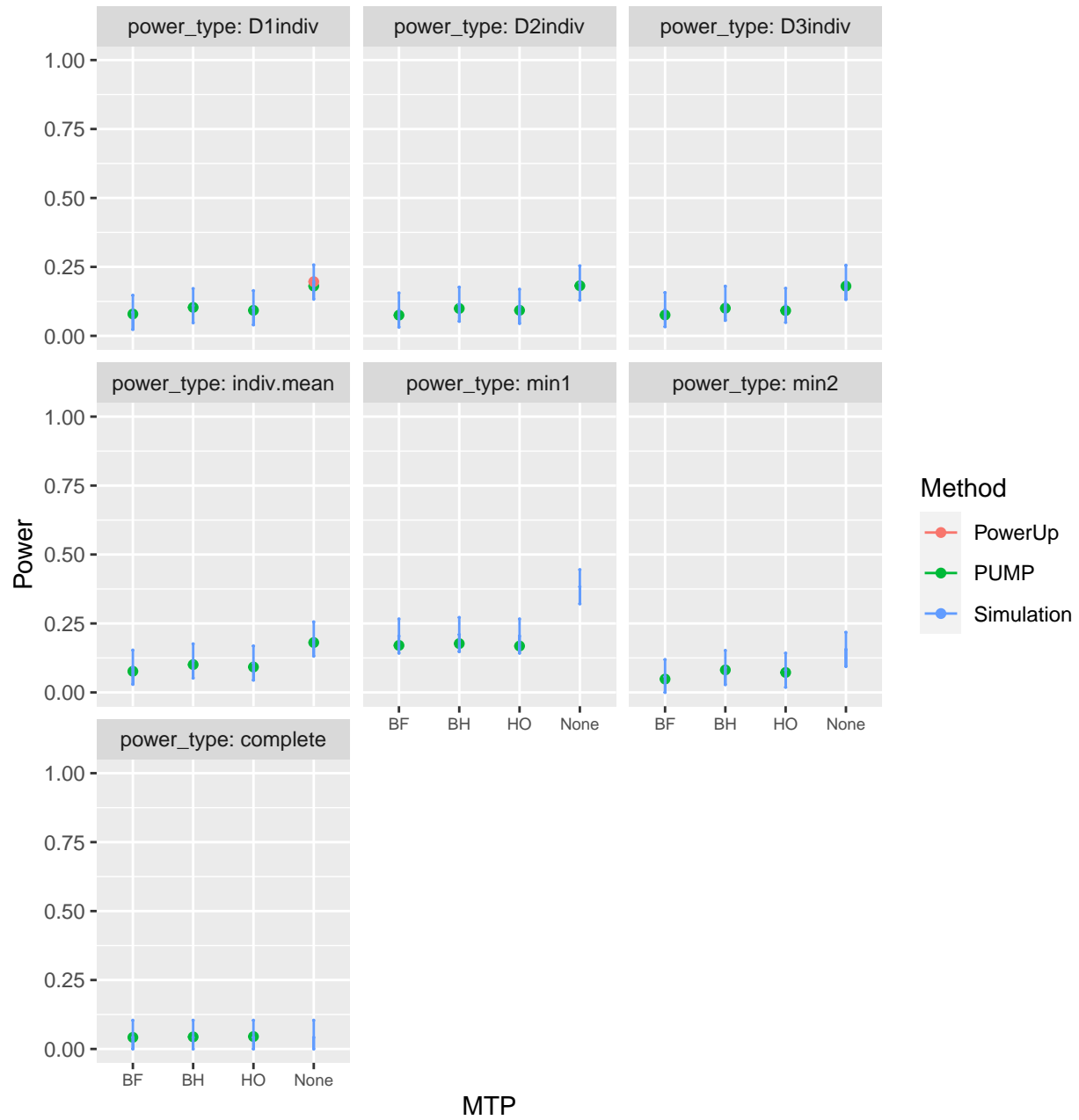
$\omega_2 = 0.1, 0.1, 0.1, \omega_3 = 0.8, 0.8, 0.8$

