

# Validate Power: d2.2

December 29, 2021

Design: Cluster RCT, with 2 levels, and randomization done at level 2 (school level).

Models: random treatment effects.

Default parameters:

- $M = 3$
- $J = 60$
- rho:  $\rho = 0.5$
- MDES = 0.125, 0.125, 0.125
- R2:  $R_1^2 = 0.1, 0.1, 0.1, R_2^2 = 0.1, 0.1, 0.1$
- ICC:  $ICC_2 = 0.1, 0.1, 0.1$

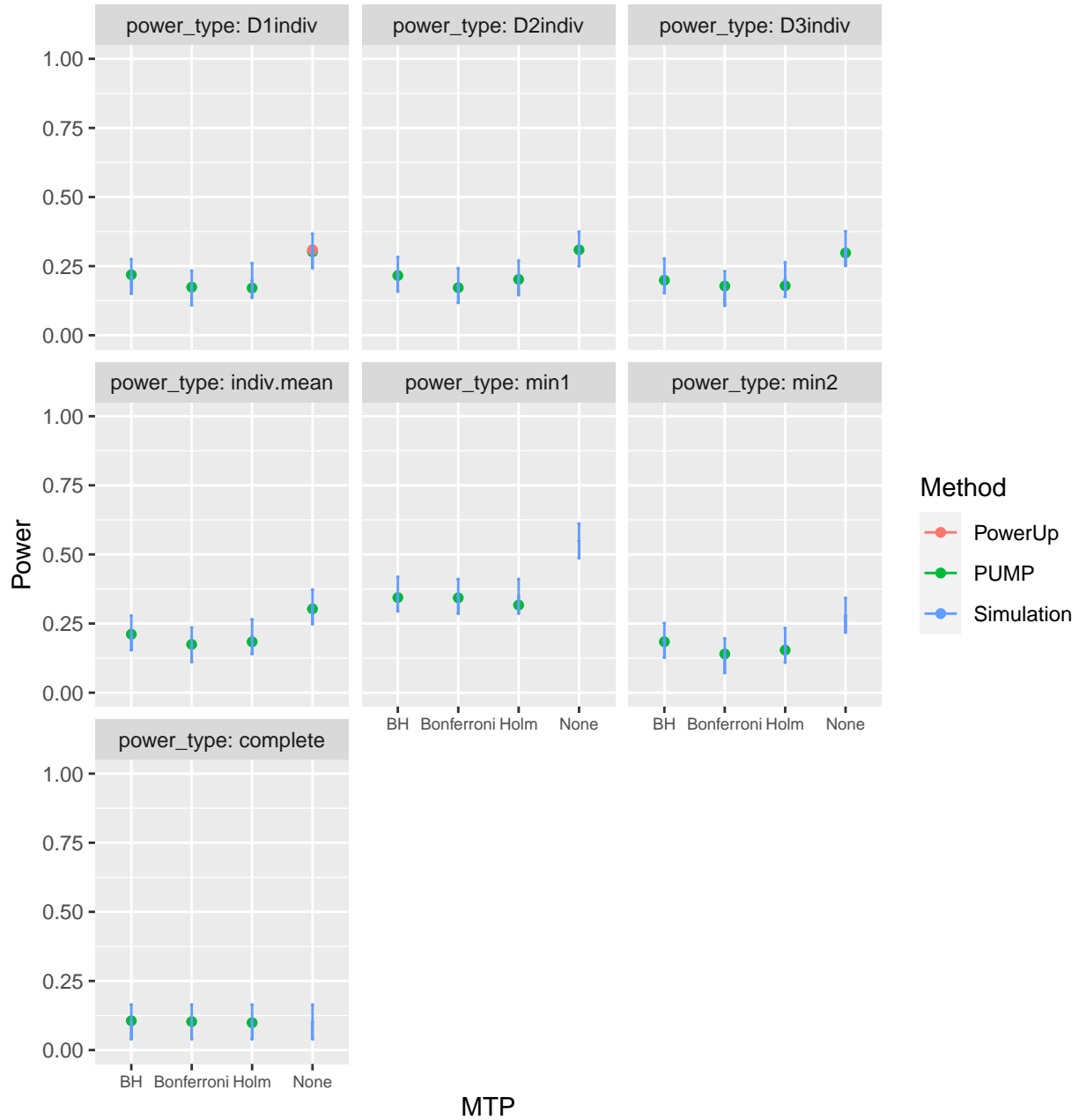
Assumptions

- Two-level design:  $ICC_3 = 0, \omega_3 = 0, K = 1$
- Constant treatment effects:  $\omega_2 = 0$

# Power Validation

Base case

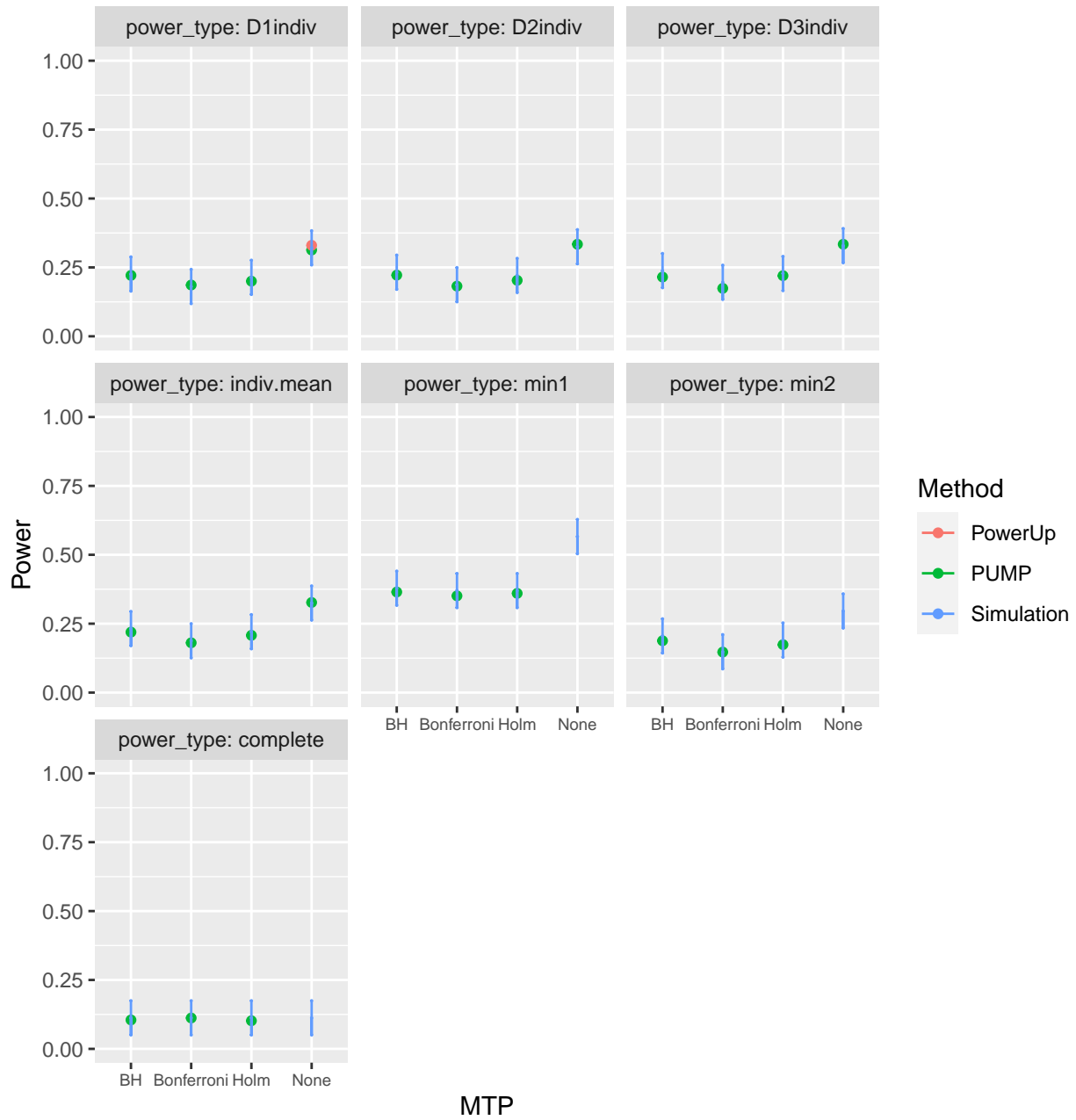
d\_m: d2.2\_m2rc



## Varying school size

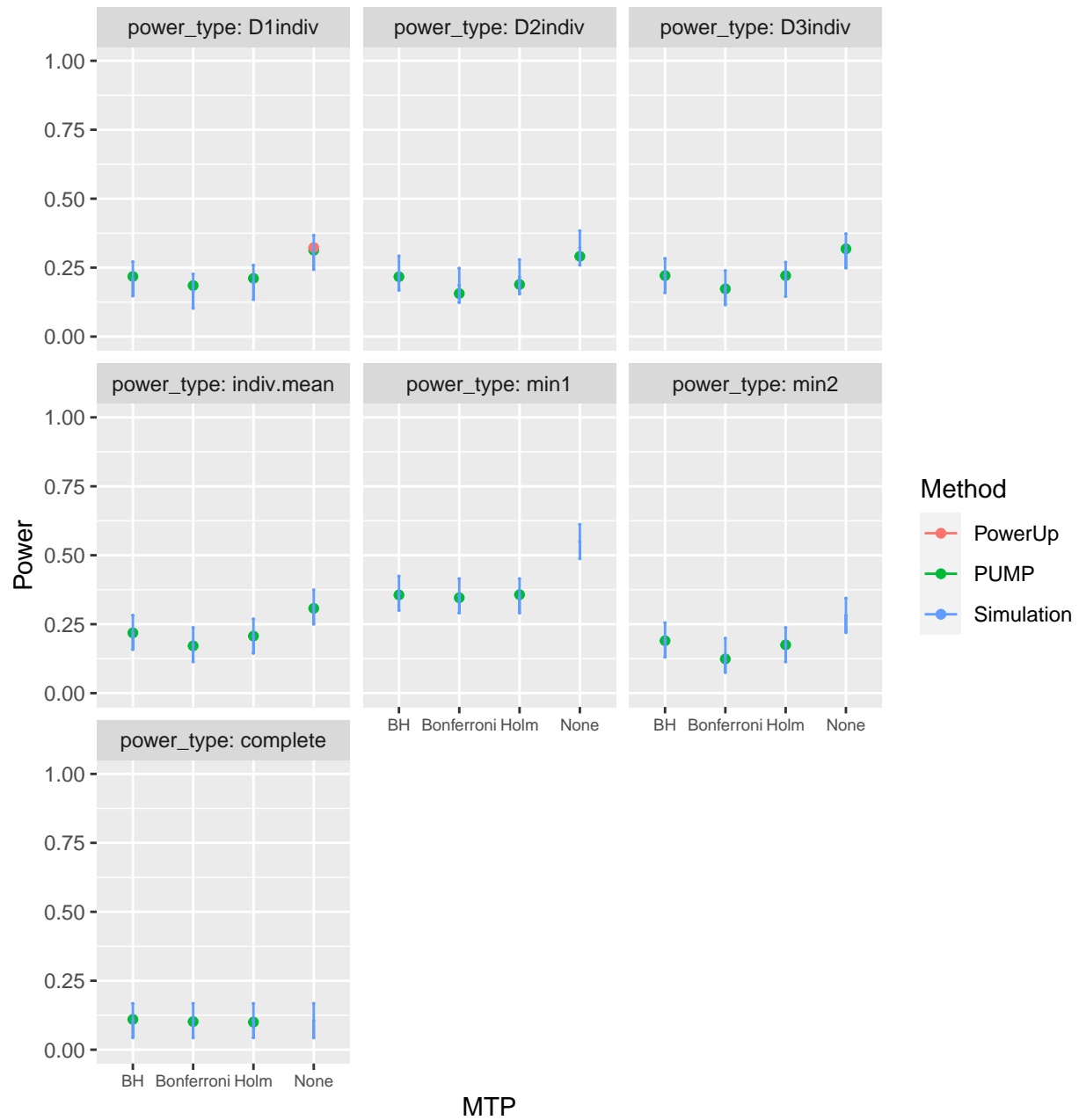
$\bar{n} = 100$

d\_m: d2.2\_m2rc



$\bar{n} = 75$

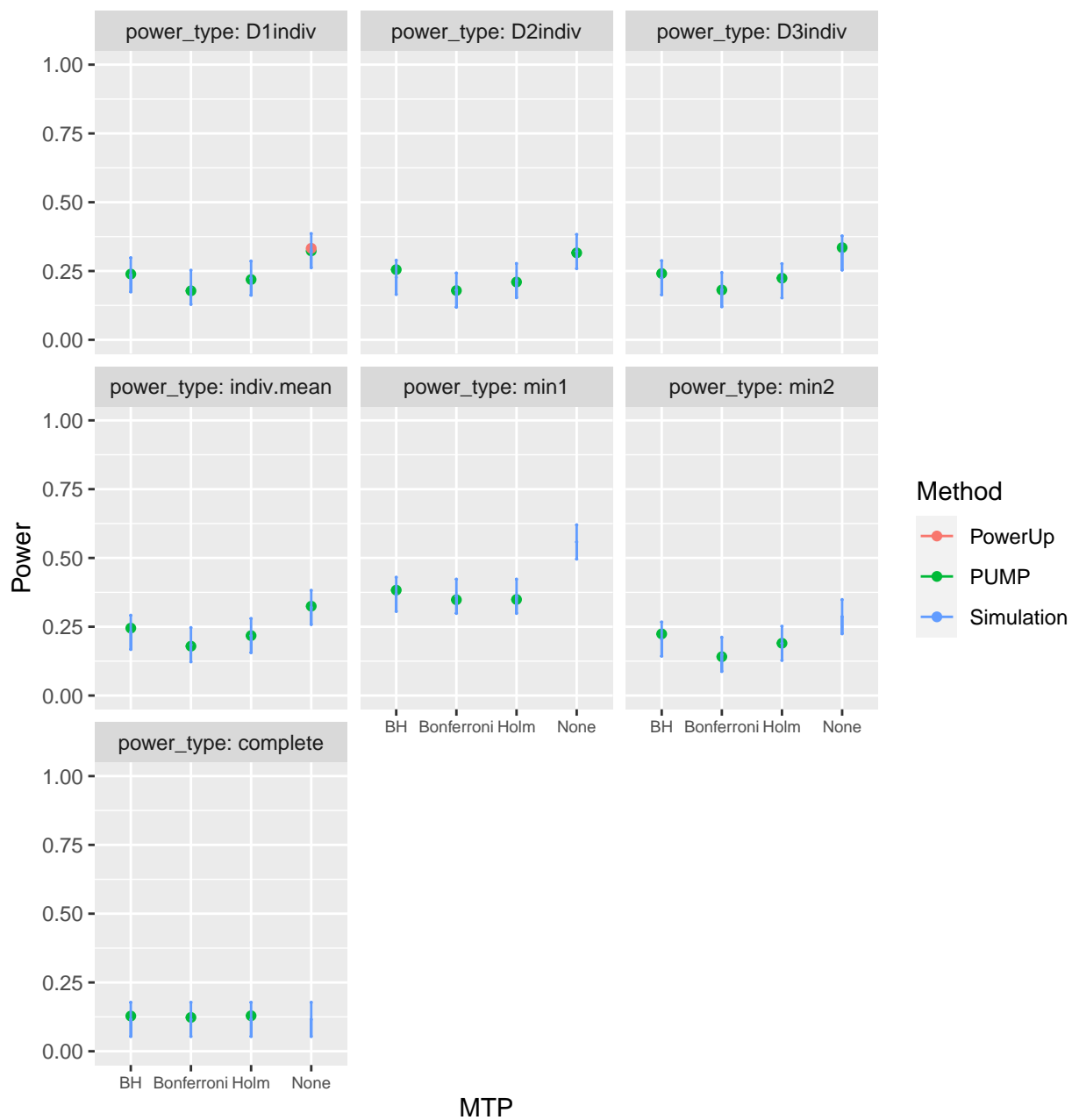
d\_m: d2.2\_m2rc



## Varying R2

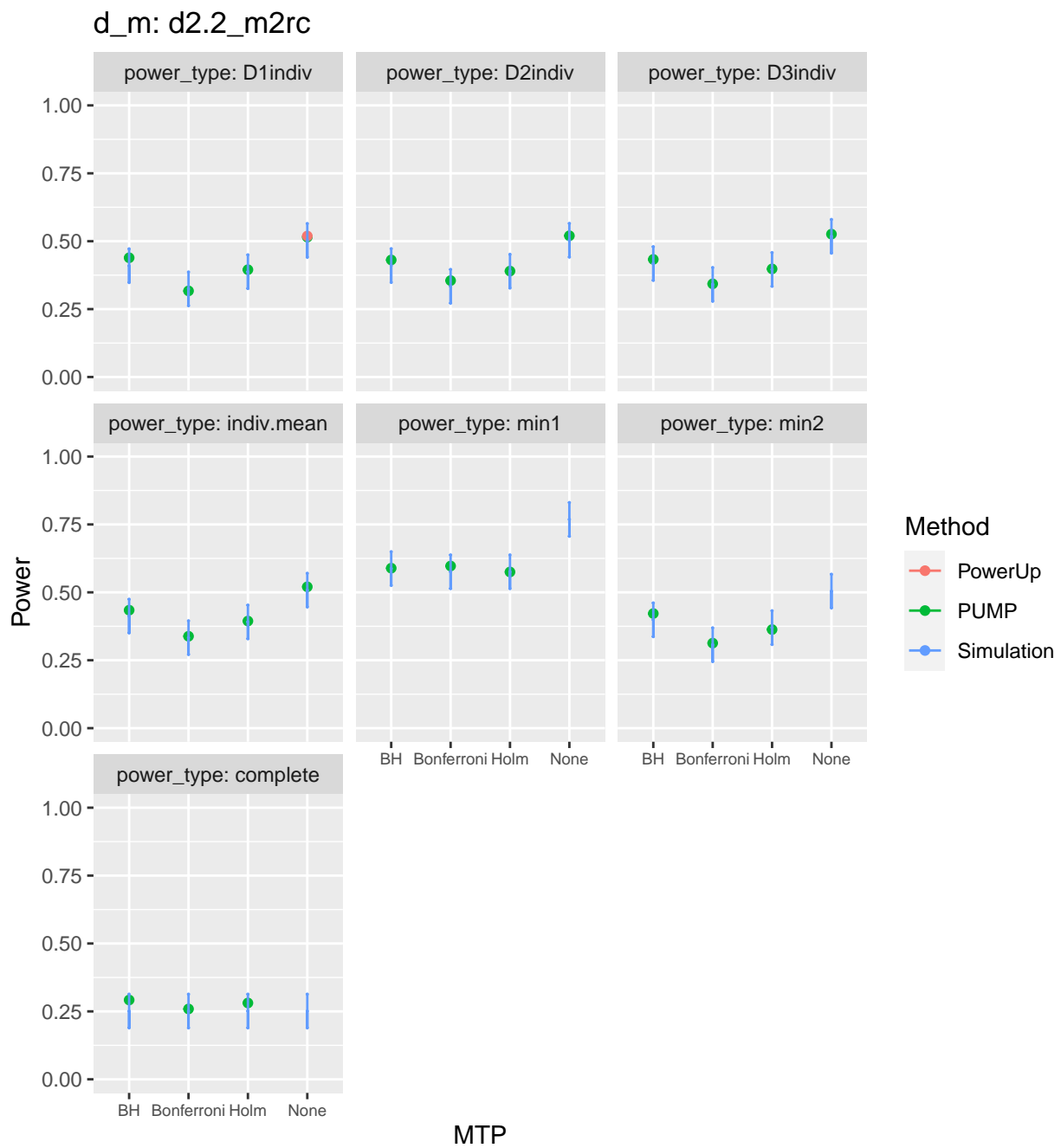
$$R_1^2 = 0.6, 0.6, 0.6$$

d\_m: d2.2\_m2rc



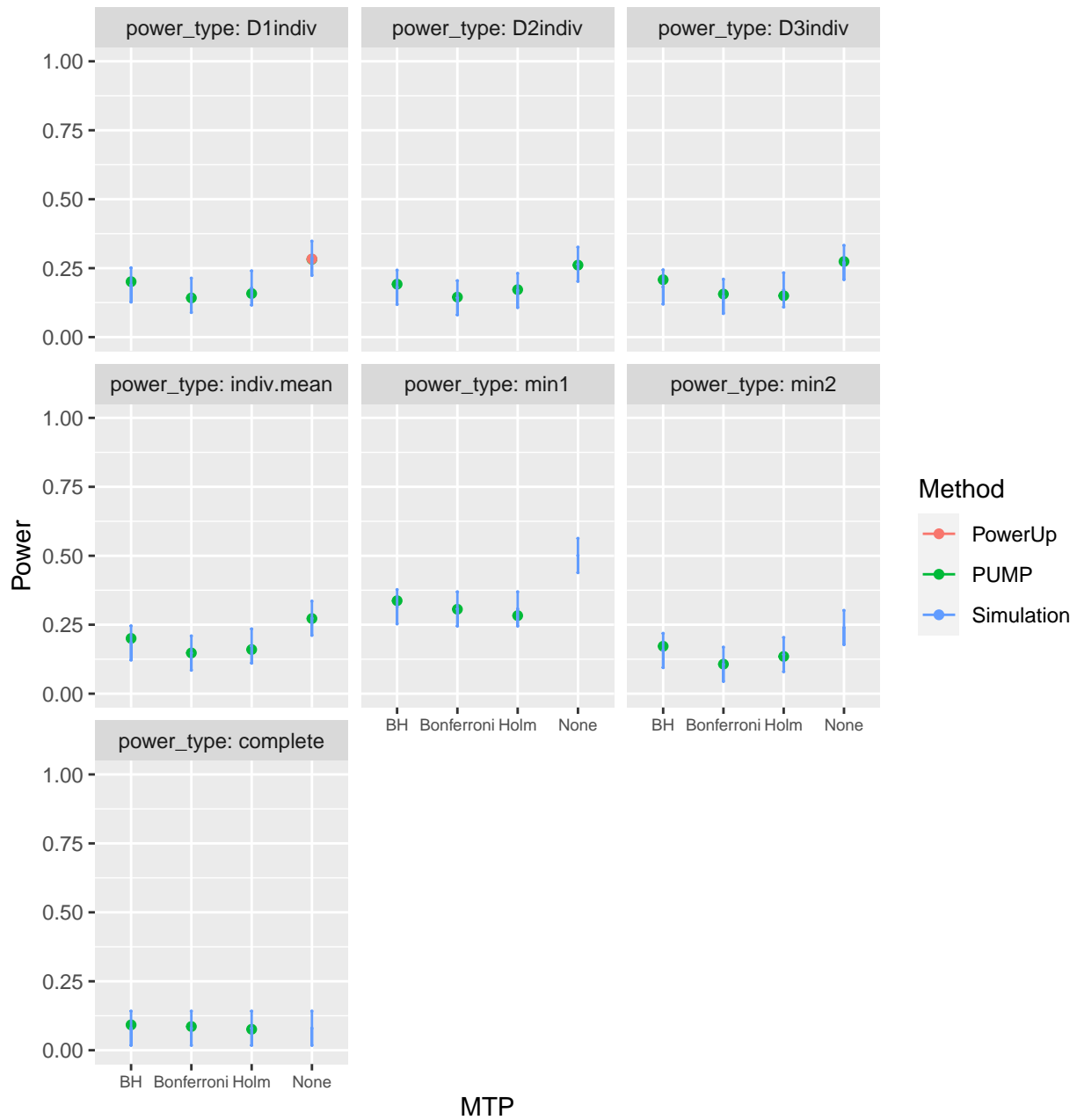
MTP

$$R_2^2 = 0.6, 0.6, 0.6$$



$$R_1^2 = 0, 0, 0 \quad R_2^2 = 0, 0, 0$$

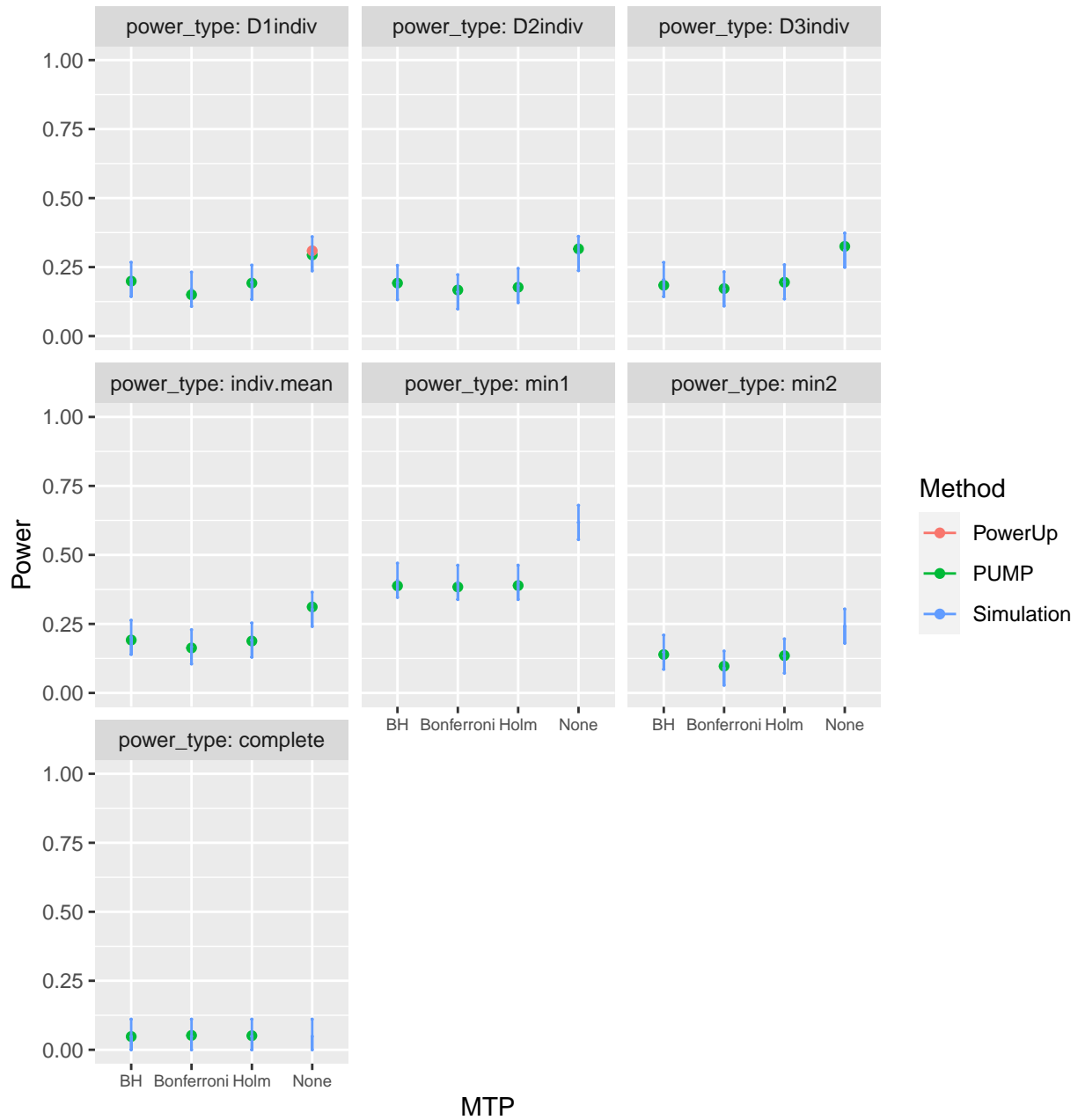
d\_m: d2.2\_m2rc



## Varying rho

$\rho = 0.2$

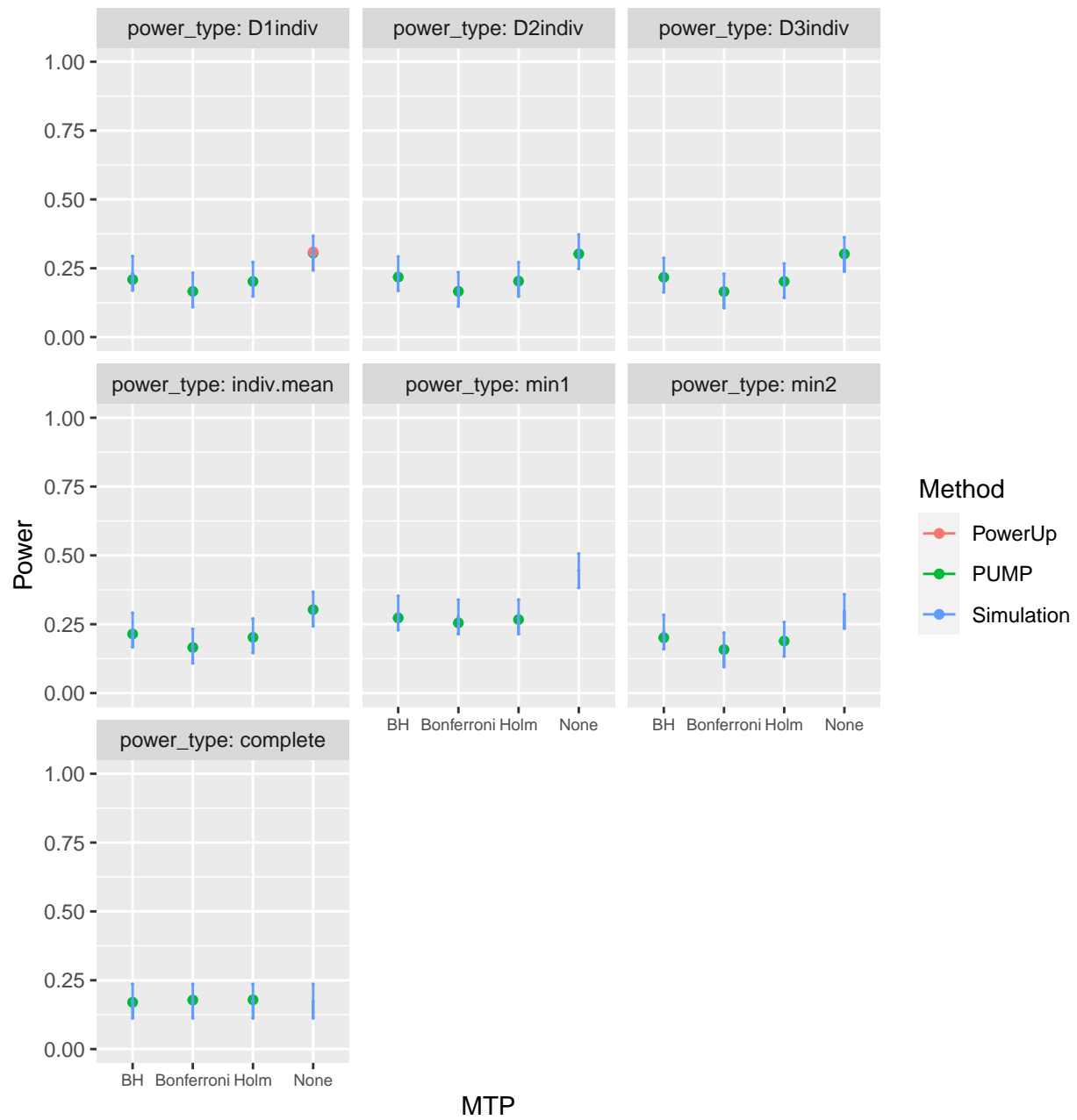
d\_m: d2.2\_m2rc





$\rho = 0.8$

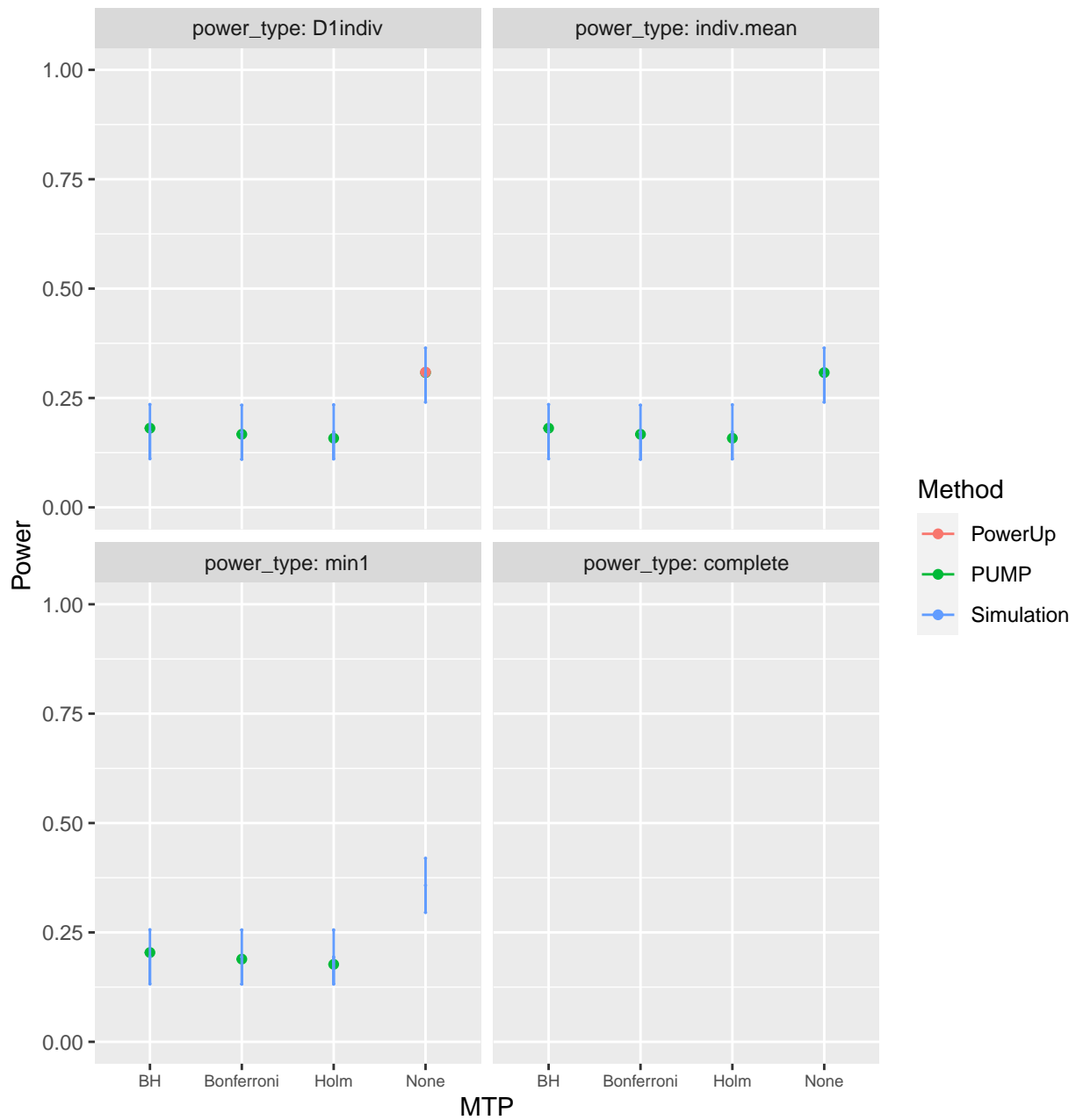
d\_m: d2.2\_m2rc



## Varying true positives

MDES = 0.125, 0, 0

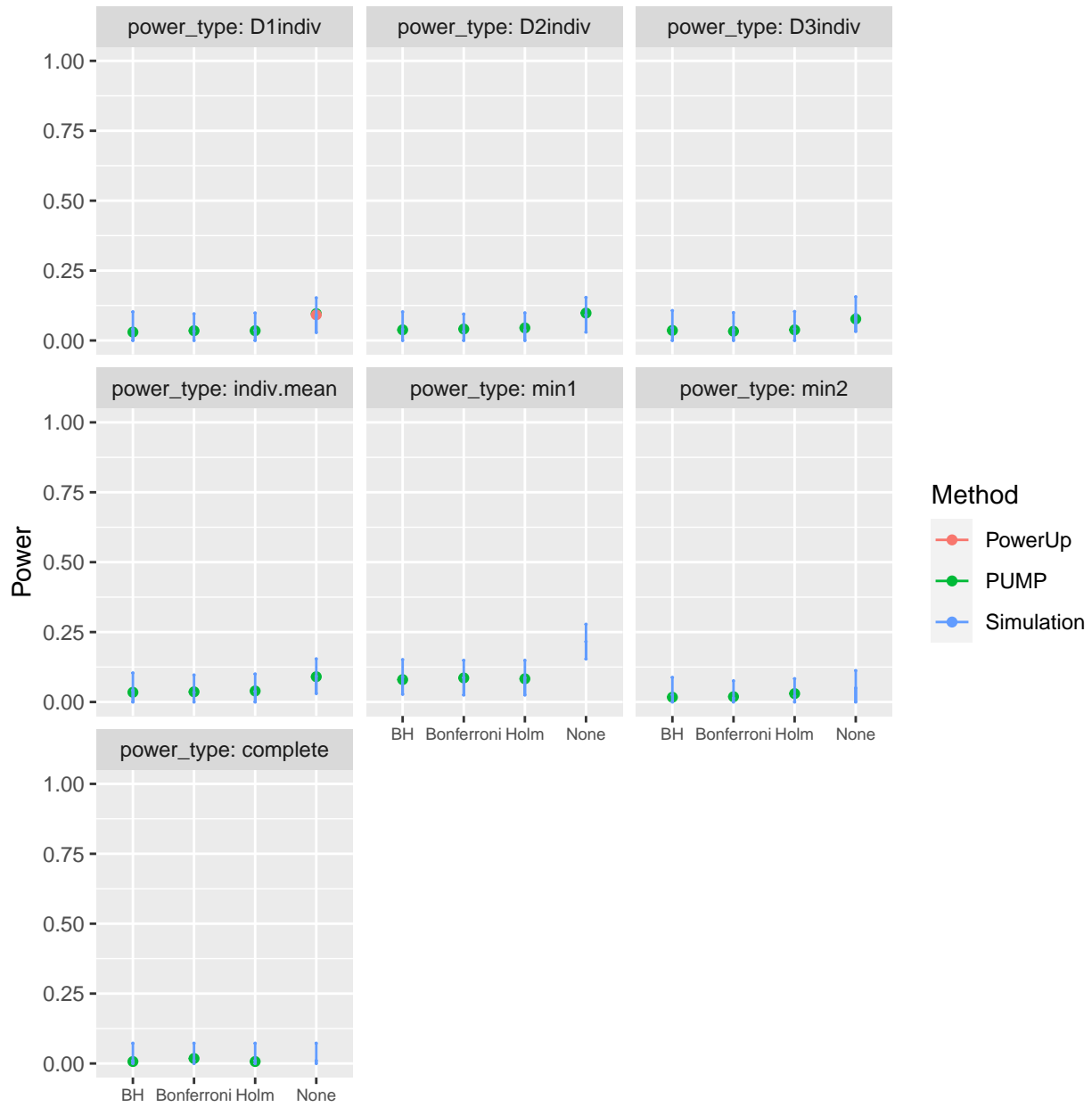
d\_m: d2.2\_m2rc



## Varying ICC

$ICC_2 = 0.7, 0.7, 0.7$

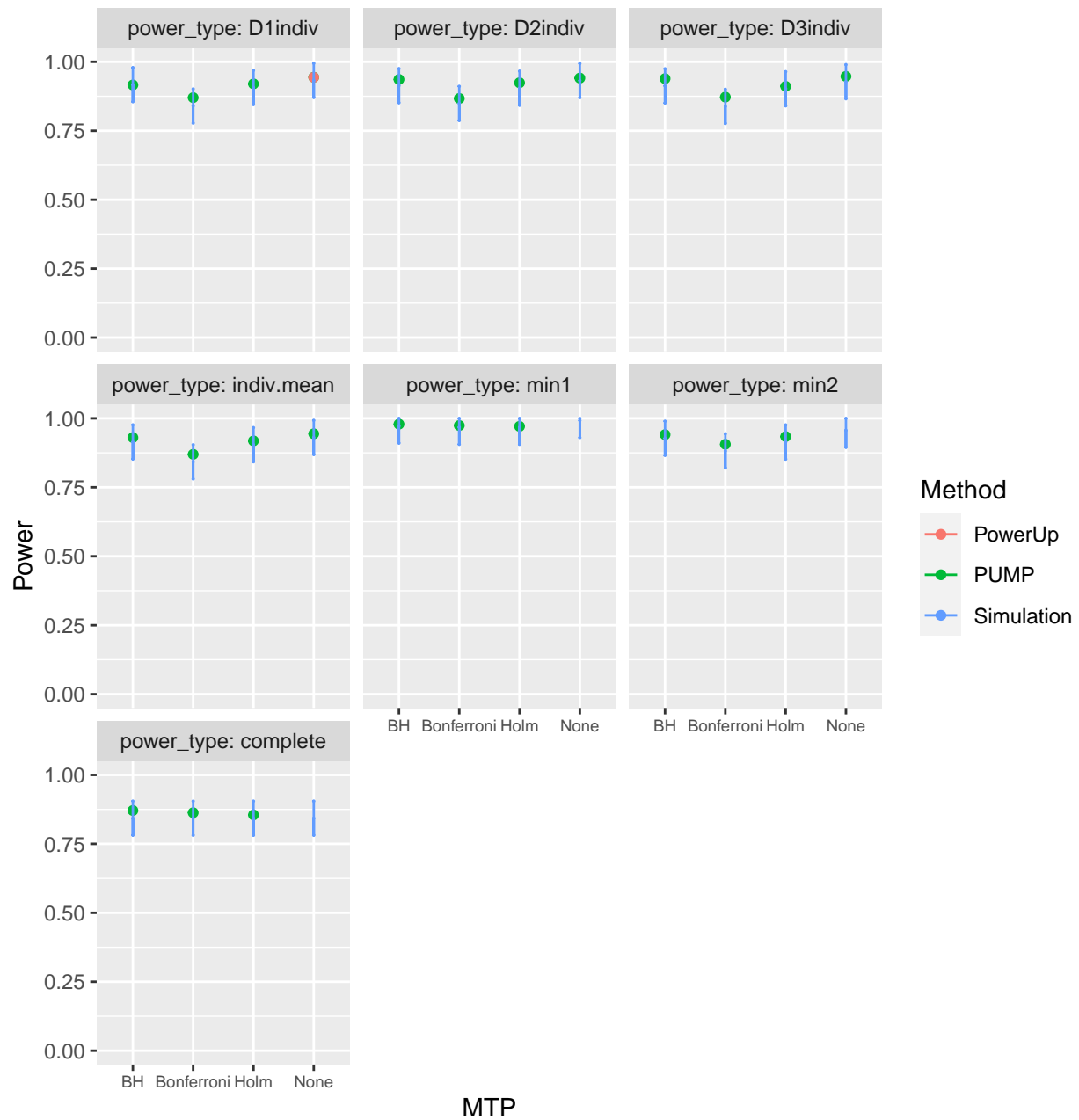
d\_m: d2.2\_m2rc



MTP

$ICC_2 = 0, 0, 0$

d\_m: d2.2\_m2rc



## MDES validation

Target value: 0.125

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Adjusted MDES | D1indiv Power | Target MDES |
## +=====+=====+=====+=====+
## | Bonferroni |      0.128     |      0.174     |      0.125     |
## +-----+-----+-----+-----+
## |      BH      |      0.127     |      0.218     |      0.125     |
## +-----+-----+-----+-----+
## |      Holm     |      0.115     |      0.161     |      0.125     |
## +-----+-----+-----+-----+
##
## Table: d2.2_m2rc
```

## Sample size validation

Target value: 60

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      J      |      63      |      0.174      |
## +-----+-----+-----+-----+
## |      BH      |      J      |      62      |      0.215      |
## +-----+-----+-----+-----+
## |      Holm     |      J      |      55      |      0.175      |
## +-----+-----+-----+-----+
##
## Table: d2.2_m2rc
```

Target value: 50

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |     nbar     |    71.12    |      0.174      |
## +-----+-----+-----+-----+
## |      BH      |     nbar     |     60      |      0.216      |
## +-----+-----+-----+-----+
## |      Holm     |     nbar     |     25      |      0.164      |
## +-----+-----+-----+-----+
##
## Table: d2.2_m2rc
```

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

