

# Validate Power: d3.1

December 27, 2021

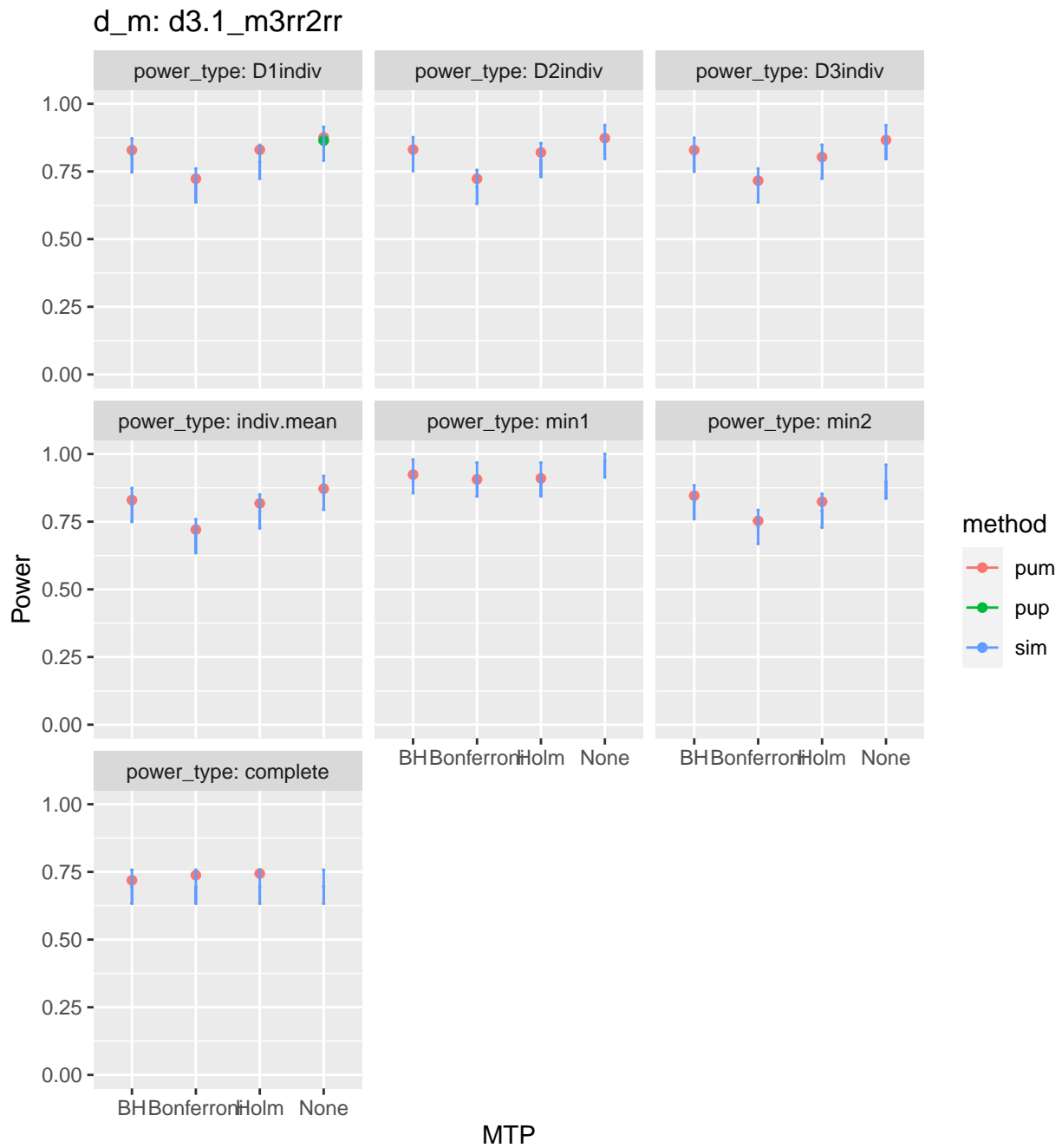
Design: Blocked RCT, with 3 levels, and randomization done at level 1 (individual level).

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:  $ICC_2 = 0.2, 0.2, 0.2$ ,  $ICC_3 = 0.2, 0.2, 0.2$
- Omega:  $\omega_2 = 0.1, 0.1, 0.1$ ,  $\omega_3 = 0.1, 0.1, 0.1$