d_m: d3.1_m3rr2rr



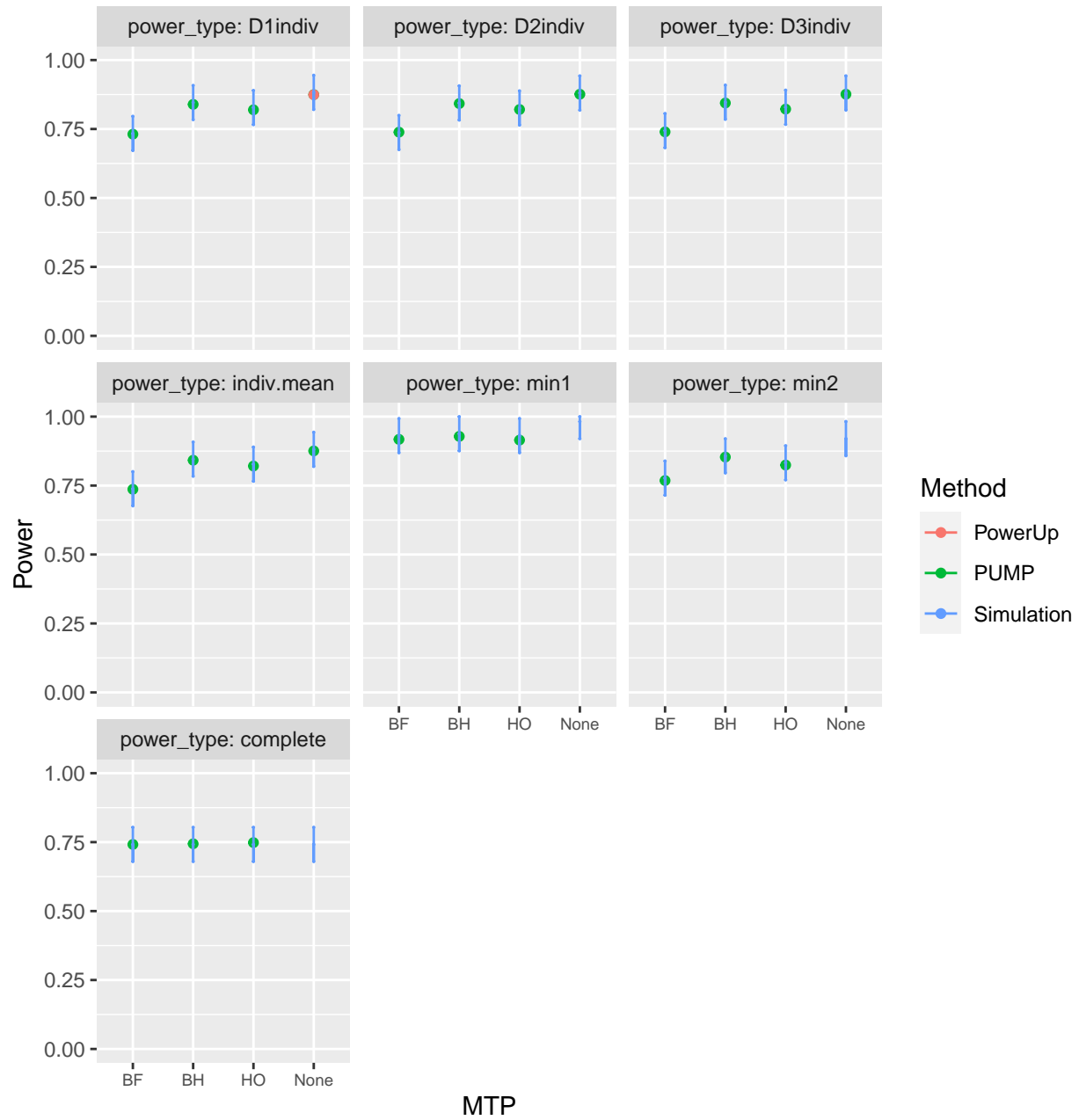
$\omega_2 = 0.8, 0.8, 0.8, \omega_3 = 0.8, 0.8, 0.8$

