

# Validate Power: d2.2

December 25, 2021

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

Models: random treatment effects.

Default parameters:

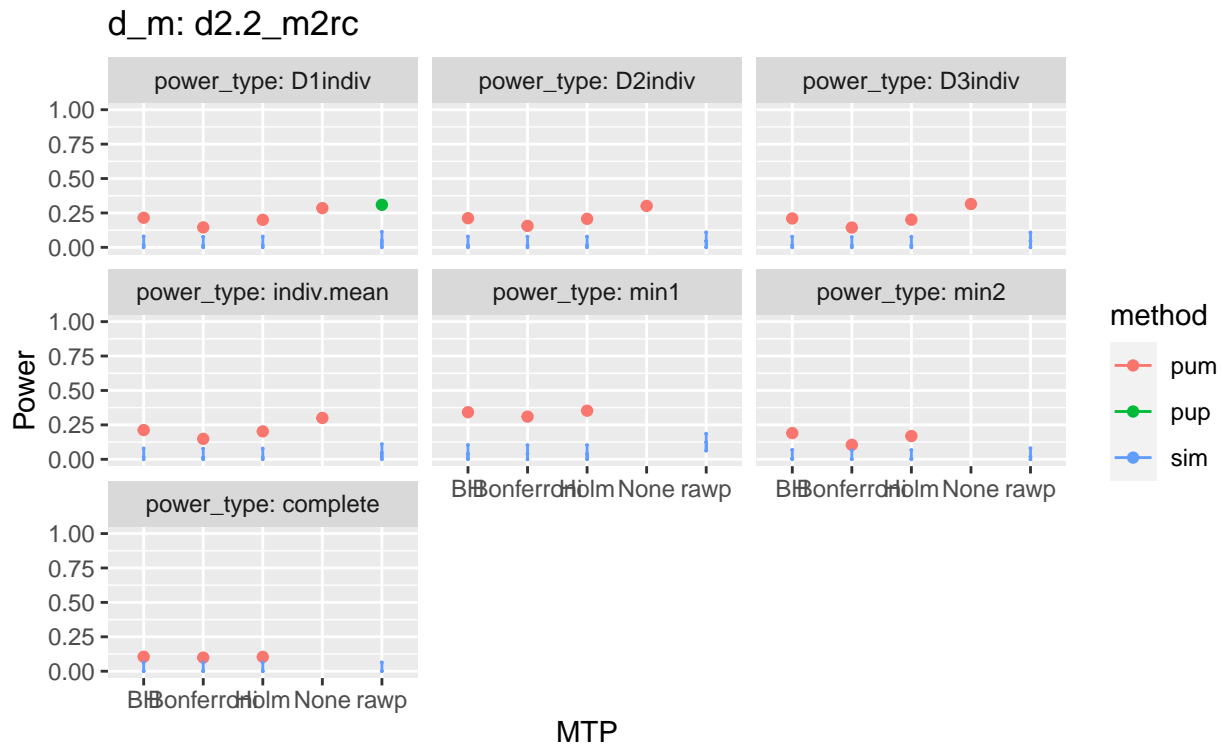
- $M = 3$
- $J = 60$
- rho:  $\rho = 0.5$
- MDES = 0.125, 0.125, 0.125
- R2:  $R_1^2 = 0.1, 0.1, 0.1, R_2^2 = 0.1, 0.1, 0.1$
- ICC:  $ICC_2 = 0.1, 0.1, 0.1$