# Power Validation

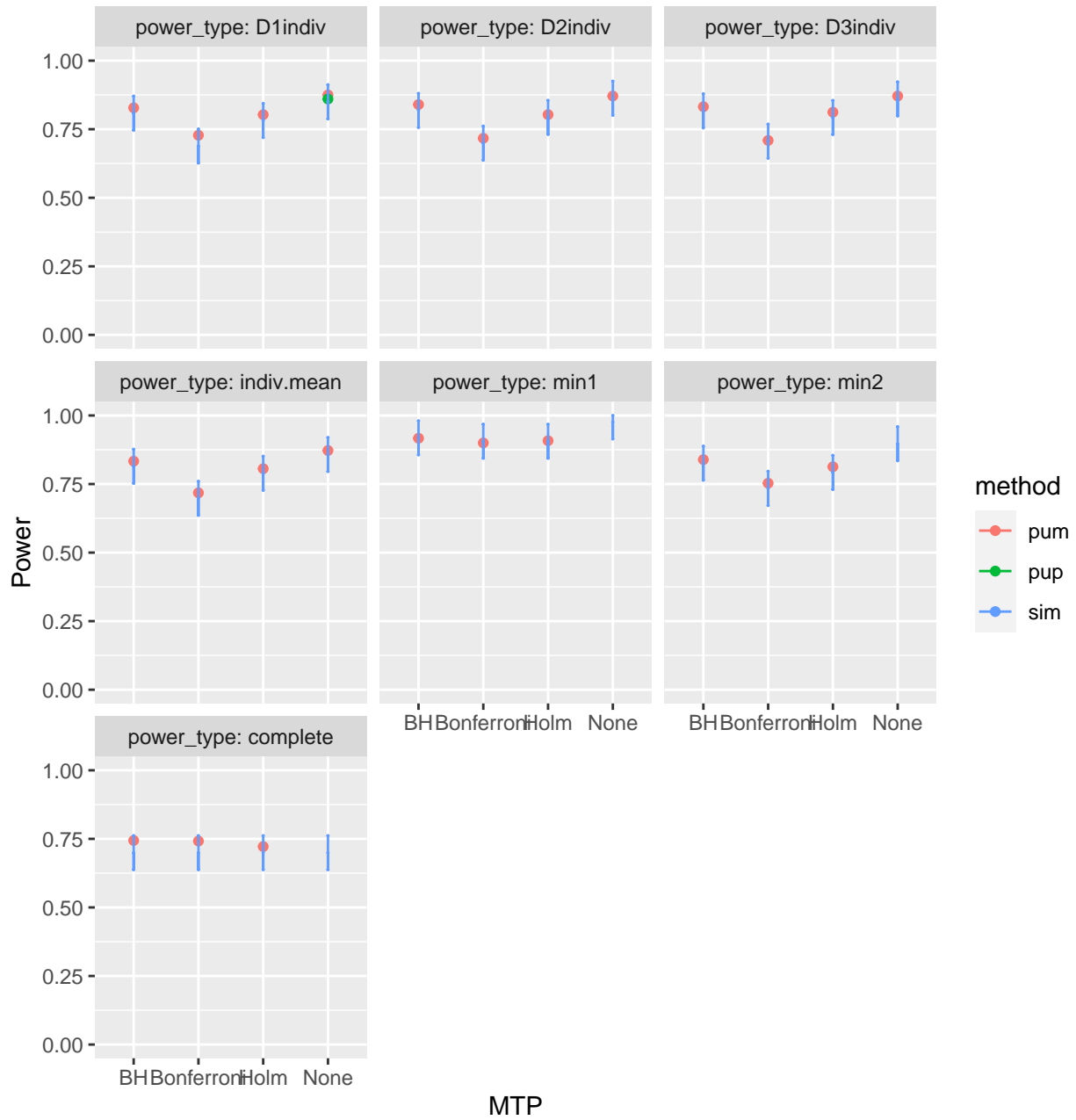
Base case



## Varying school size

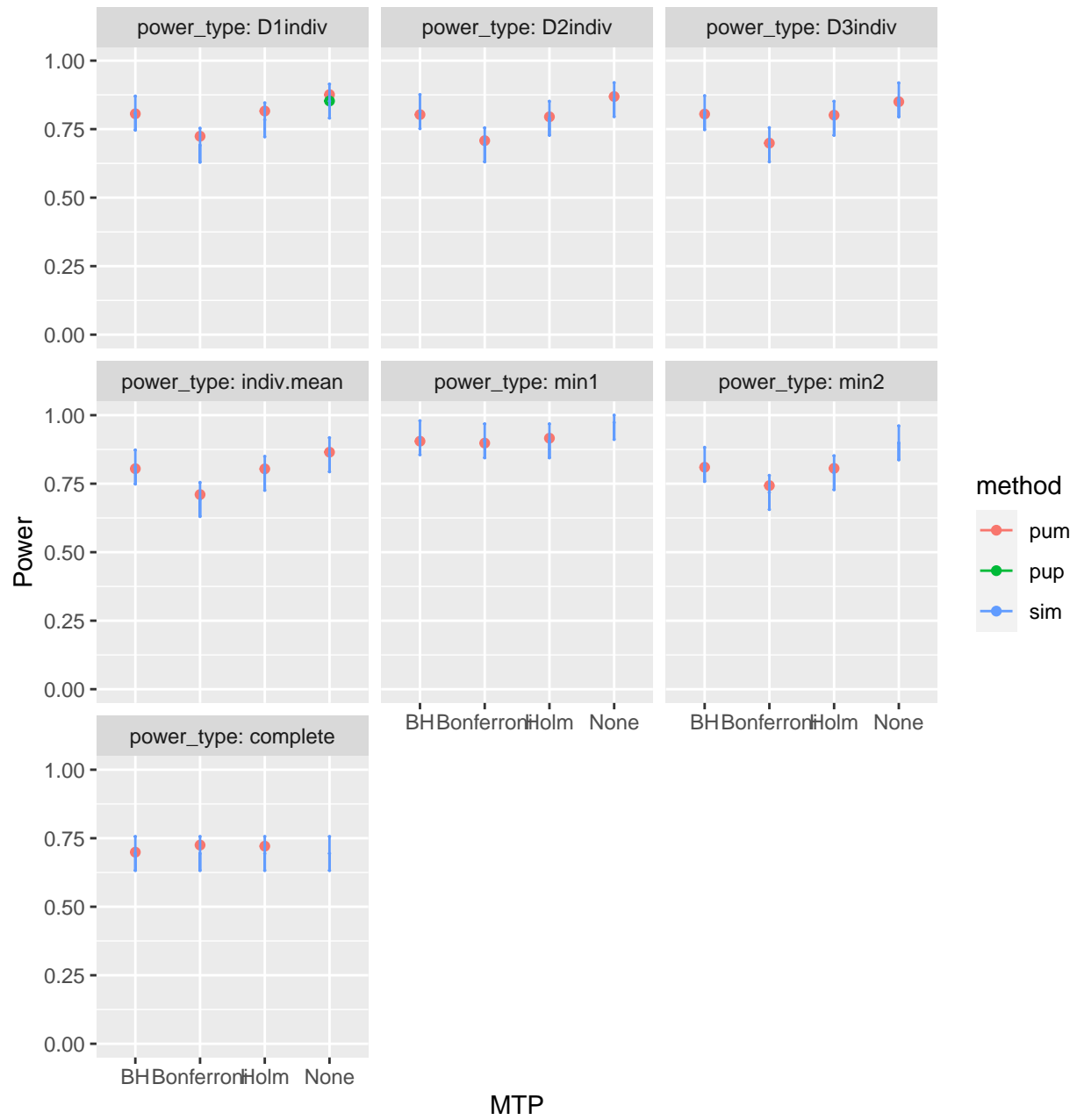
$\bar{n} = 75$

d\_m: d3.1\_m3rr2rr



$\bar{n} = 50$

d\_m: d3.1\_m3rr2rr

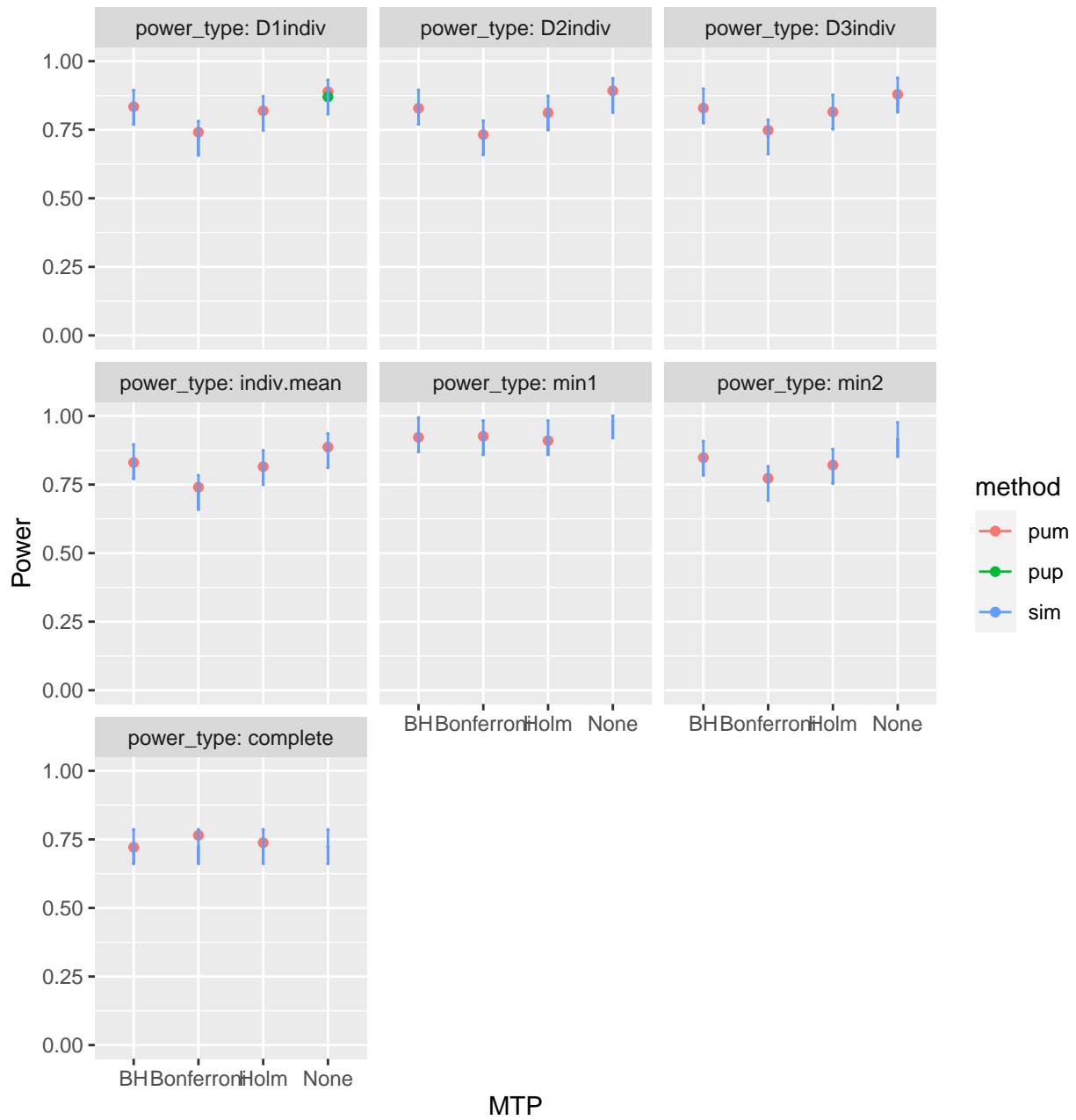


MTP