d_m: d3.1_m3rr2rr



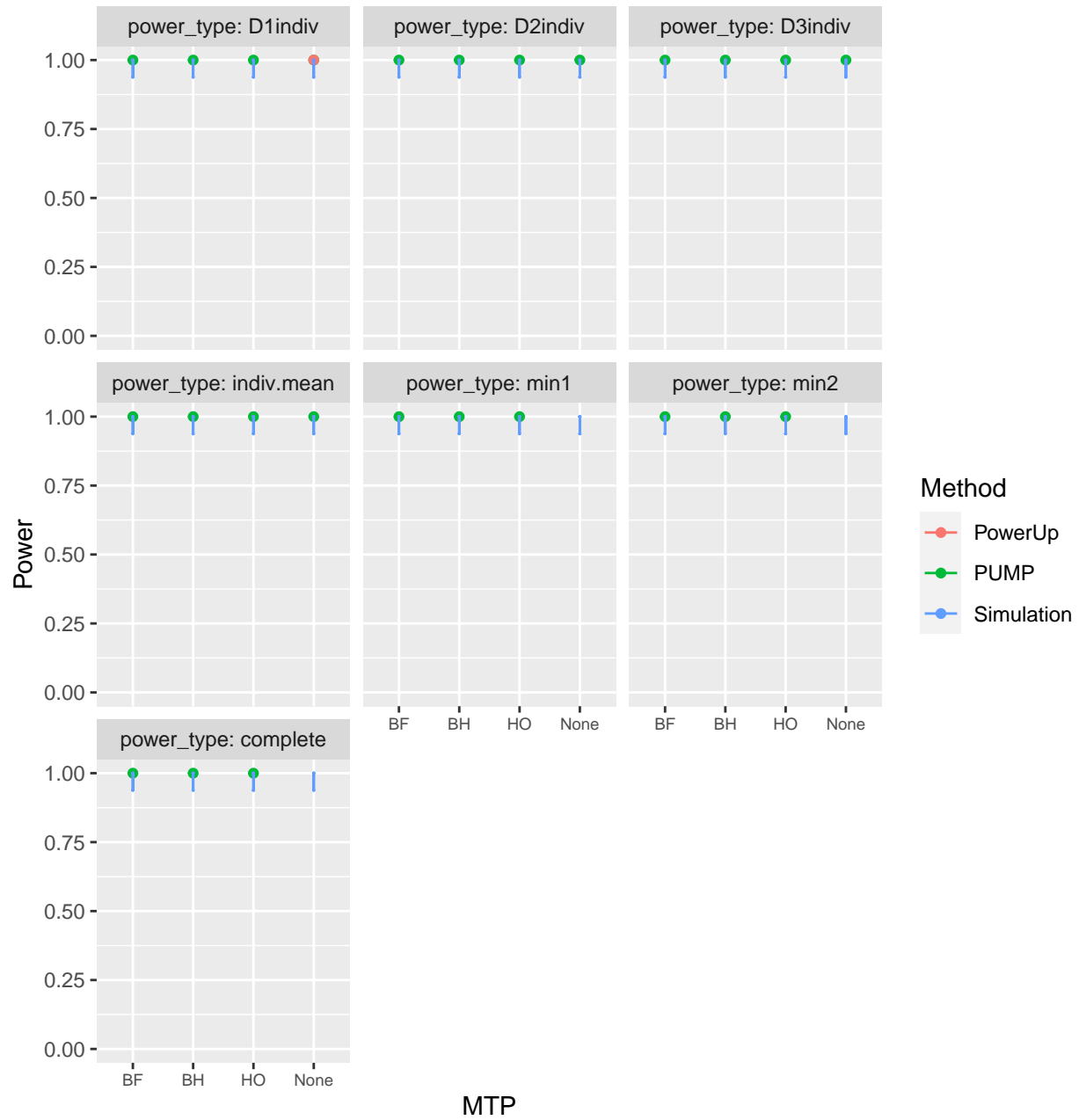
$\omega_2 = 0, 0, 0, \omega_3 = 0.1, 0.1, 0.1$