Assumptions

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

## Power Validation

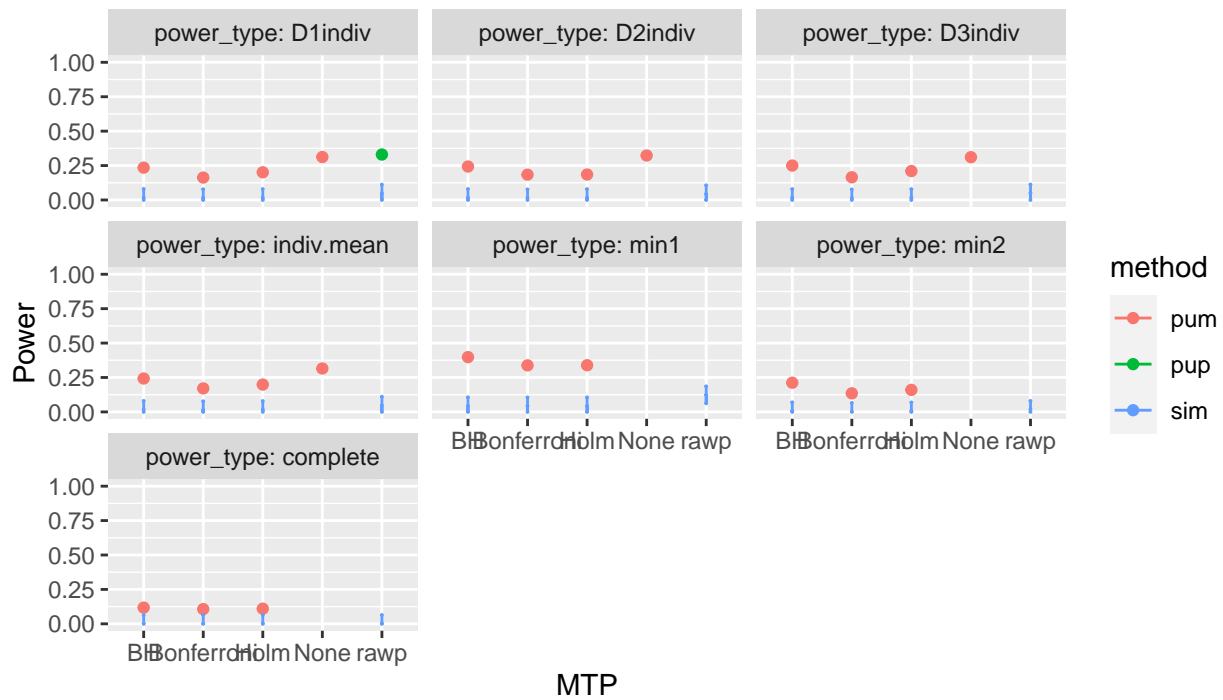