## Varying R2

$R_1^2 = 0.6, 0.6, 0.6$

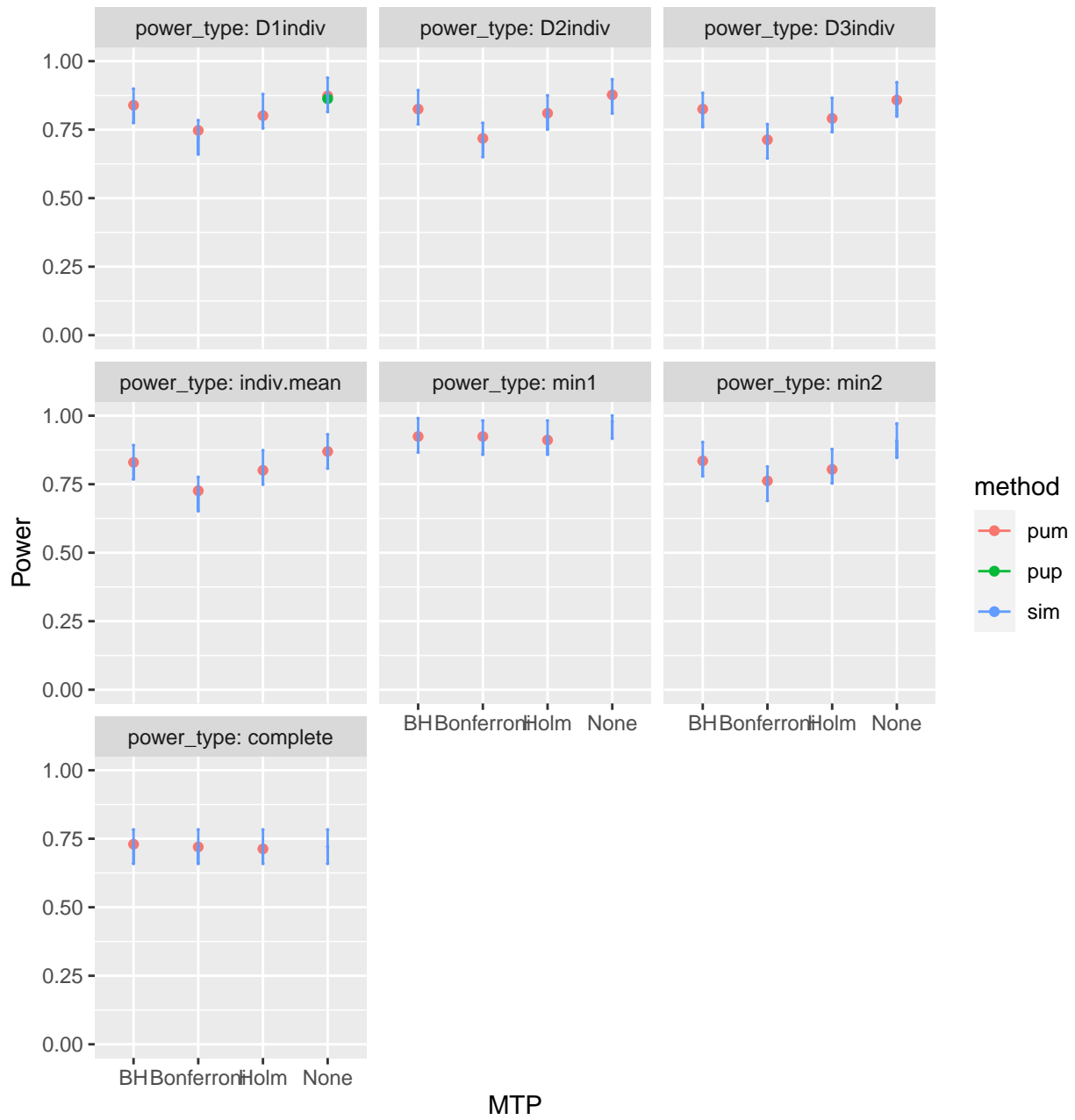
d\_m: d3.1\_m3rr2rr



MTP

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

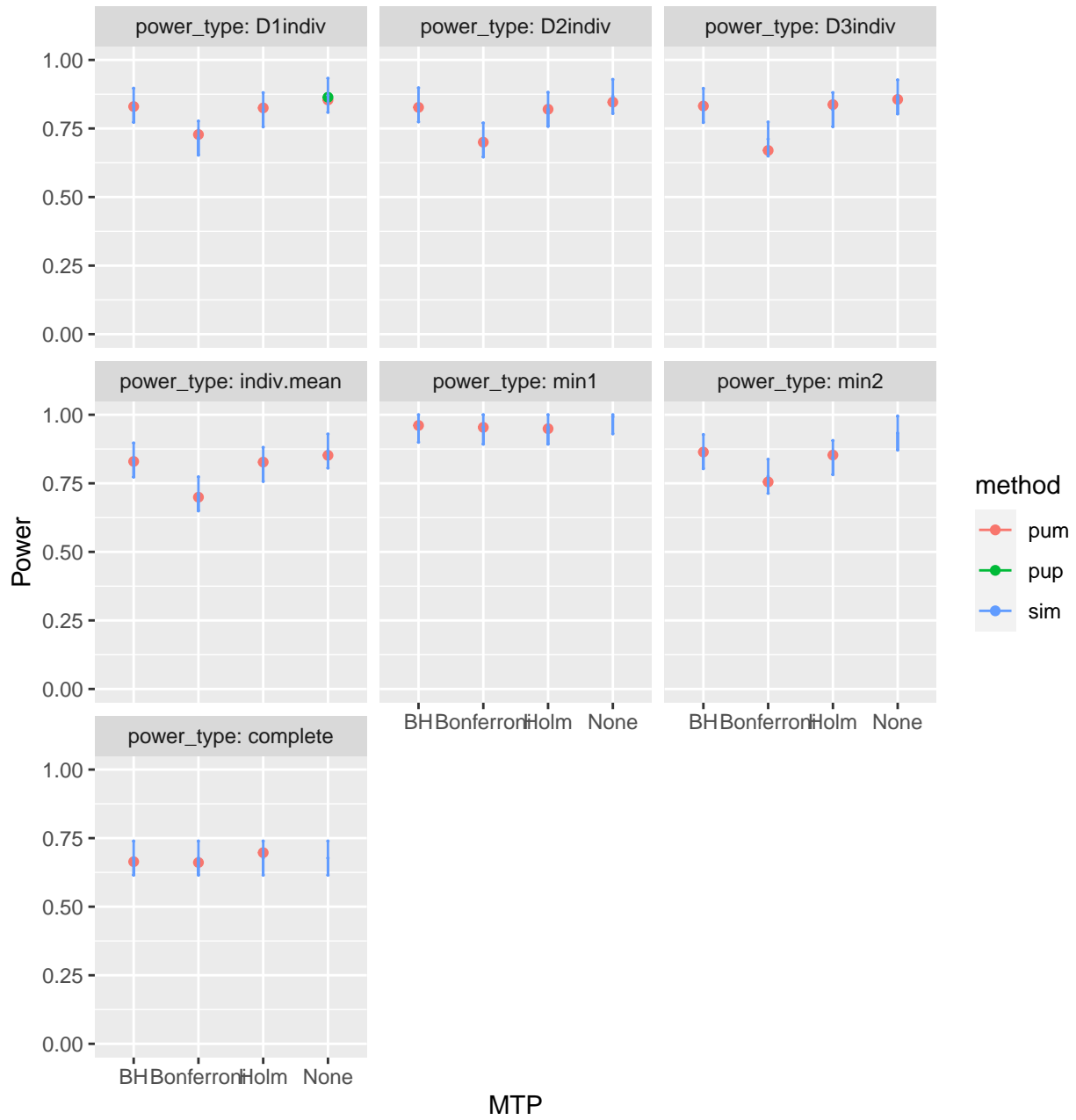
d\_m: d3.1\_m3rr2rr



## Varying rho

$\rho = 0.2$