d_m: d3.1_m3rr2rr



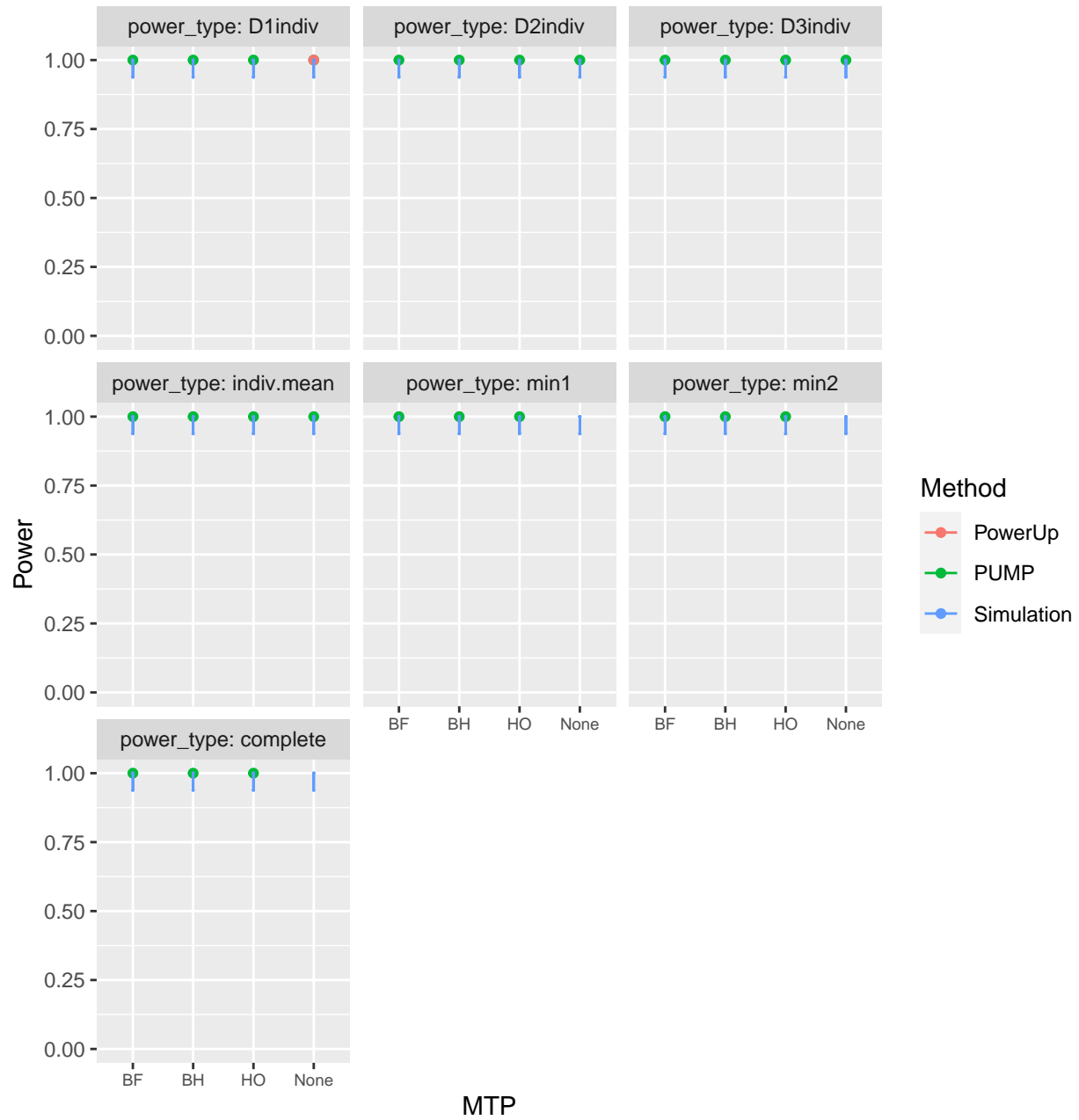
$\omega_2 = 0.1, 0.1, 0.1, \omega_3 = 0, 0, 0$

d_m: d3.1_m3rr2rr



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

d_m: d3.1_m3rr2rr



MDES validation

Target value: 0.125

```
##
##
## +-----+-----+-----+-----+
## | MTP | Adjusted MDES | D1indiv Power | Target MDES |
## +=====+=====+=====+=====+
## | BF  |      0.125      |      0.721      |      0.125      |
## +-----+-----+-----+-----+
## | BH  |      0.127      |      0.842      |      0.125      |
## +-----+-----+-----+-----+
## | H0  |      0.125      |      0.81       |      0.125      |
## +-----+-----+-----+-----+
##
## Table: d3.1_m3rr2rr
```