Base case



## Varying school size

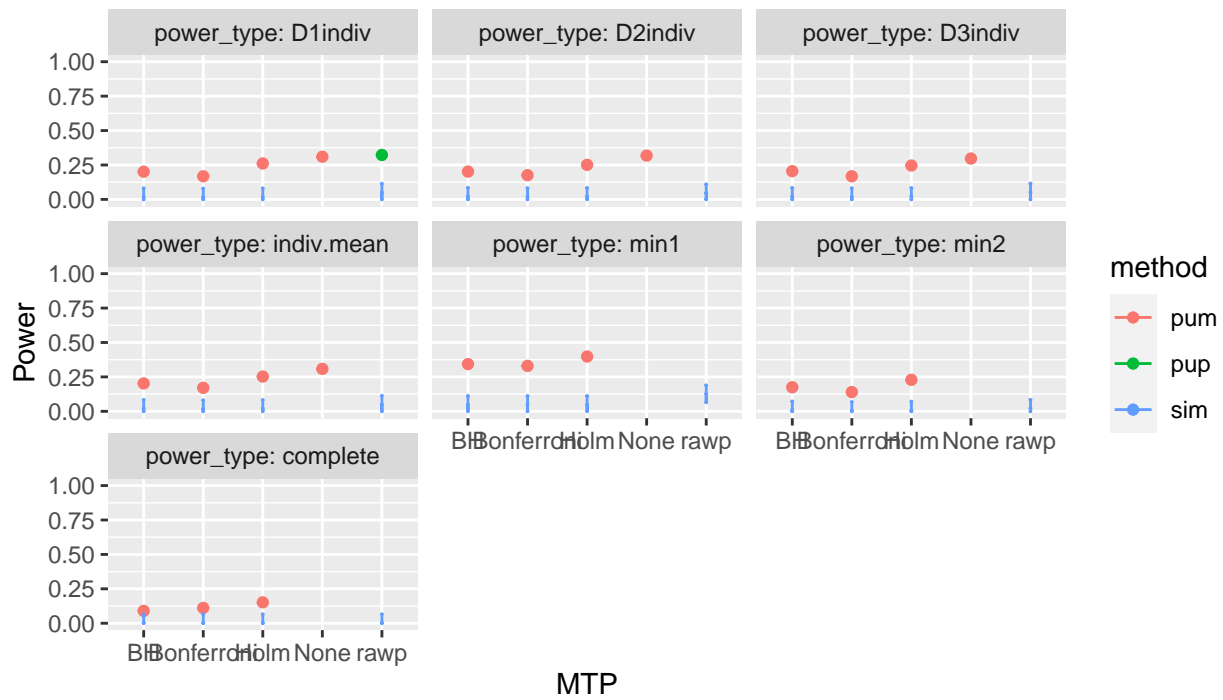
$\bar{n} = 100$

d\_m: d2.2\_m2rc



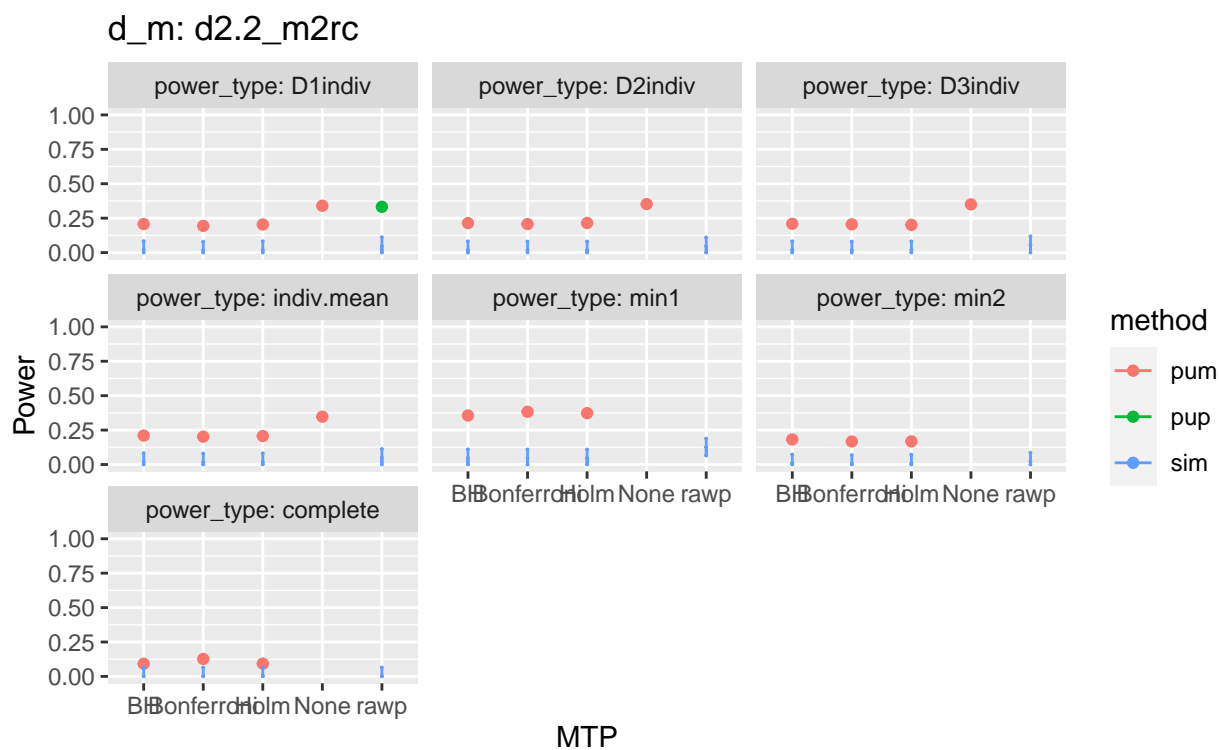
$\bar{n} = 75$

d\_m: d2.2\_m2rc

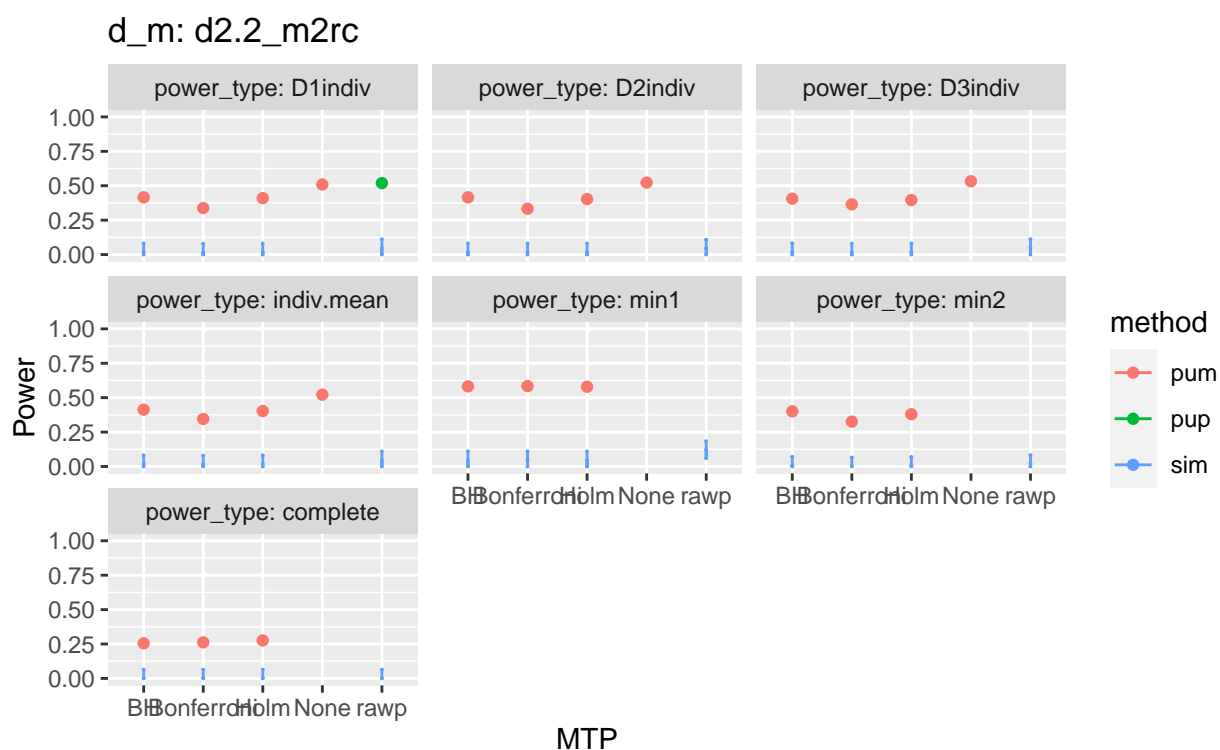


## Varying R2

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

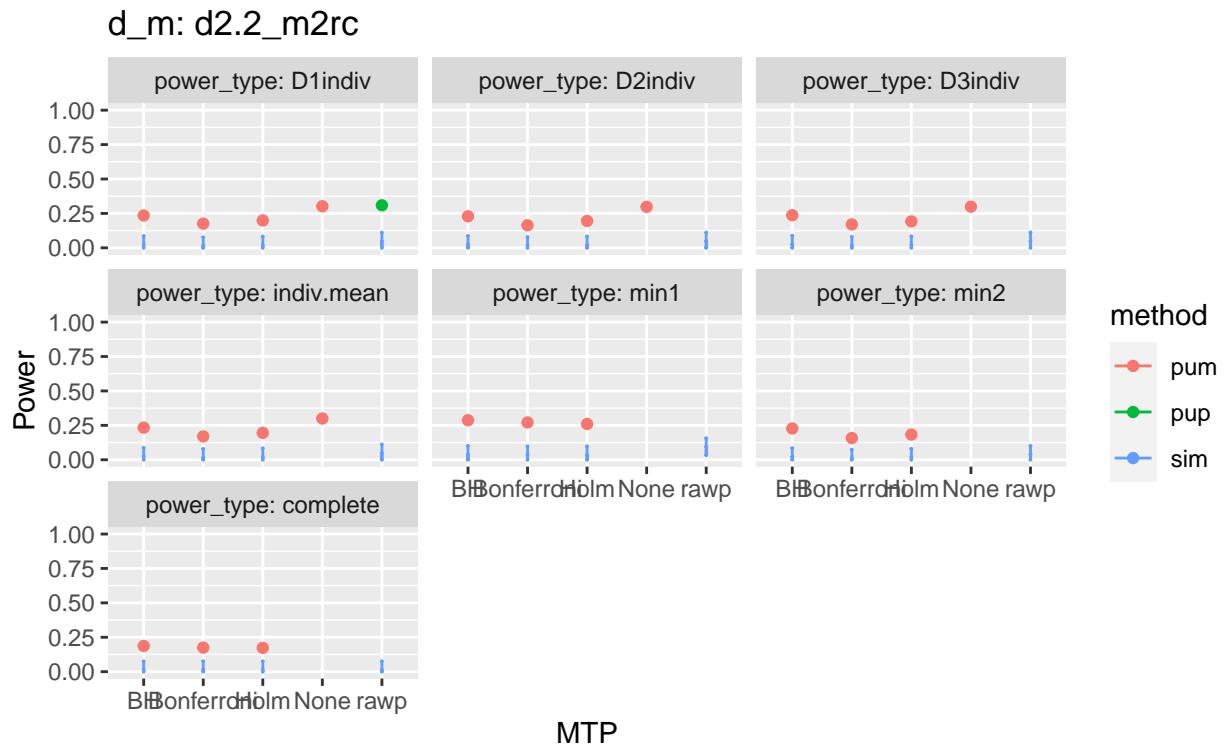


$$R_2^2 = 0.6, 0.6, 0.6$$



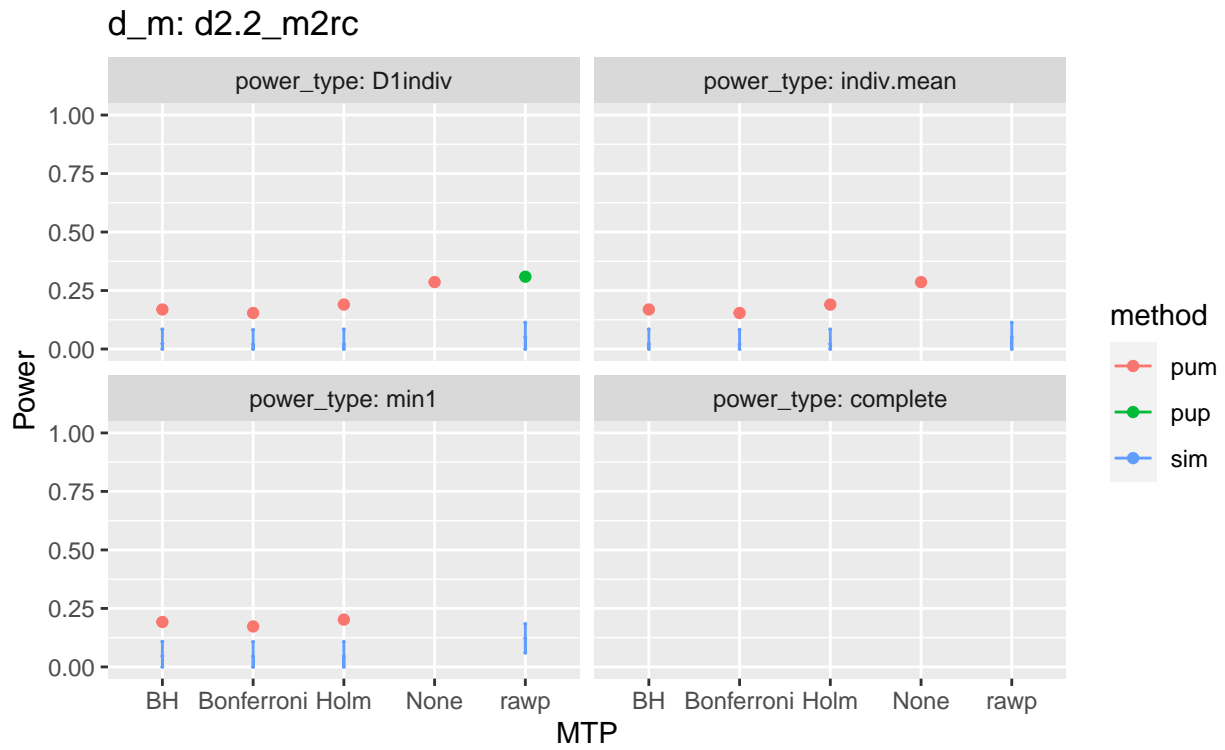
$$R_1^2 = 0, 0, 0 \quad R_2^2 = 0, 0, 0$$





## Varying true positives

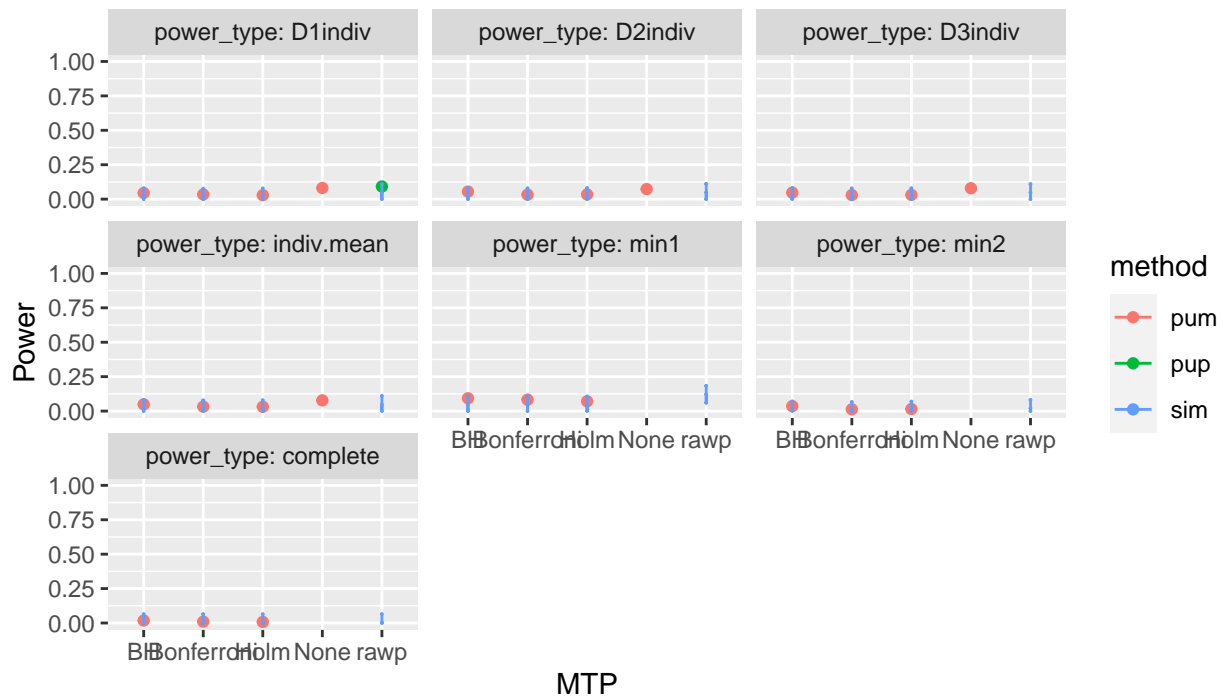
MDES = 0.125, 0, 0



## Varying ICC

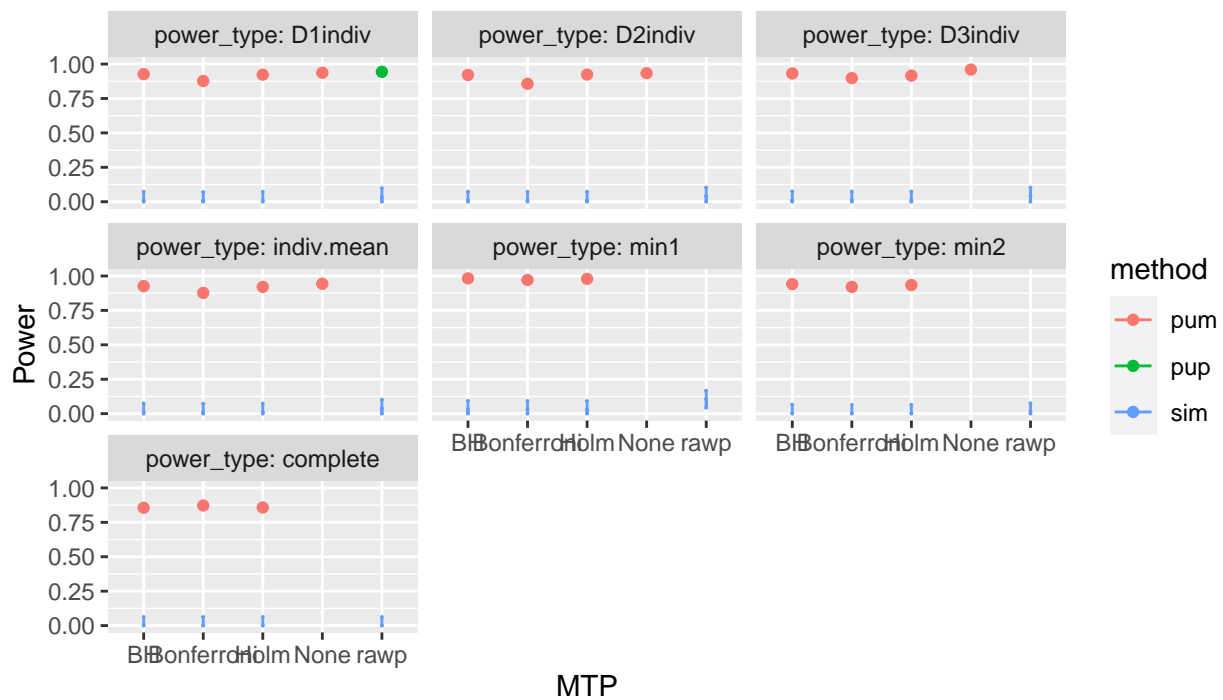
$ICC_2 = 0.7, 0.7, 0.7$

d\_m: d2.2\_m2rc



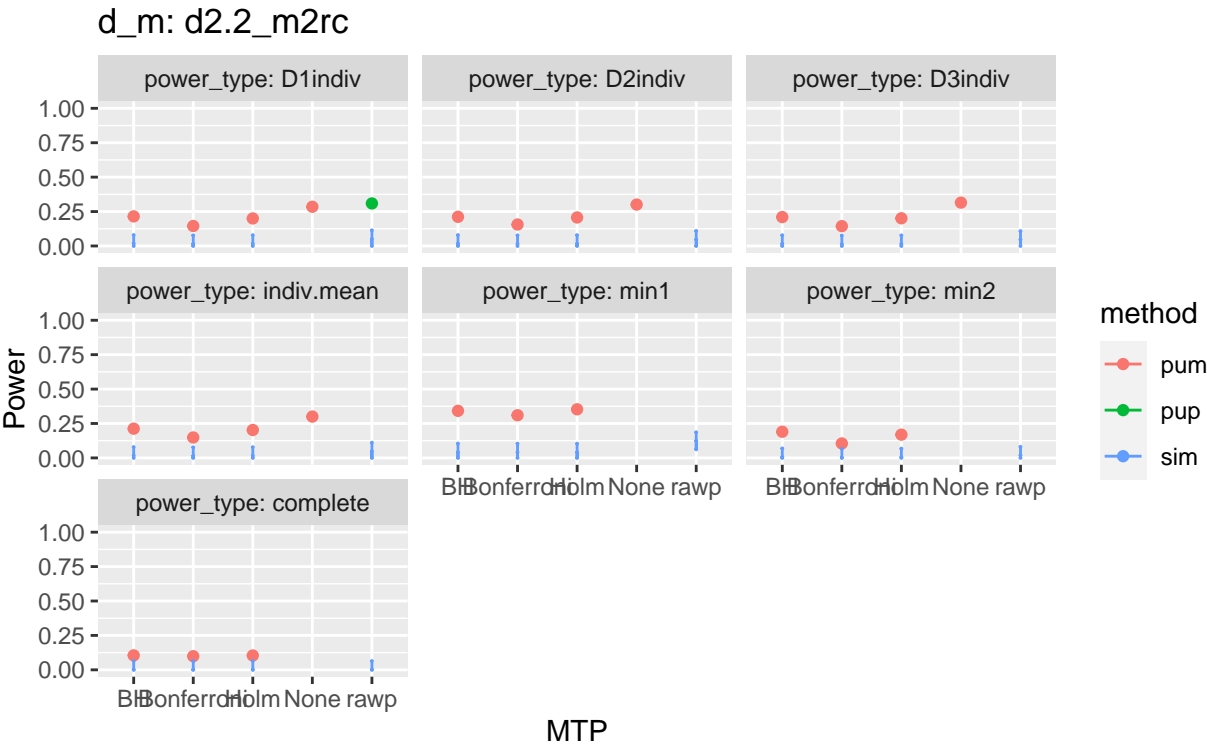
$ICC_2 = 0, 0, 0$

d\_m: d2.2\_m2rc



Kappa

$\kappa = 0.4$



MDES validation

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Adjusted MDES | D1indiv Power | Target MDES |
## +=====+=====+=====+=====+
## | Bonferroni |      0.118    |      0.145    |      0.125    |
## +-----+-----+-----+-----+
## |      BH      |      0.129    |      0.224    |      0.125    |
## +-----+-----+-----+-----+
## |      Holm     |      0.124    |      0.193    |      0.125    |
## +-----+-----+-----+-----+
##
## Table: d2.2_m2rc
```

Sample size validation

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
##
```

```

## | Bonferroni |      J      |      54      |      0.145      |
## +-----+-----+-----+-----+
## |      BH      |      J      |      62      |      0.217      |
## +-----+-----+-----+-----+
## |      Holm      |      J      |      62      |      0.201      |
## +-----+-----+-----+-----+
##
## Table: d2.2_m2rc
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      nbar      |      27.17      |      0.145      |
## +-----+-----+-----+-----+
## |      BH      |      nbar      |      52      |      0.211      |
## +-----+-----+-----+-----+
## |      Holm      |      nbar      |      74      |      0.205      |
## +-----+-----+-----+-----+
##
## Table: d2.2_m2rc

```