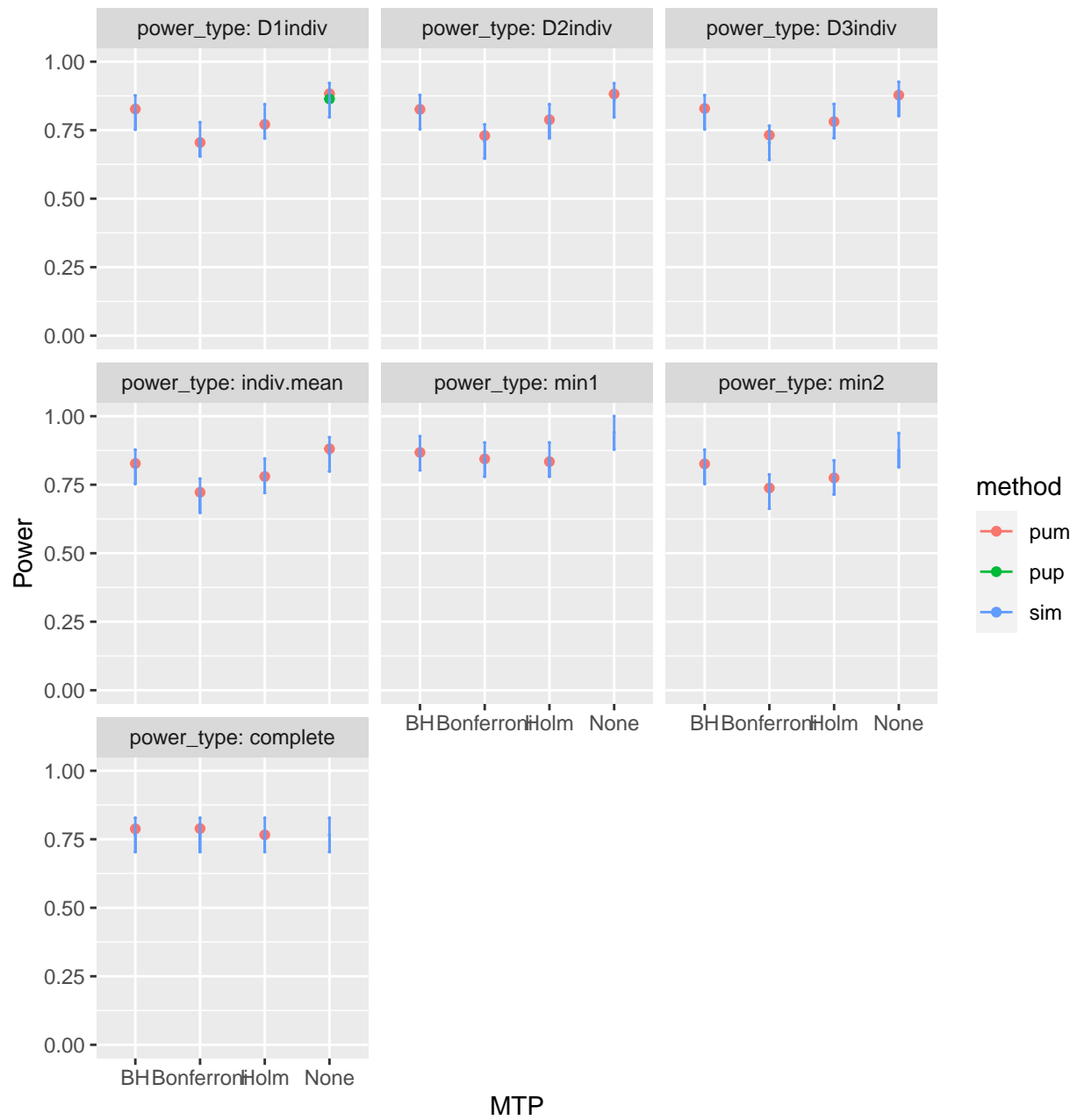
d\_m: d3.1\_m3rr2rr



MTP

$\rho = 0.8$

d\_m: d3.1\_m3rr2rr

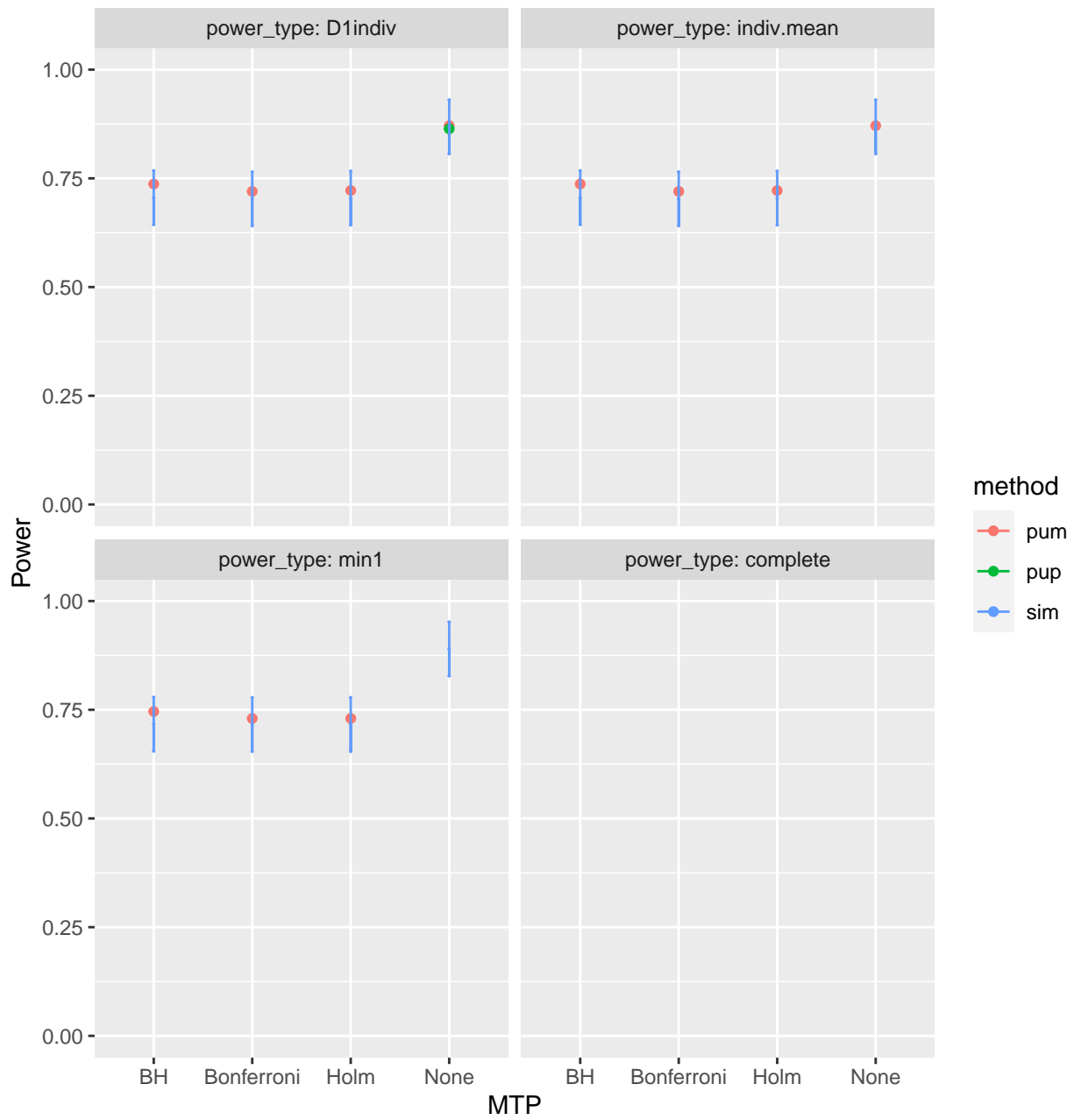




## Varying true positives

MDES = 0.125, 0, 0

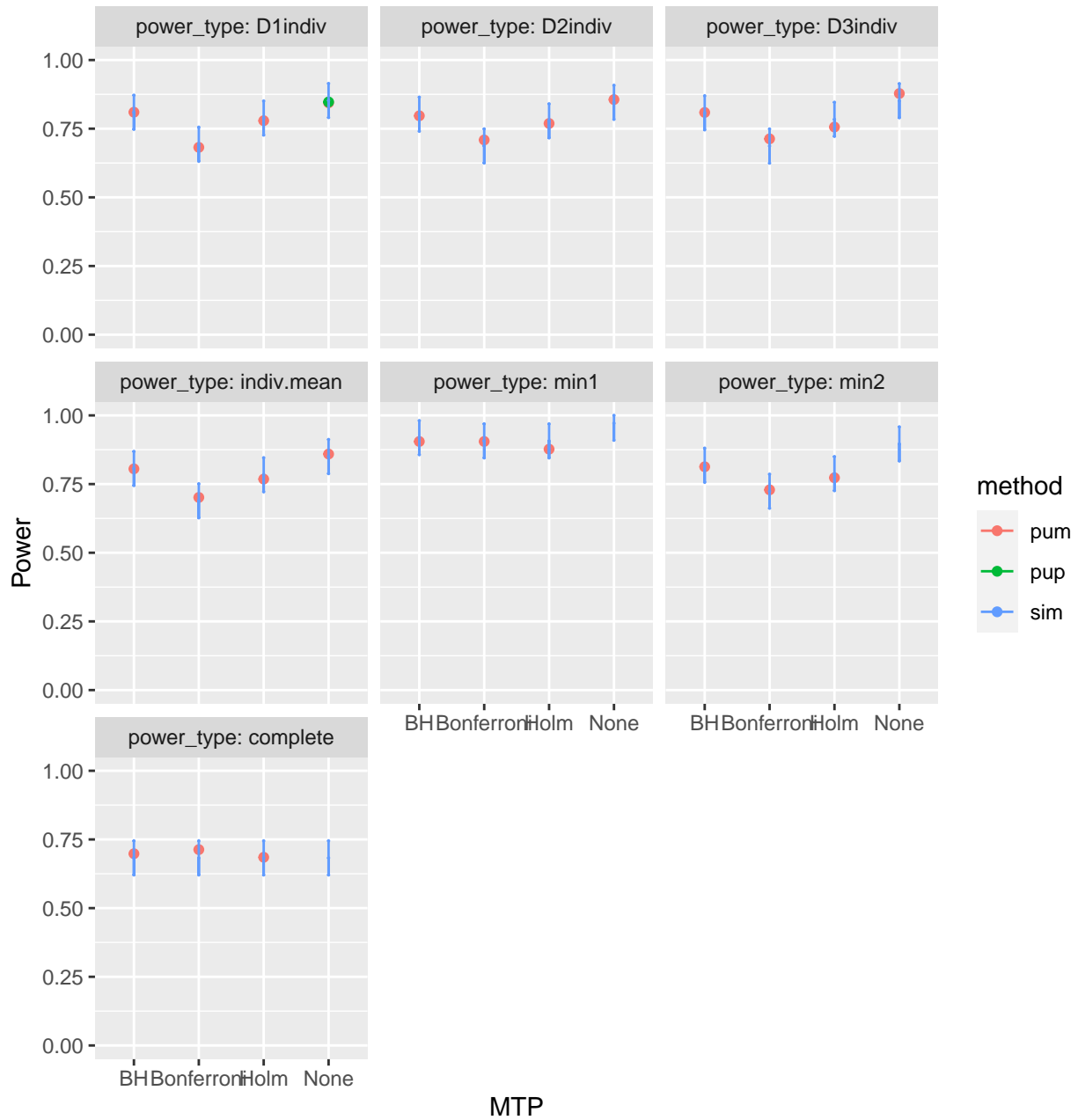
d\_m: d3.1\_m3rr2rr



## Varying ICC

$ICC_2 = 0.7, 0.7, 0.7$

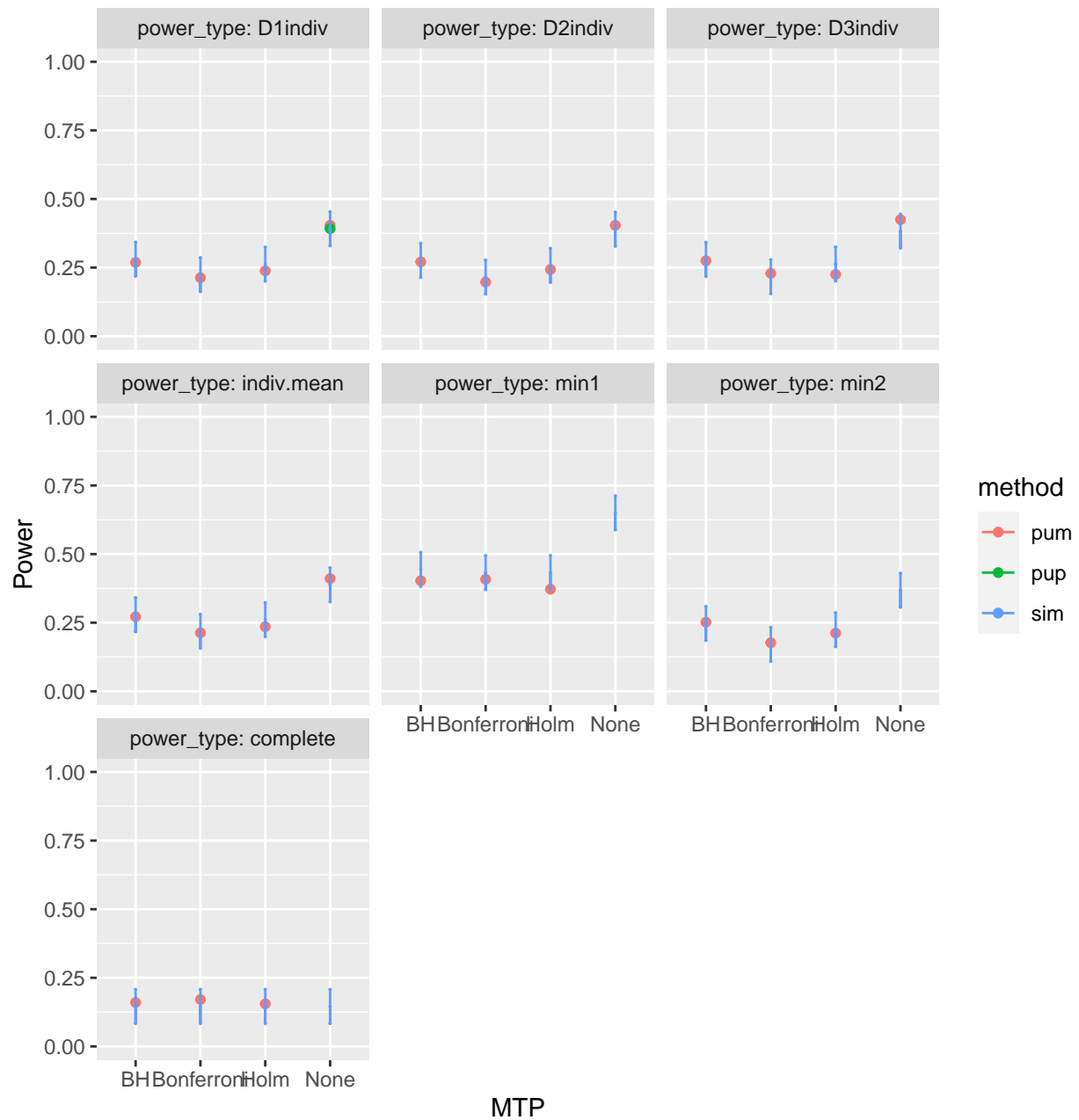
d\_m: d3.1\_m3rr2rr



MTP

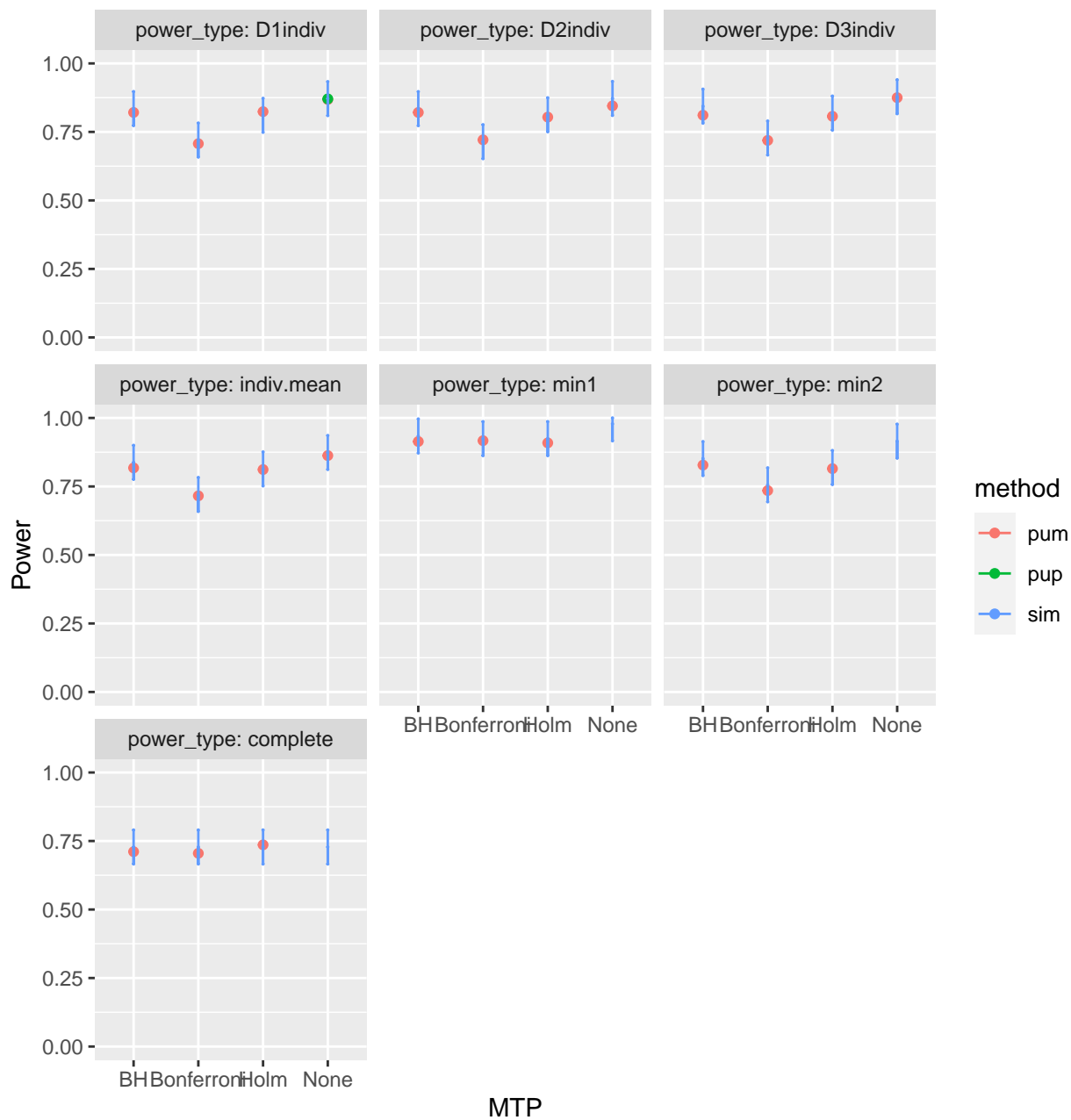
$ICC_3 = 0.7, 0.7, 0.7$

d\_m: d3.1\_m3rr2rr

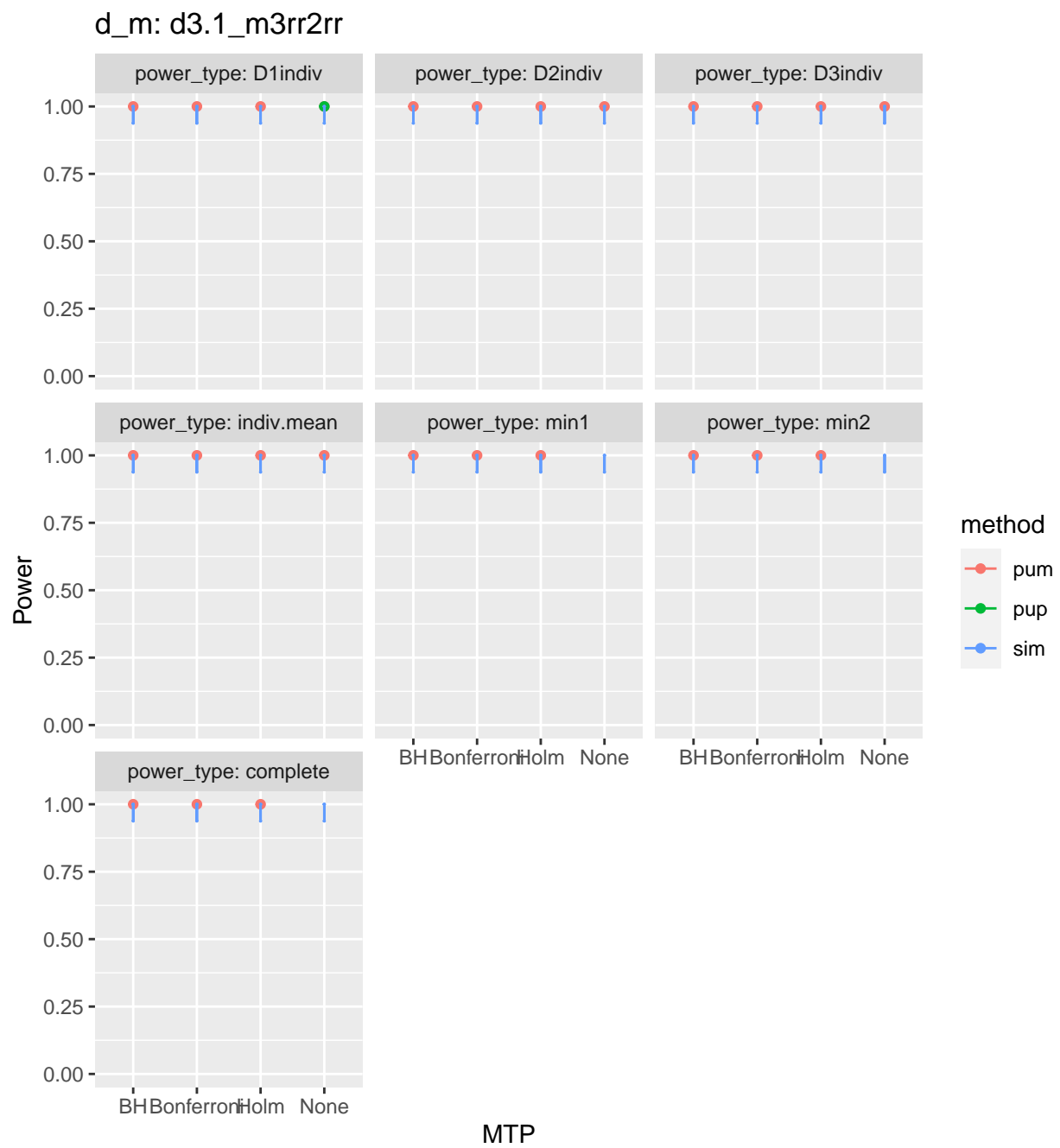


ICC<sub>2</sub> = 0, 0, 0

d\_m: d3.1\_m3rr2rr



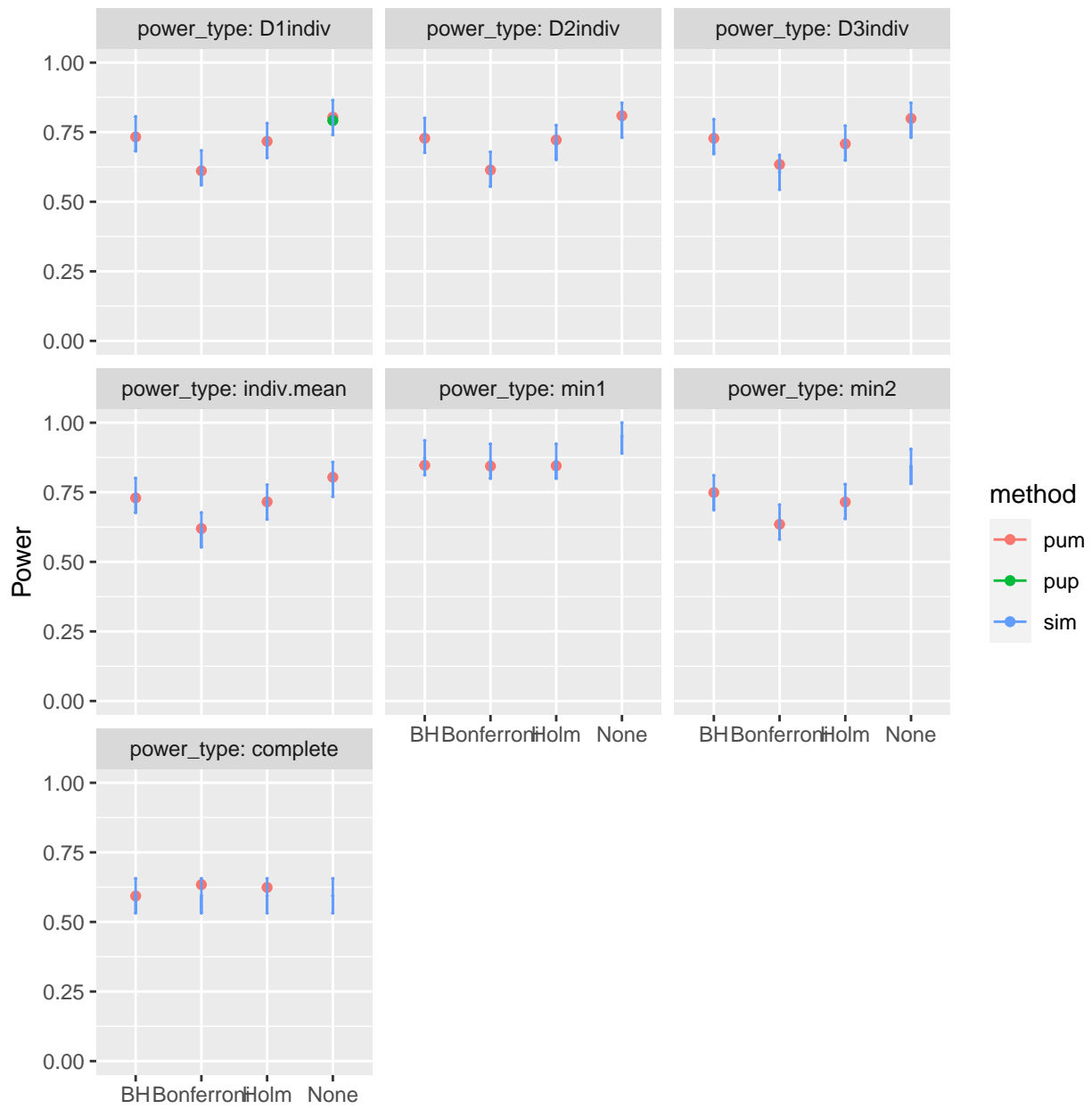
$ICC_2 = 0.2, 0.2, 0.2$



## Varying Omega

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

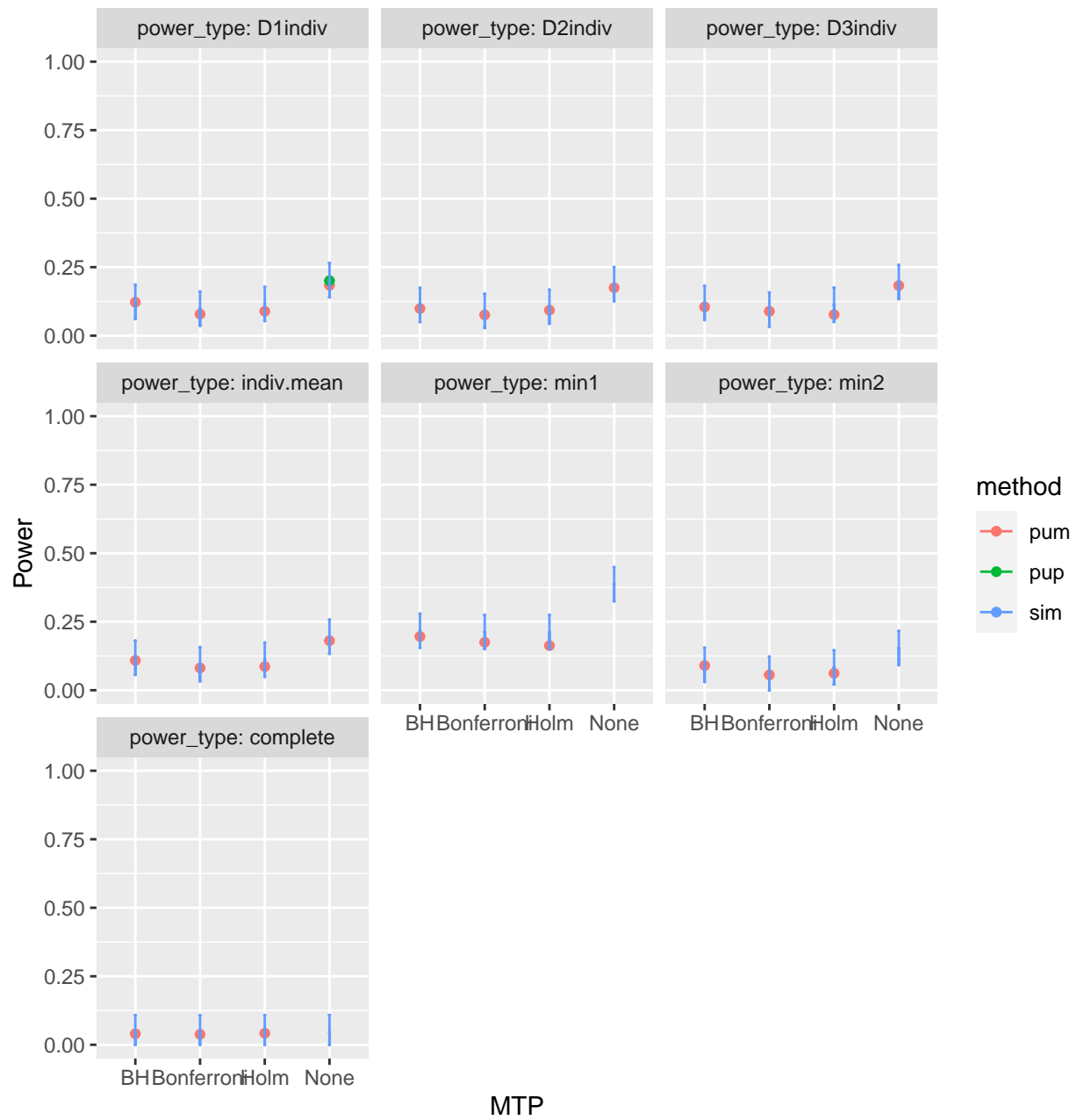
d\_m: d3.1\_m3rr2rr



MTP

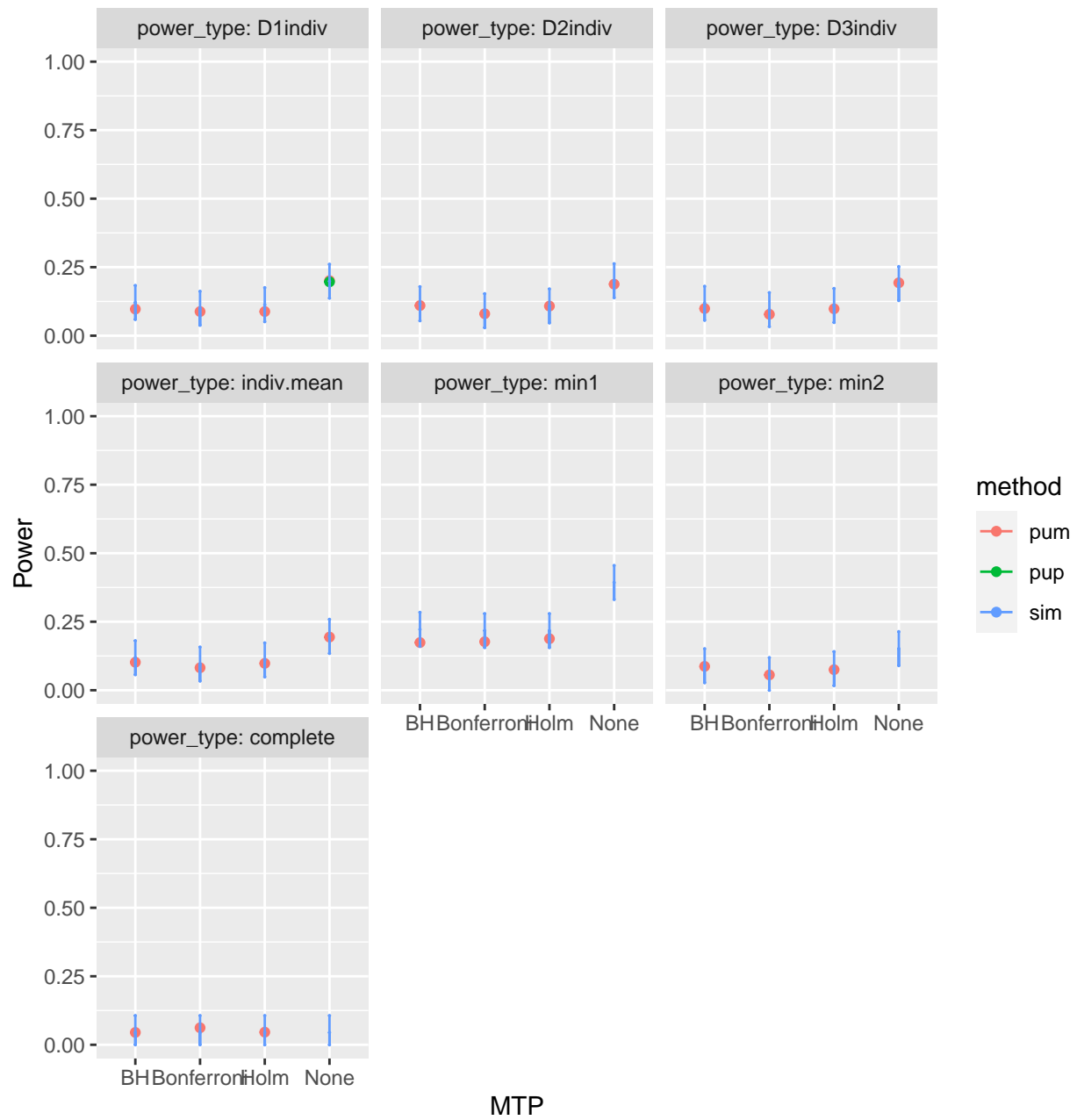
$\omega_2 = 0.1, 0.1, 0.1, \omega_3 = 0.8, 0.8, 0.8$

d\_m: d3.1\_m3rr2rr



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

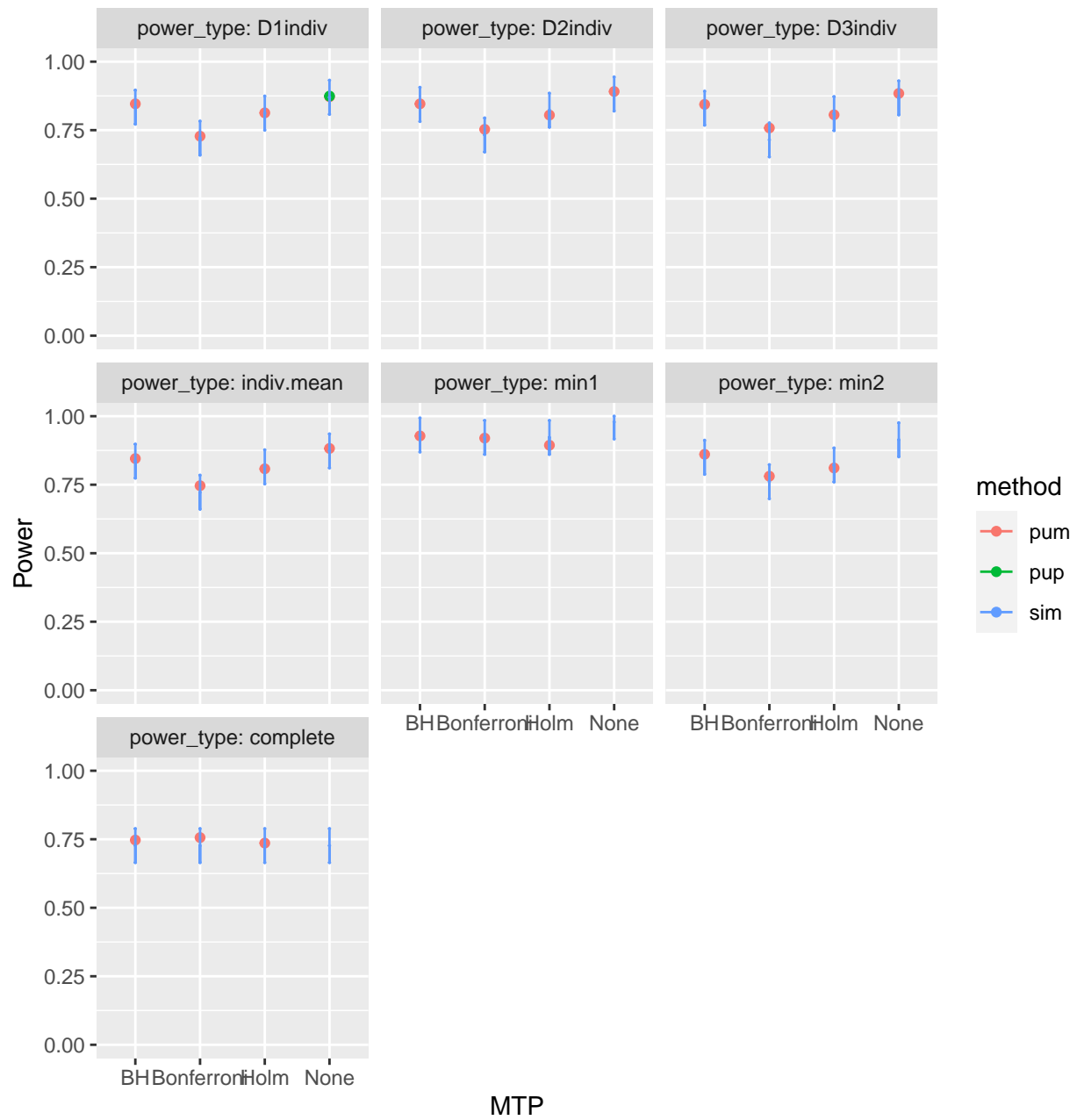
d\_m: d3.1\_m3rr2rr





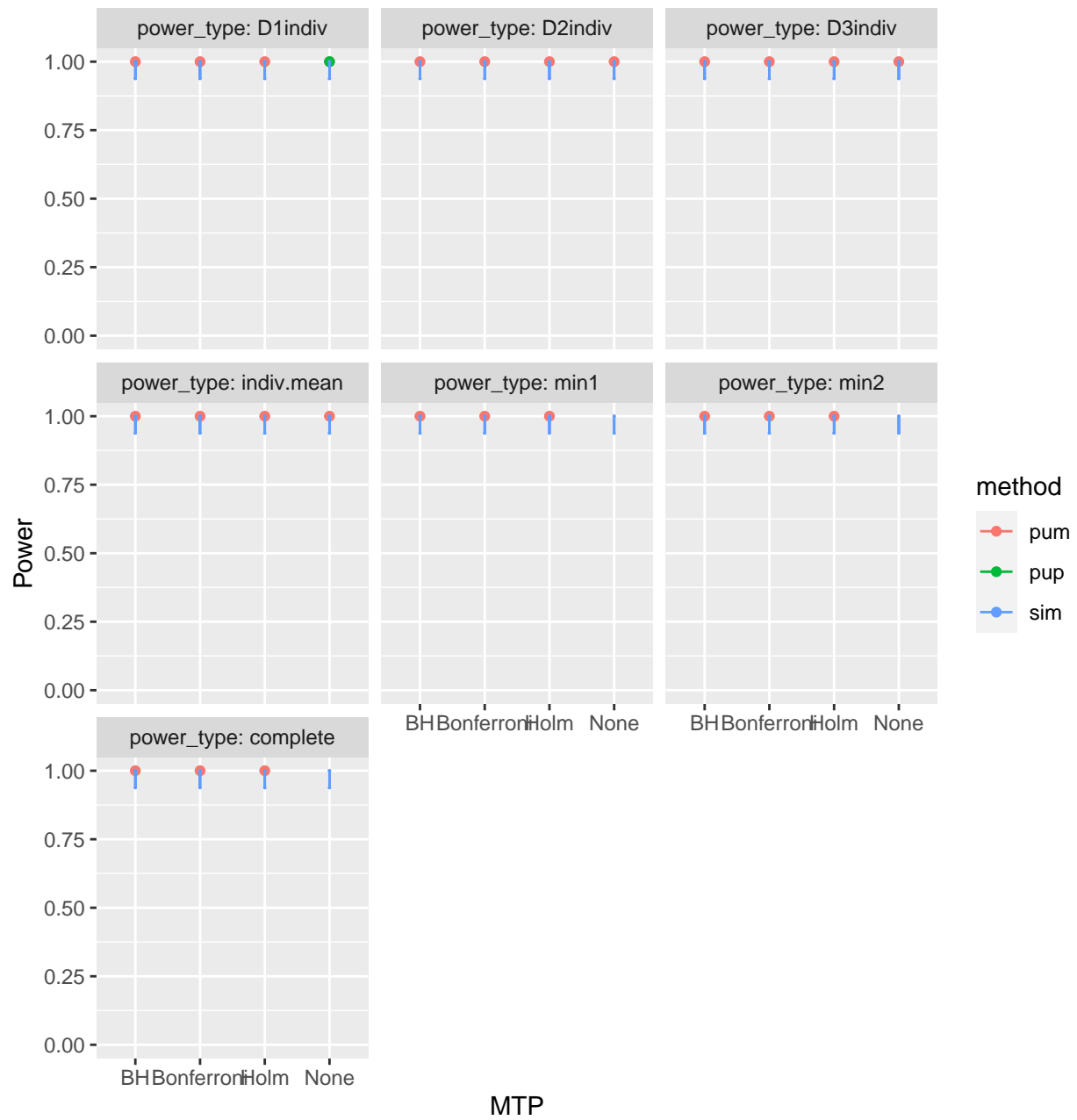
$\omega_2 = 0, 0, 0, \omega_3 = 0.1, 0.1, 0.1$

d\_m: d3.1\_m3rr2rr



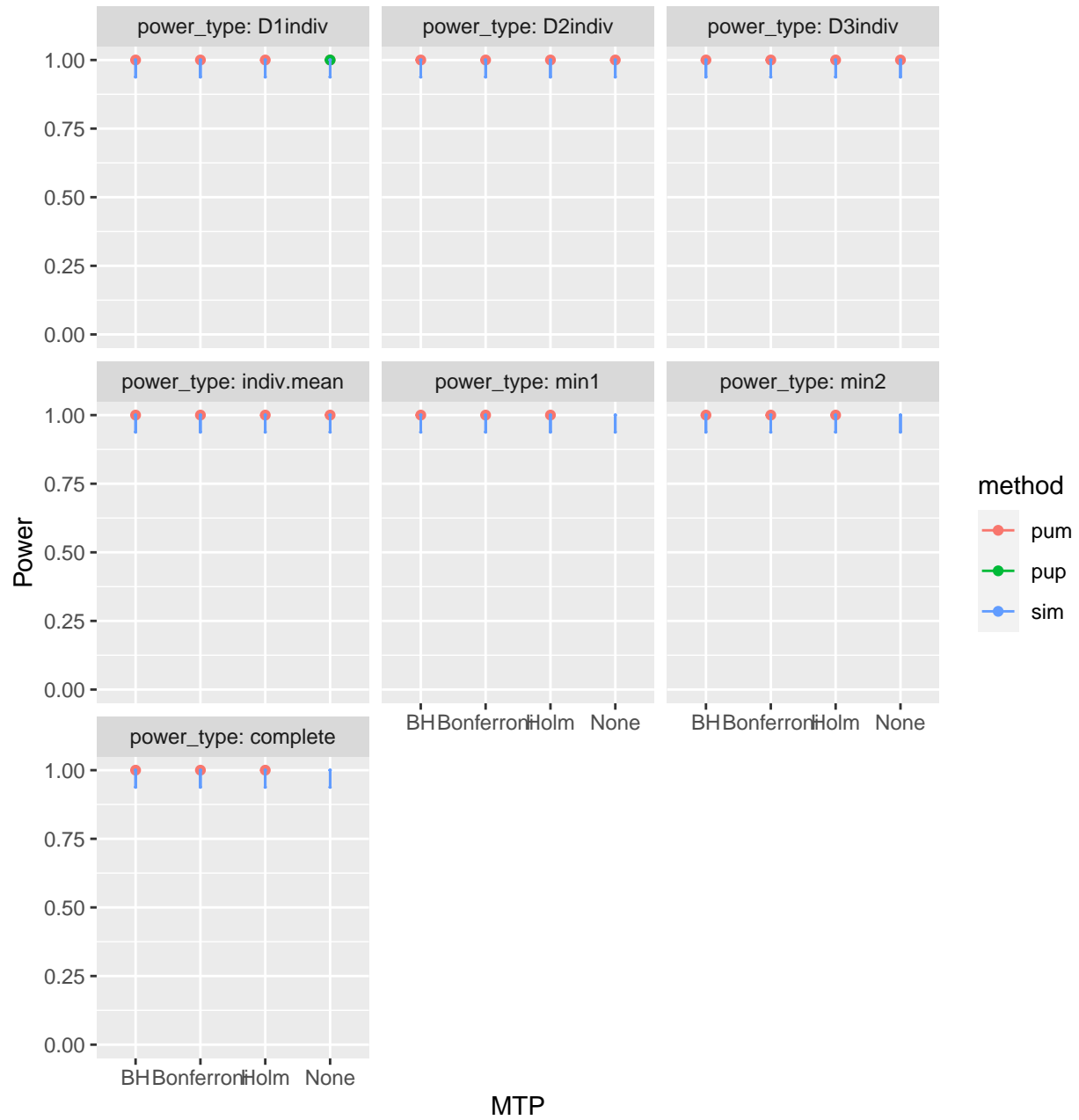
$\omega_2 = 0.1, 0.1, 0.1, \omega_3 = 0, 0, 0$

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 |
## +=====+=====+=====+=====+
## | Bonferroni |      0.126    |      0.723    |      0.125    |
## +-----+-----+-----+-----+
## |      BH      |      0.126    |      0.837    |      0.125    |
## +-----+-----+-----+-----+
## |      Holm     |      0.127    |      0.826    |      0.125    |
## +-----+-----+-----+-----+
##
## Table: d3.1_m3rr2rr
```

## Sample size validation

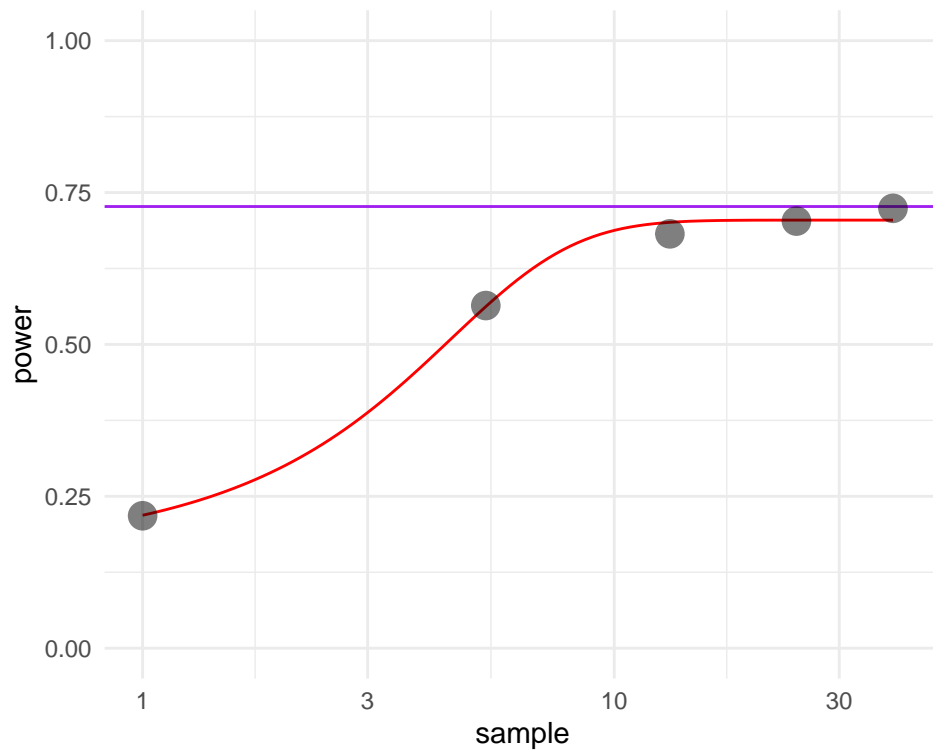
Target value: 15

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      K      |      15     |      0.723    |
## +-----+-----+-----+-----+
## |      BH      |      K      |      15     |      0.824    |
## +-----+-----+-----+-----+
## |      Holm     |      K      |      16     |      0.833    |
## +-----+-----+-----+-----+
##
## Table: d3.1_m3rr2rr
```

Target value: 30

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      J      |      34     |      0.723    |
## +-----+-----+-----+-----+
## |      BH      |      J      |      34     |      0.833    |
## +-----+-----+-----+-----+
## |      Holm     |      J      |     112     |      0.831    |
## +-----+-----+-----+-----+
##
## Table: d3.1_m3rr2rr
```

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



Target value: 100

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |    nbar    |    132.2    |    0.723    |
## +-----+-----+-----+-----+
## |      BH      |    nbar    |    128      |    0.831    |
## +-----+-----+-----+-----+
## |      Holm     |    nbar    |   15176     |    0.824    |
## +-----+-----+-----+-----+
##
## Table: d3.1_m3rr2rr
```

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