Sample size validation

Target value: 15

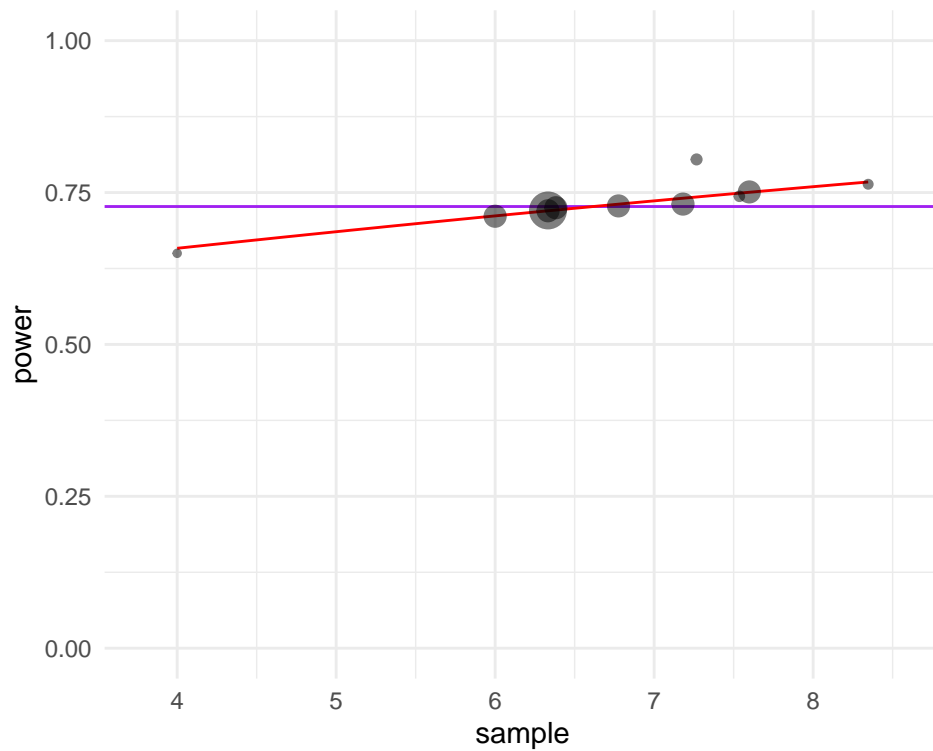
```
##
##
## +-----+-----+-----+-----+
## | MTP | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | BF  |      K      |      15      |      0.721      |
## +-----+-----+-----+-----+
## | BH  |      K      |      16      |      0.842      |
## +-----+-----+-----+-----+
## | H0  |      K      |      16      |      0.818      |
## +-----+-----+-----+-----+
##
## Table: d3.1_m3rr2rr
```

Target value: 30

```
##
##
## +-----+-----+-----+-----+
## | MTP | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | BF  |      J      |      32      |      0.721      |
## +-----+-----+-----+-----+
## | BH  |      J      |      64      |      0.846      |
## +-----+-----+-----+-----+
## | H0  |      J      |      36      |      0.812      |
## +-----+-----+-----+-----+
##
## Table: d3.1_m3rr2rr
```

Note: particularly flat power curves results in discrepancy for J.

For MTP = BH:

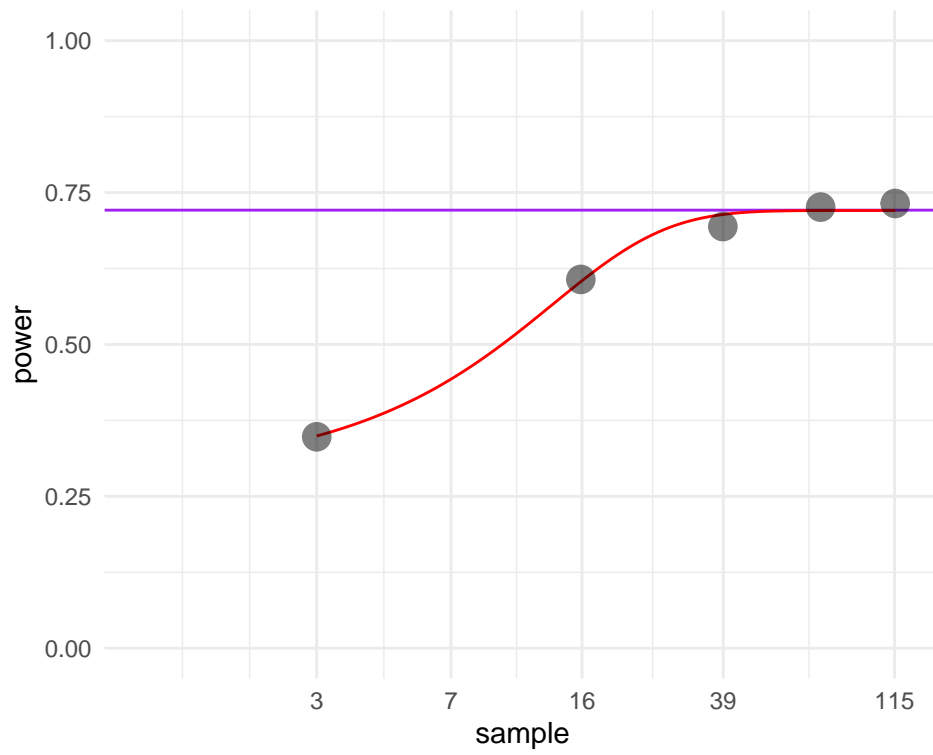


Target value: 100

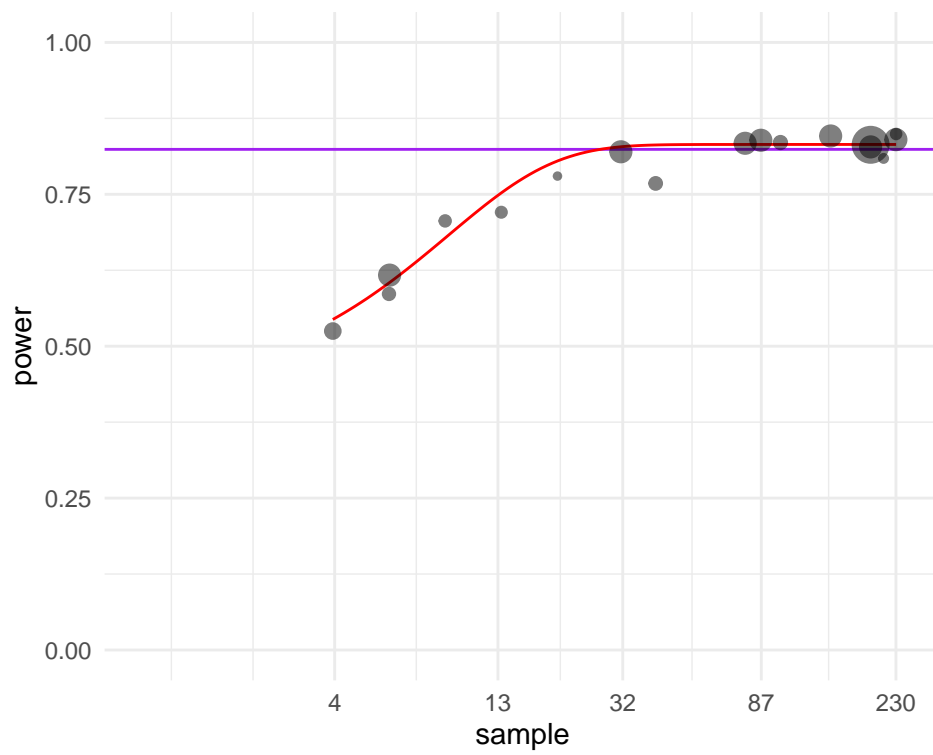
```
##
##
## +-----+-----+-----+-----+
## | MTP | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | BF  | nbar         | 114.7      | 0.721         |
## +-----+-----+-----+-----+
## | BH  | nbar         | 5785       | 0.842         |
## +-----+-----+-----+-----+
## | H0  | nbar         | 180        | 0.813         |
## +-----+-----+-----+-----+
##
## Table: d3.1_m3rr2rr
```

Note: particularly flat power curves results in discrepancy for `nbar`.

For MTP = BF:



For MTP = BH:



For MTP = H0:

