

# Validate Power: d3.2

December 25, 2021

Design: Blocked Cluster RCT, with 3 levels, and randomization done at level 2 (school level).

Models: random and fixed treatment effects.

Default parameters:

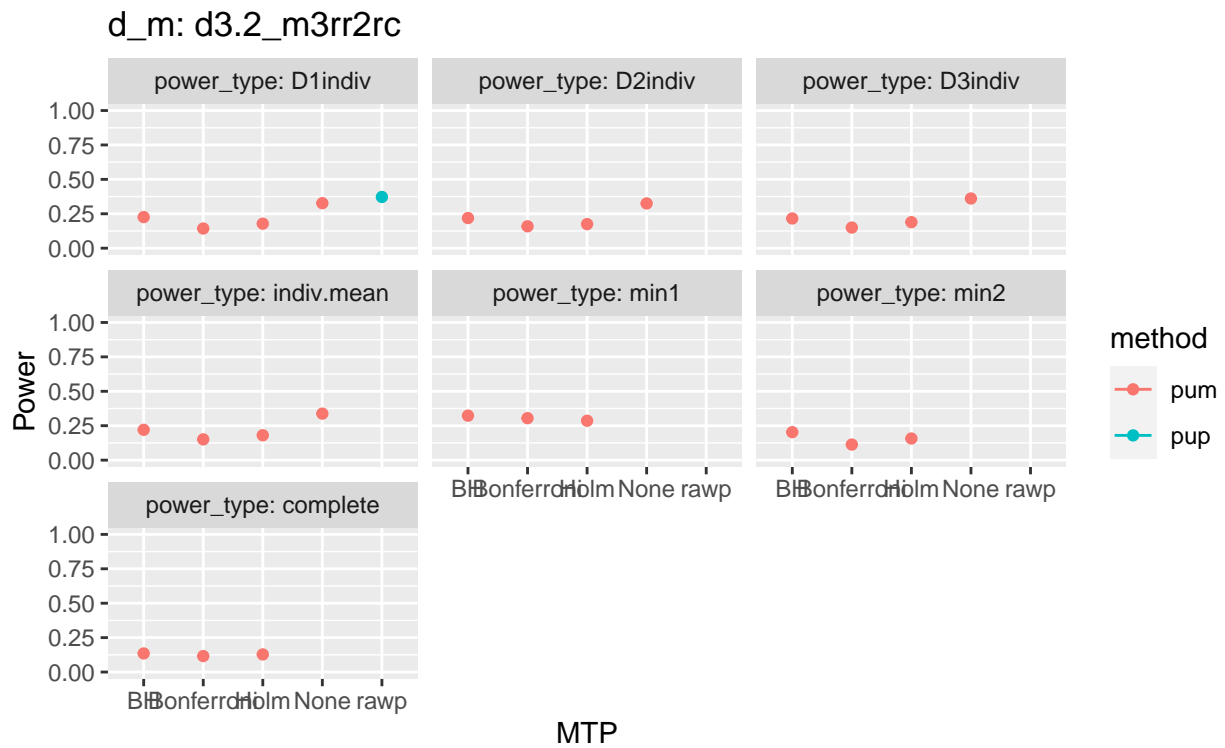
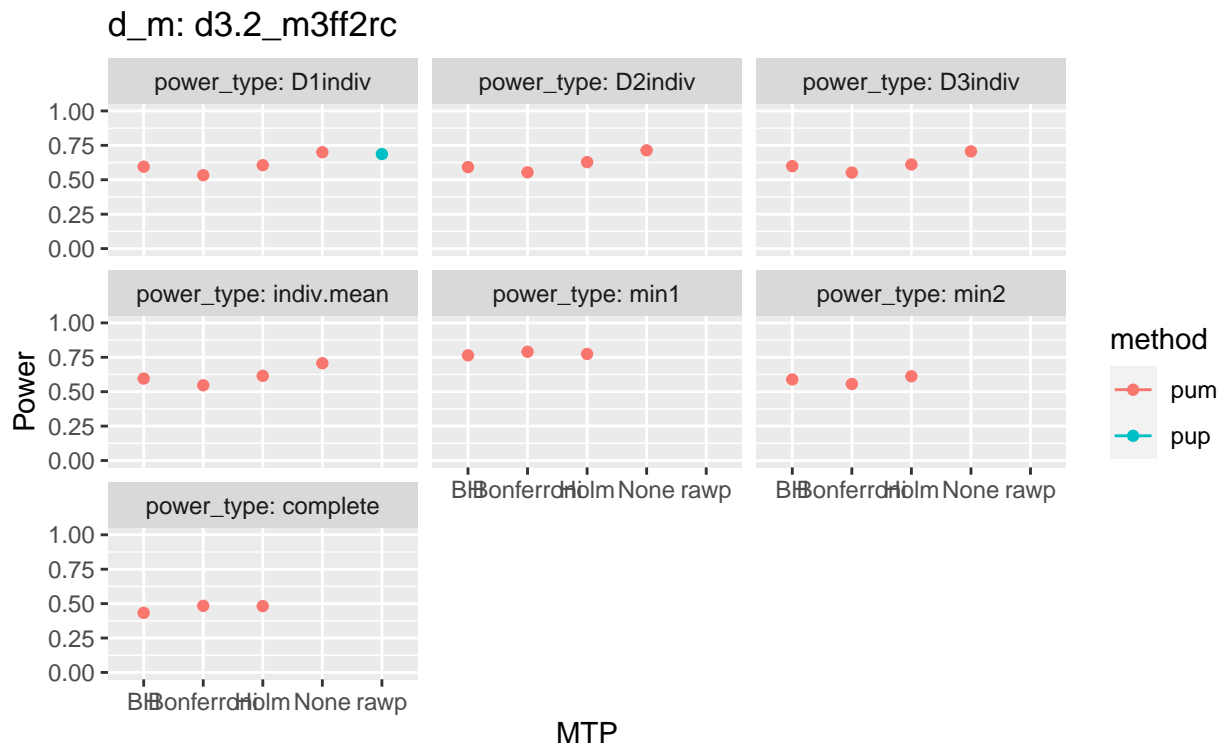
- $M = 3$
- $J = 30$
- $K = 10$
- rho:  $\rho = 0.5$
- MDES: 0.125, 0.125, 0.125
- R2:  $R_1^2 = 0.1, 0.1, 0.1, R_2^2 = 0.1, 0.1, 0.1, R_3^2 = 0$
- ICC:  $ICC_2 = 0.2, 0.2, 0.2, ICC_3 = 0.2, 0.2, 0.2$
- Omega2:  $\omega_2 = 0$

Parameters by model type:

- Omega3:  $\omega_3 = 0$  for fixed effects,  $\omega_3 = 0.1, 0.1, 0.1$  for random effects

# Power Validation

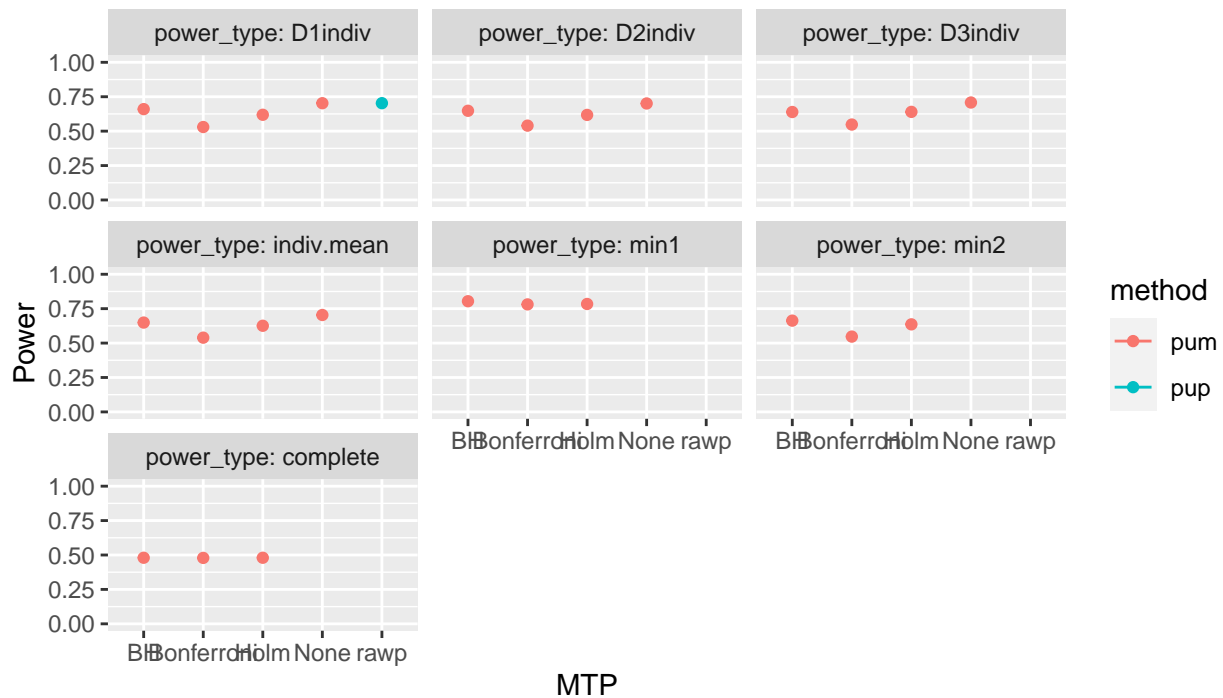
Base case



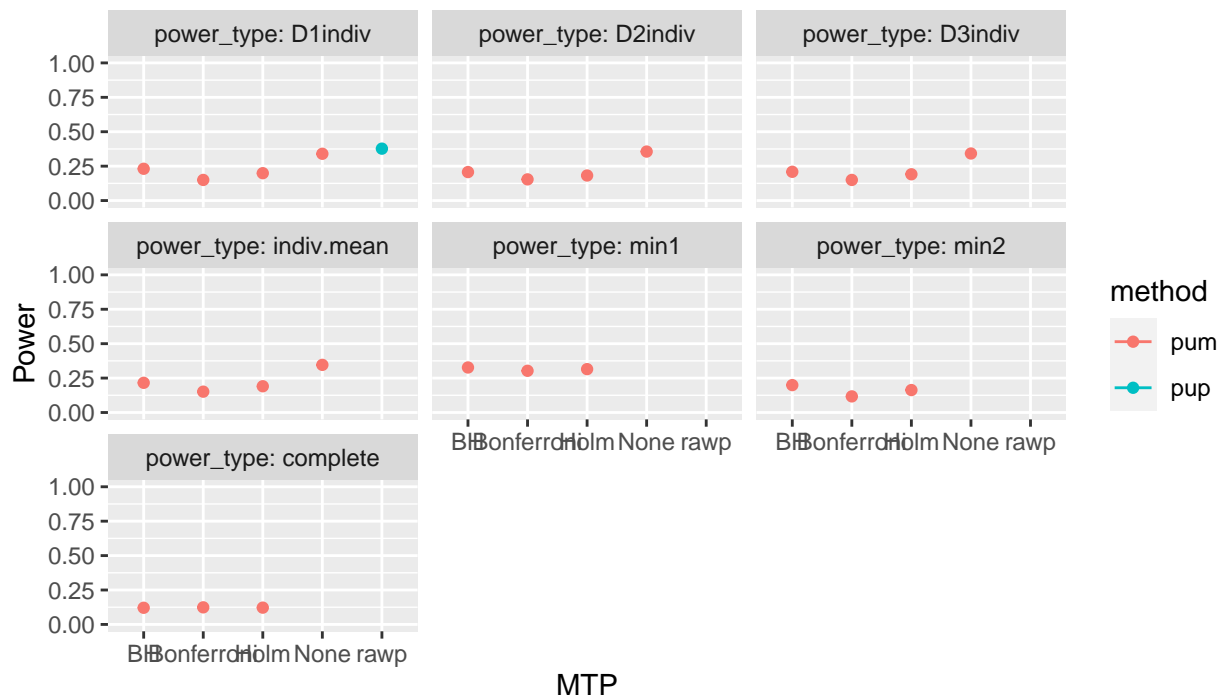
## Varying school size

$\bar{n} = 100$

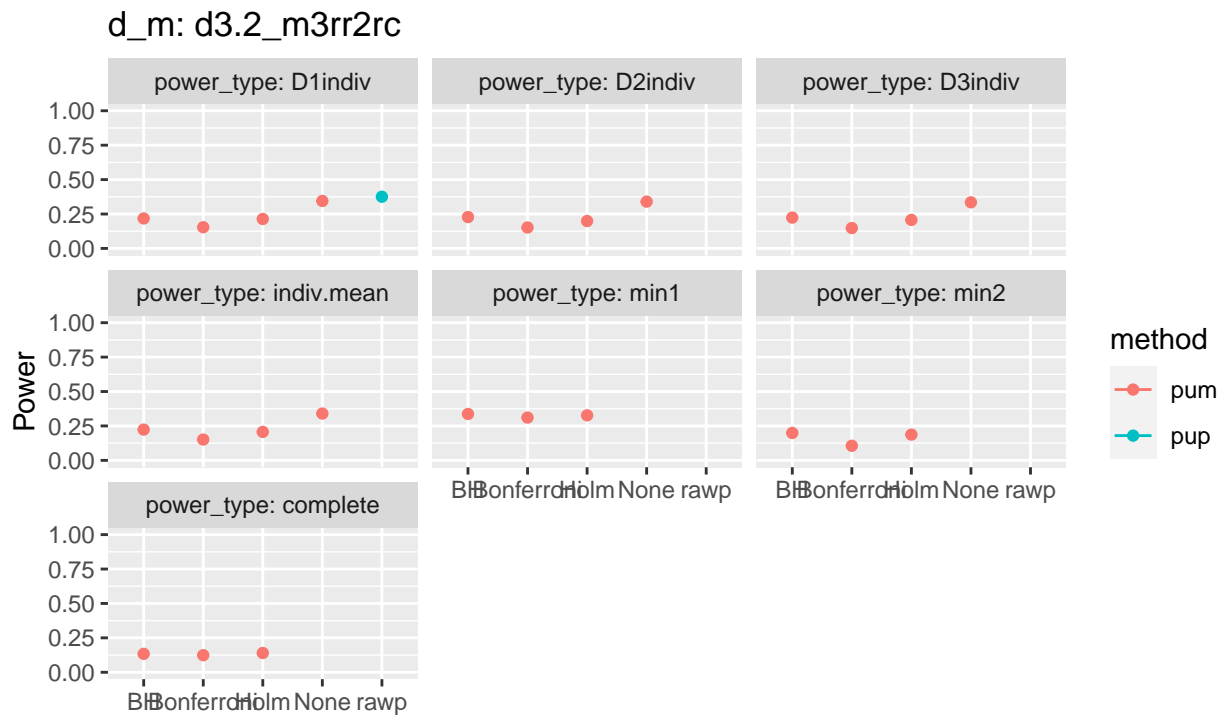
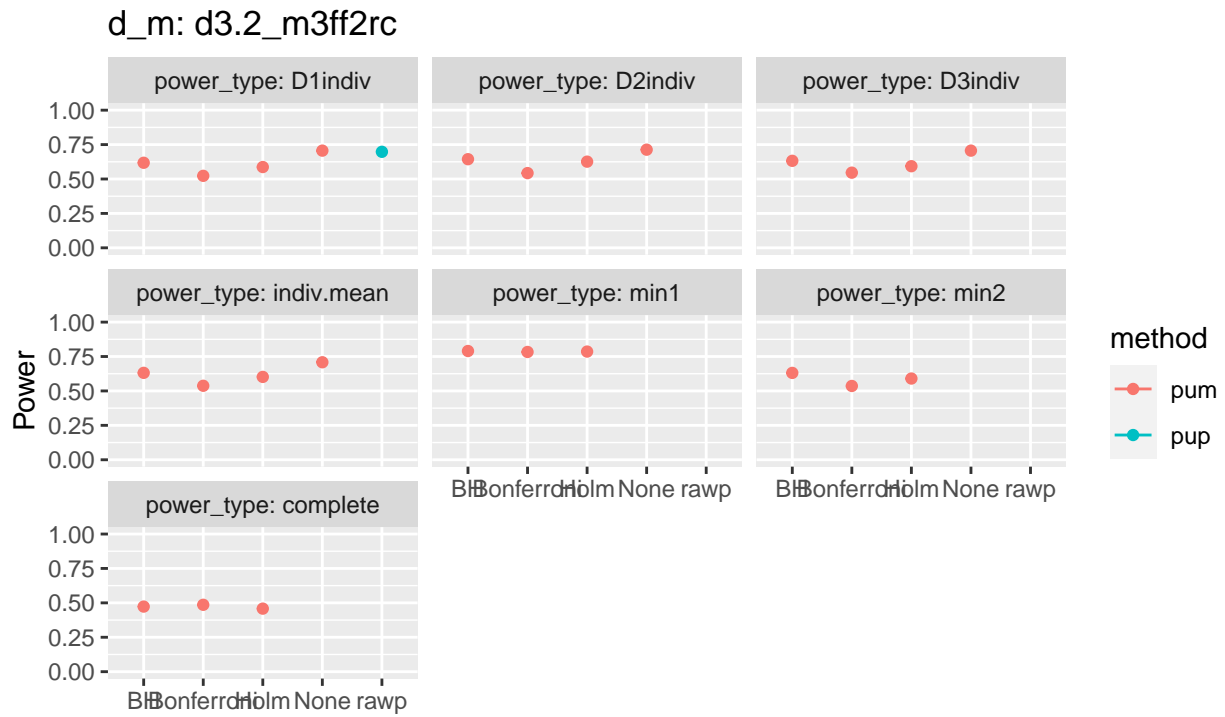
d\_m: d3.2\_m3ff2rc



d\_m: d3.2\_m3rr2rc

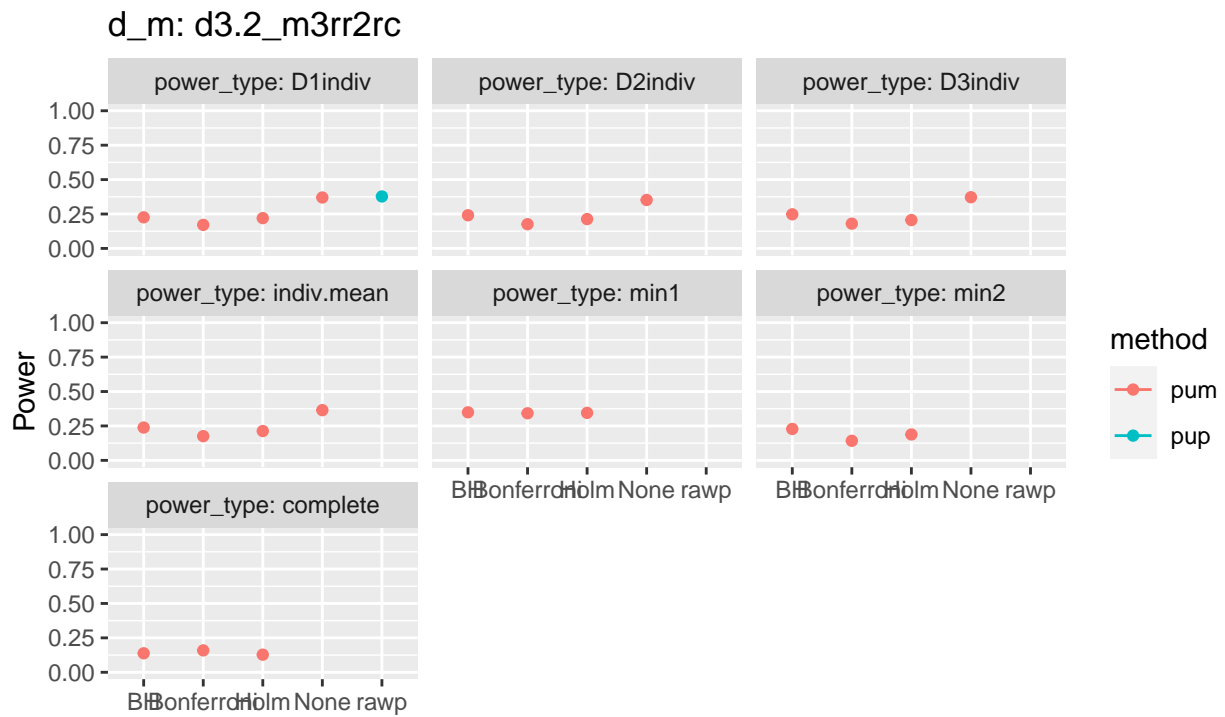
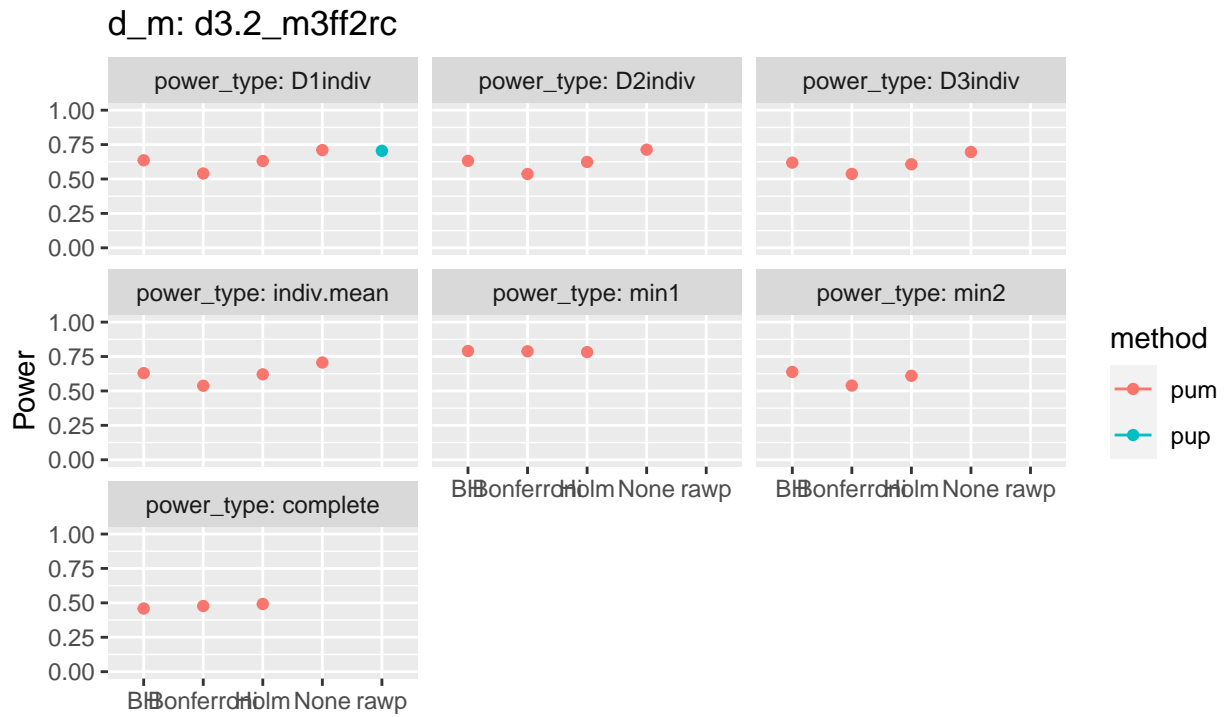


$\bar{n} = 75$

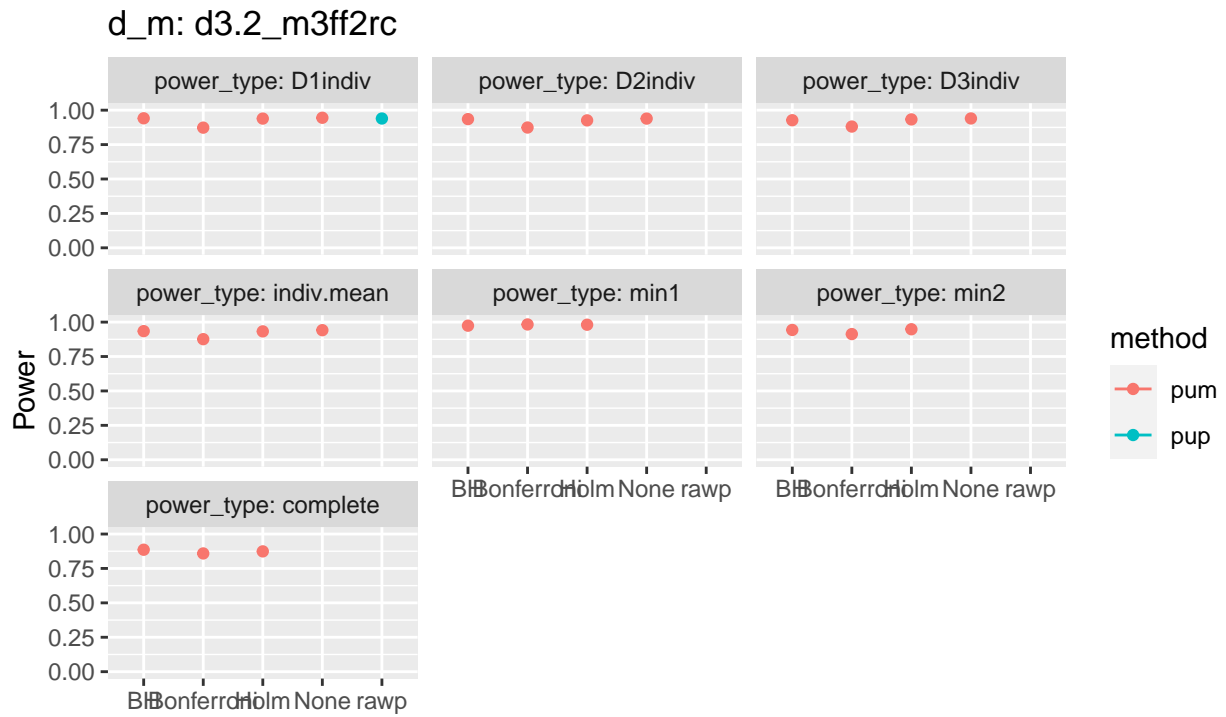


## Varying R2

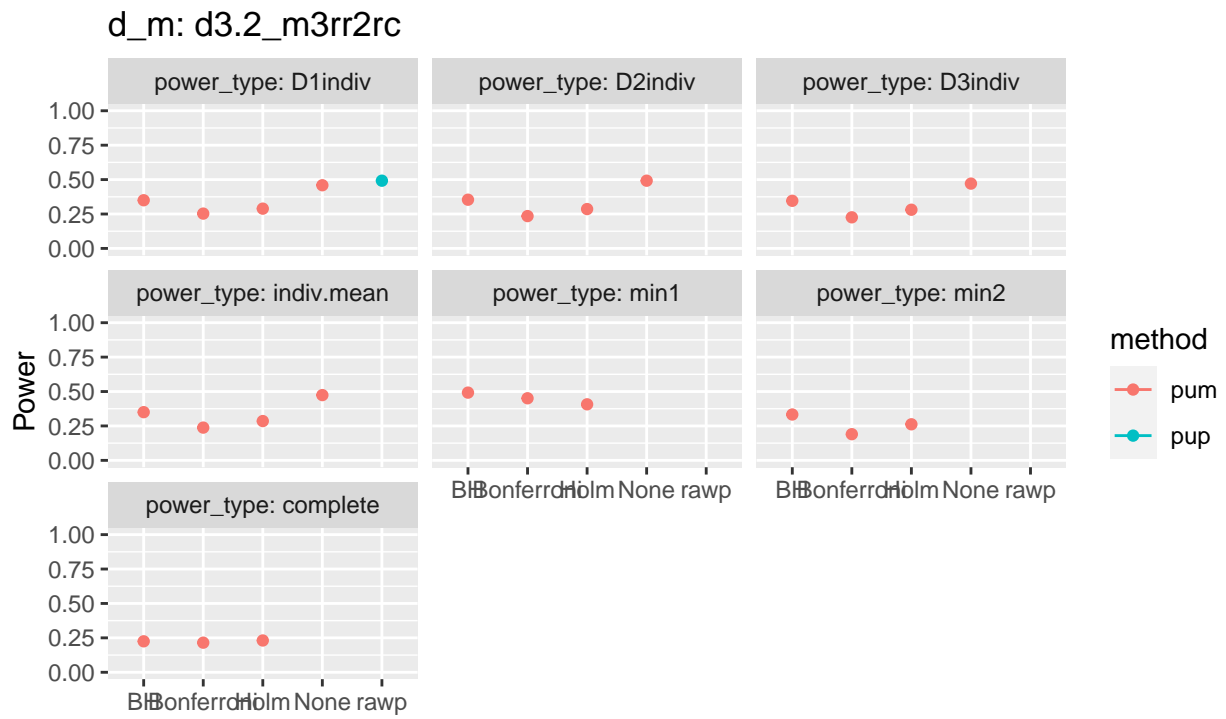
$$R_1^2 = 0.6, 0.6, 0.6$$



$R_2^2 = 0.6, 0.6, 0.6$

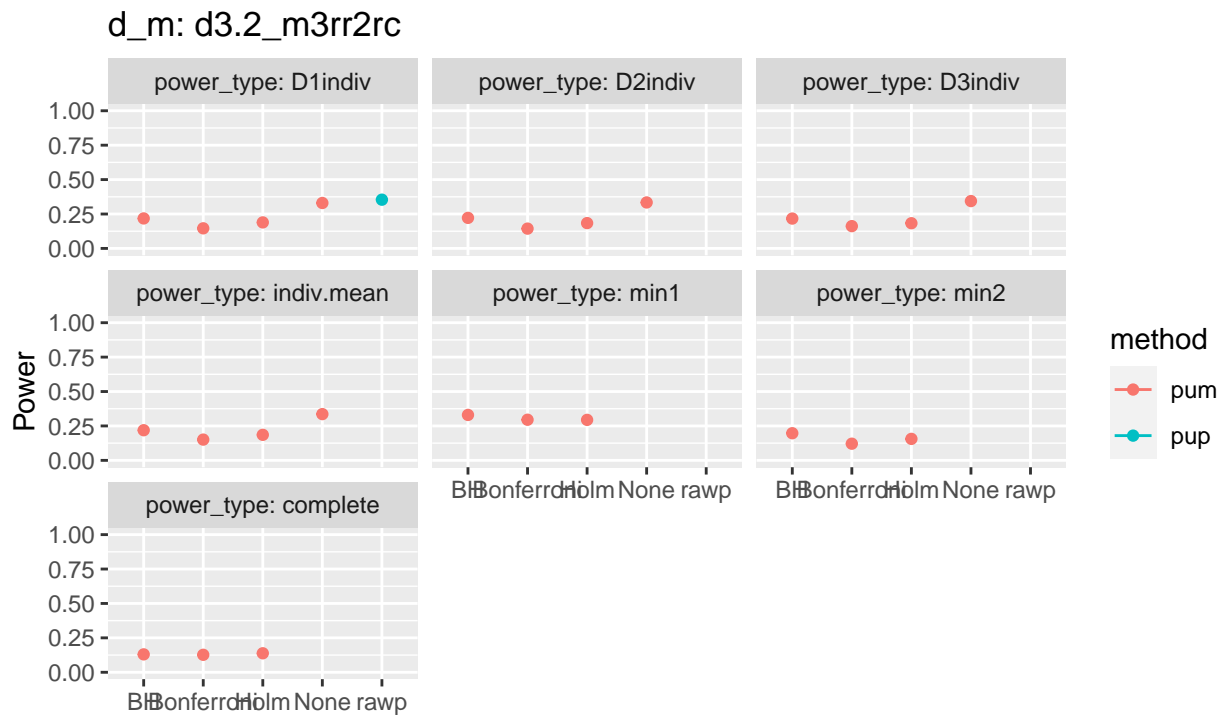
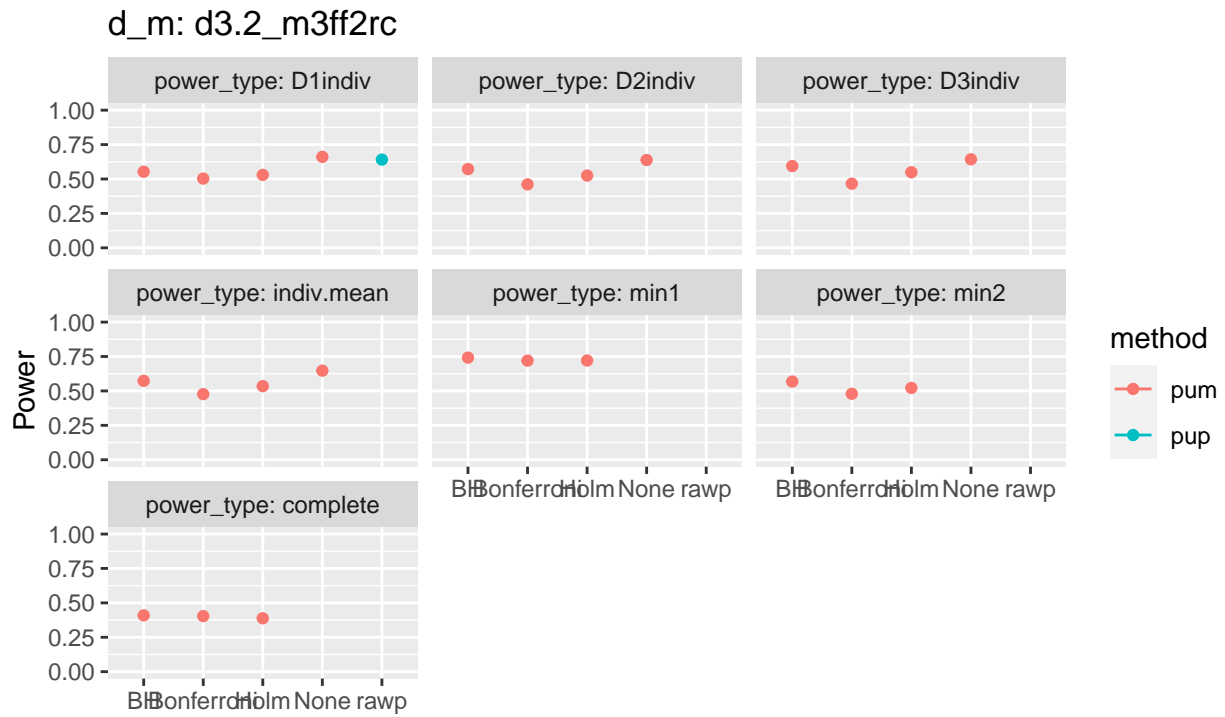


MTP



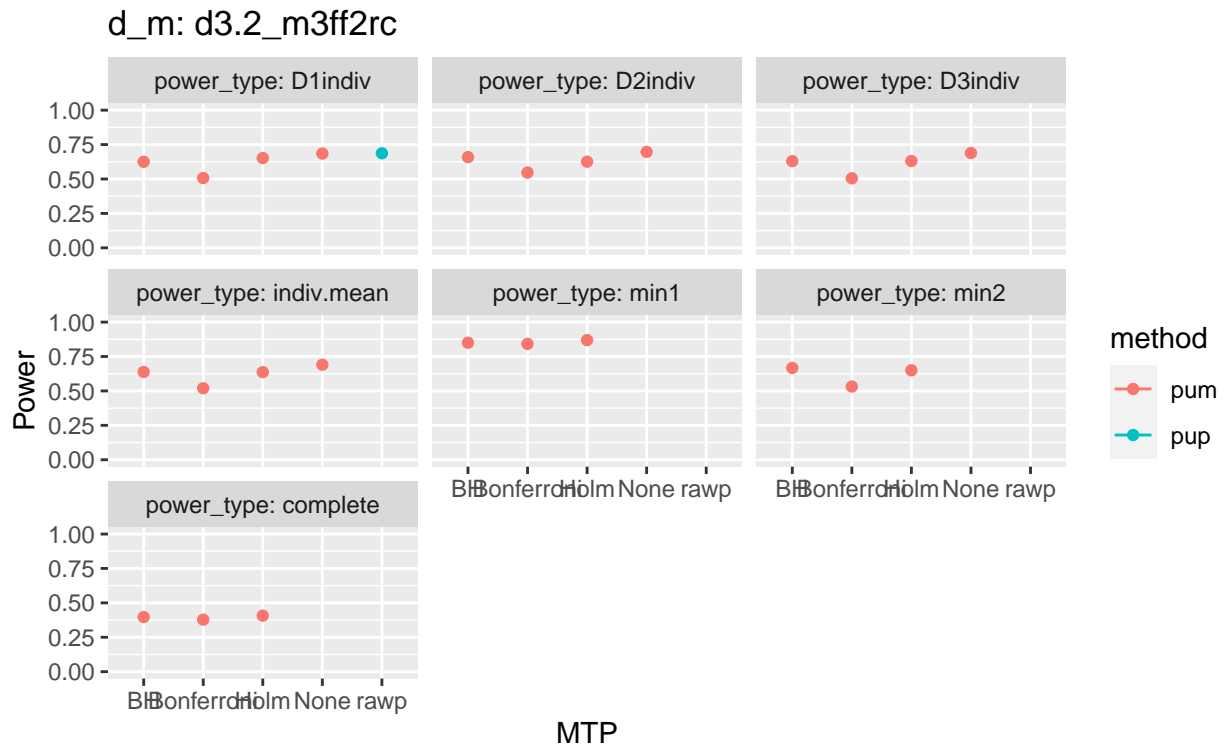
MTP

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

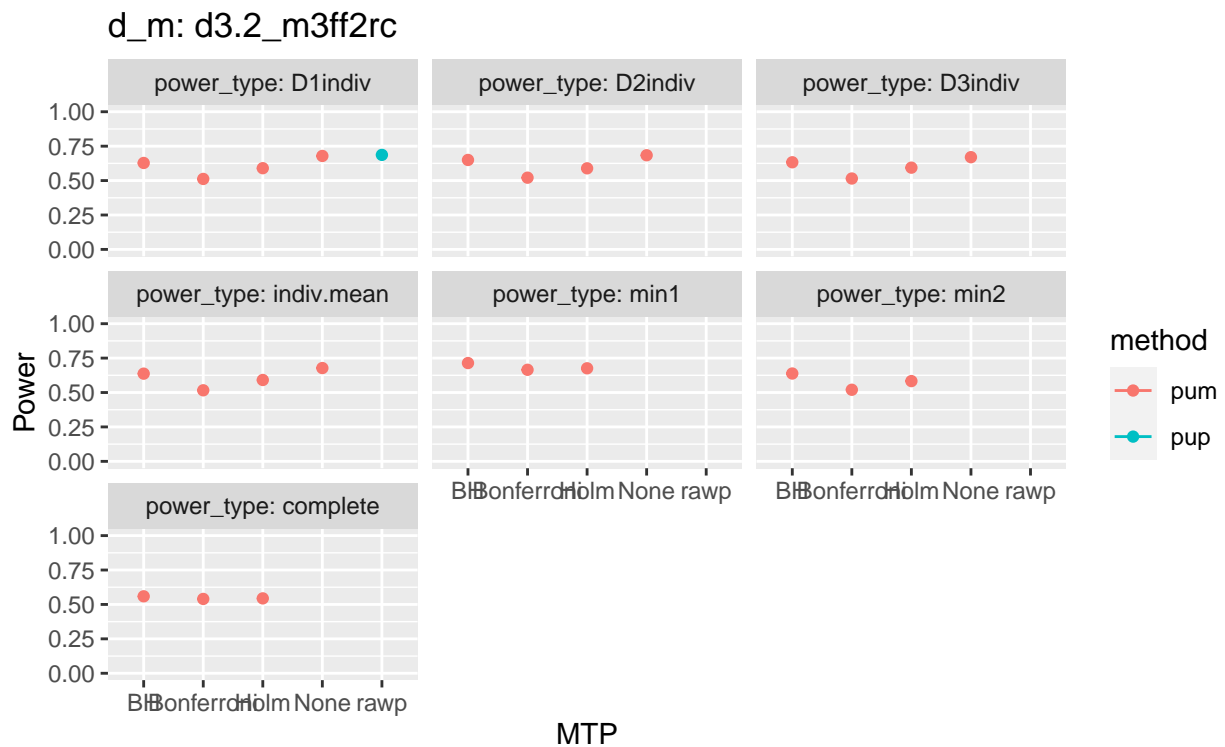


**Varying rho**

$$\rho = 0.2$$



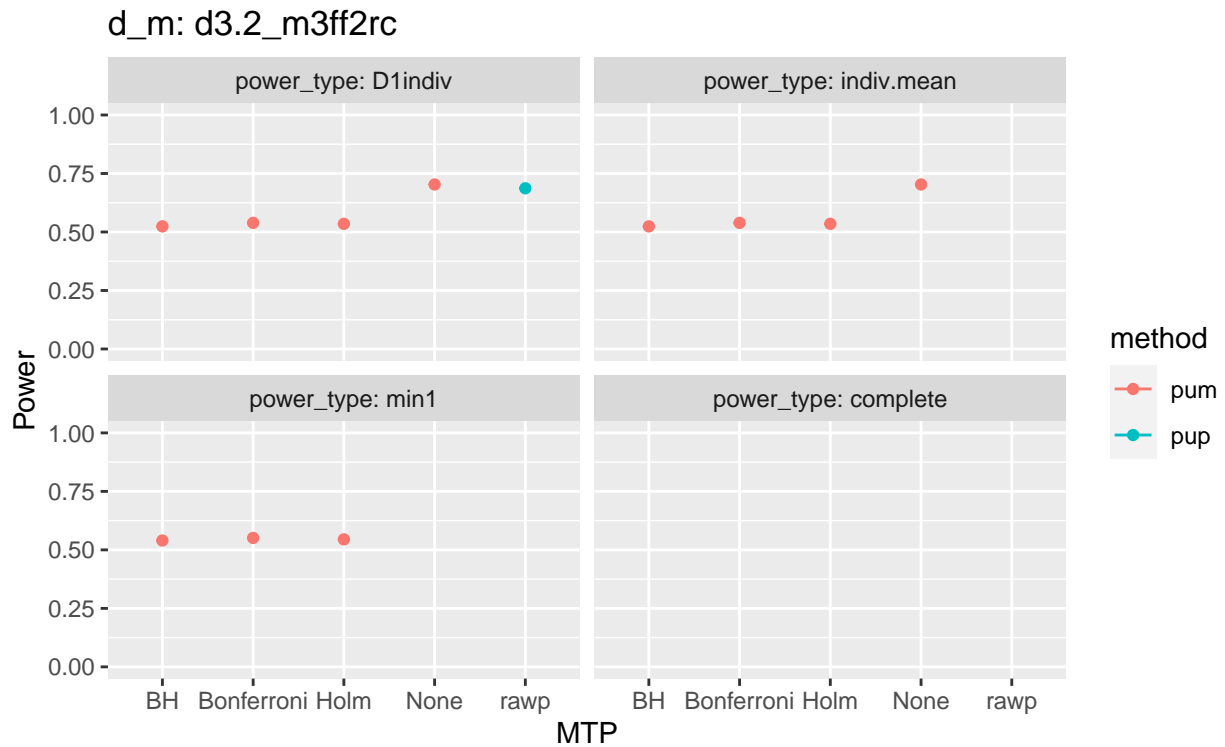
$\rho = 0.8$



Varying true positives

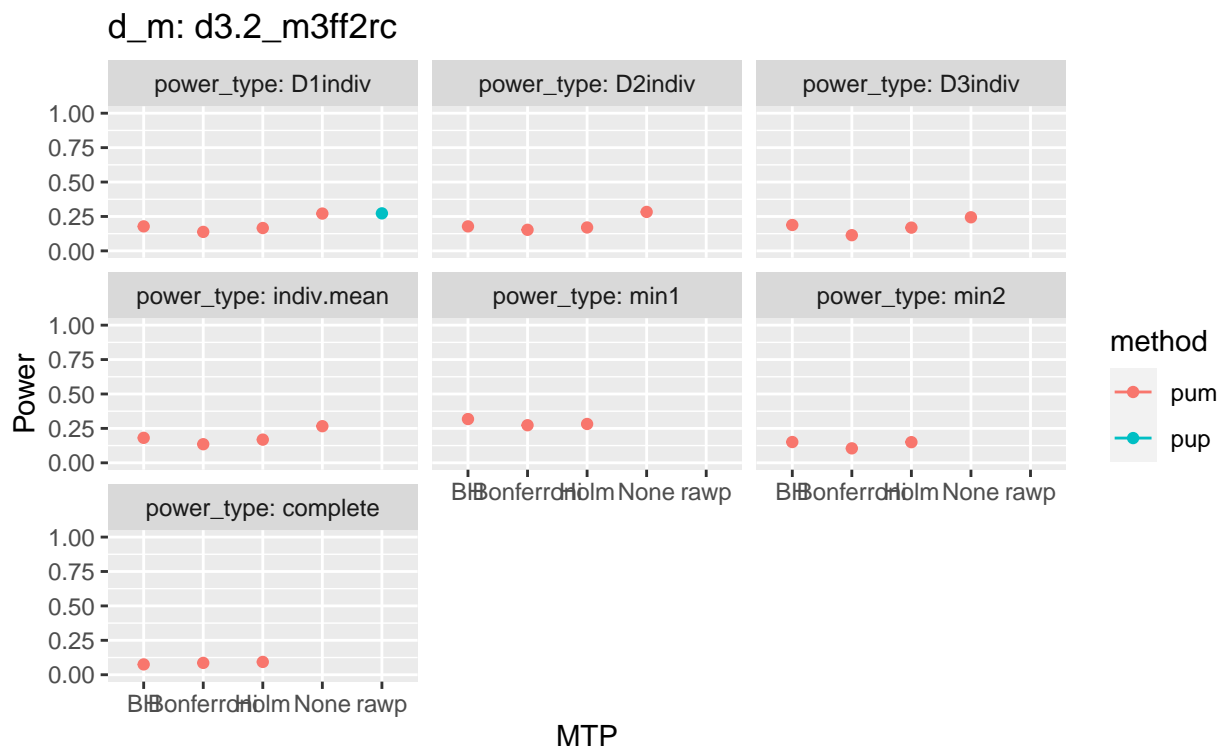
MDES = 0.125, 0, 0

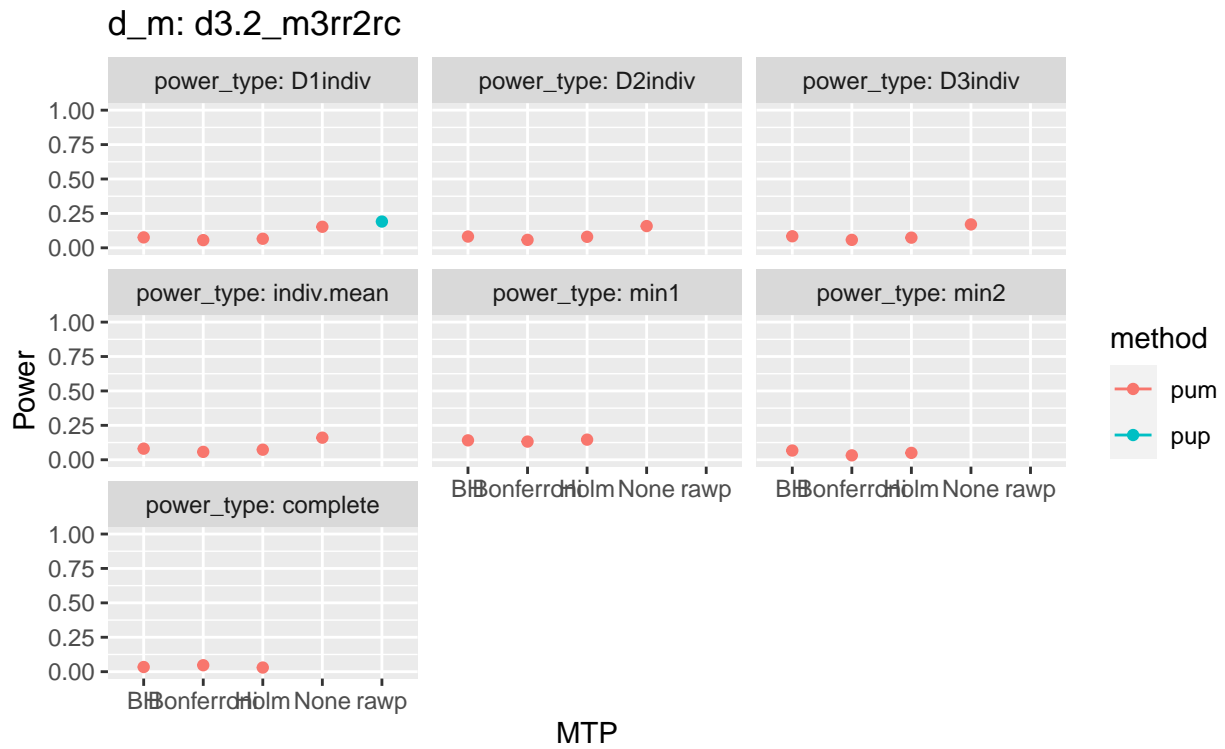




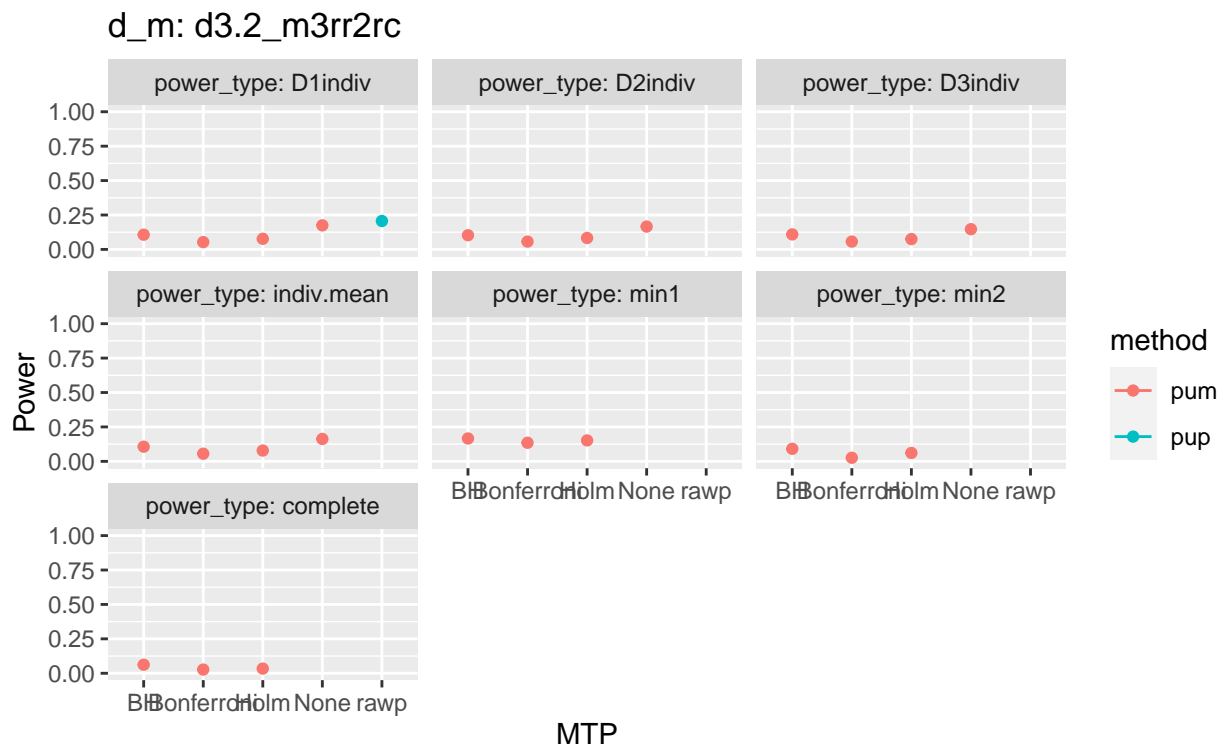
## Varying ICC

ICC<sub>2</sub> = 0.7, 0.7, 0.7

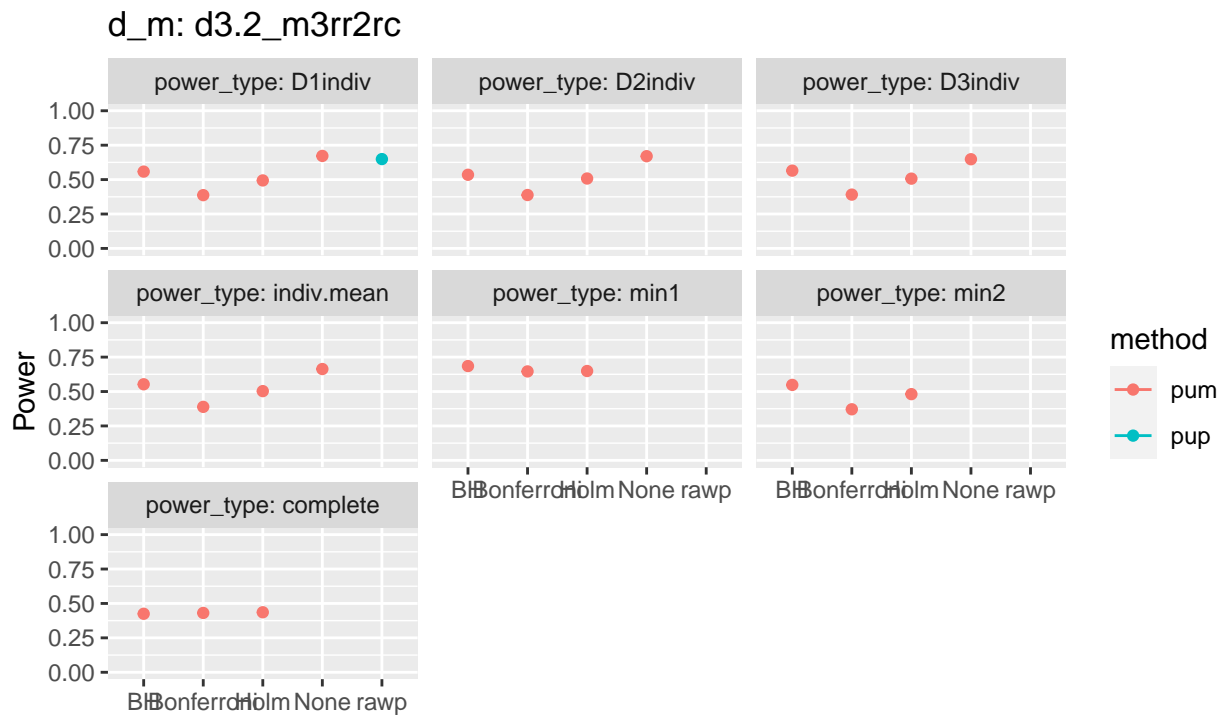
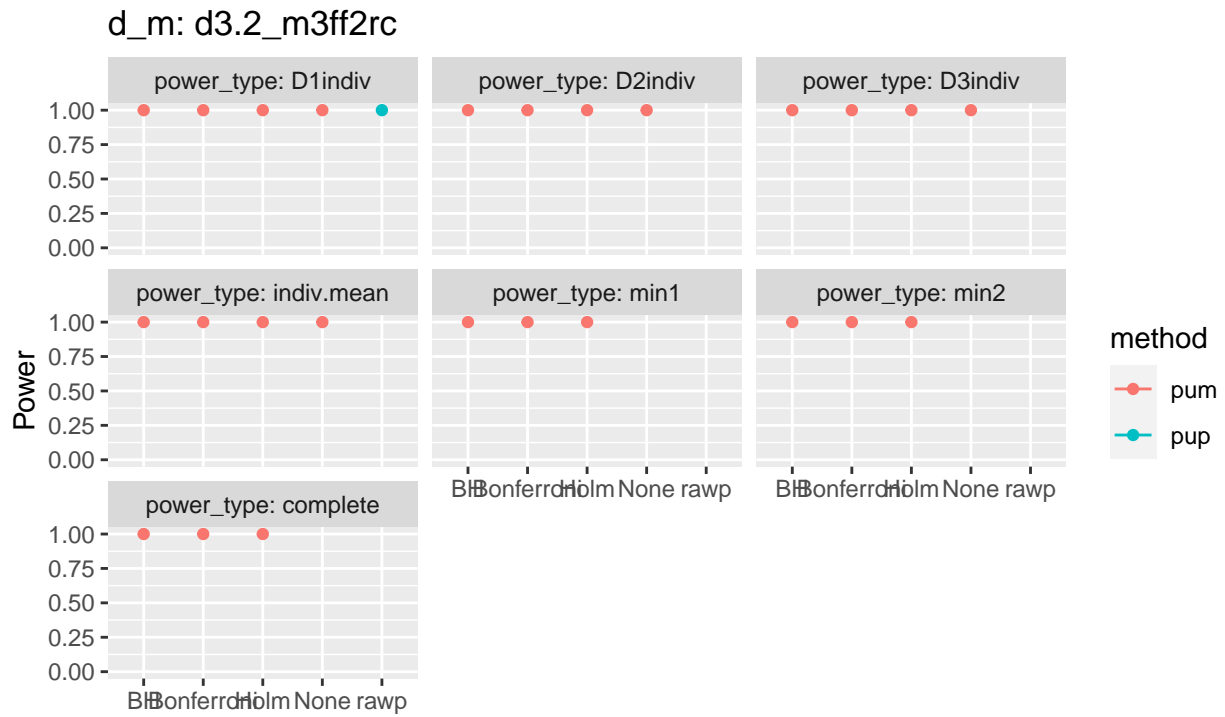




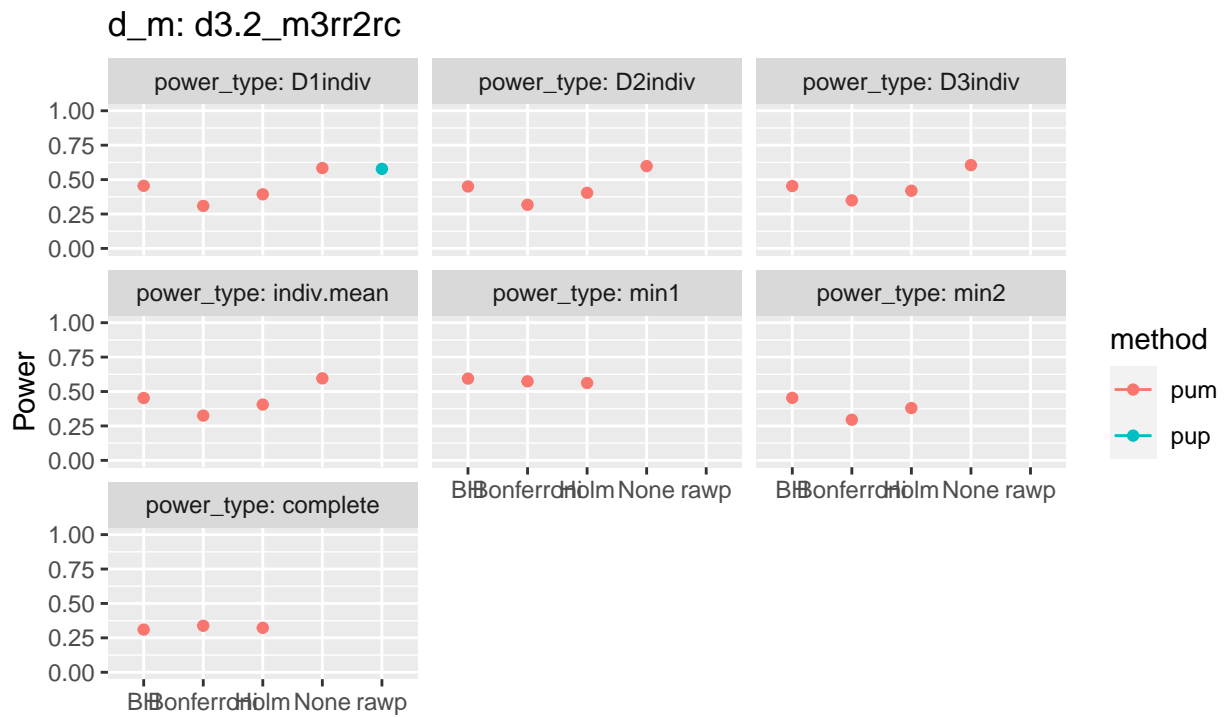
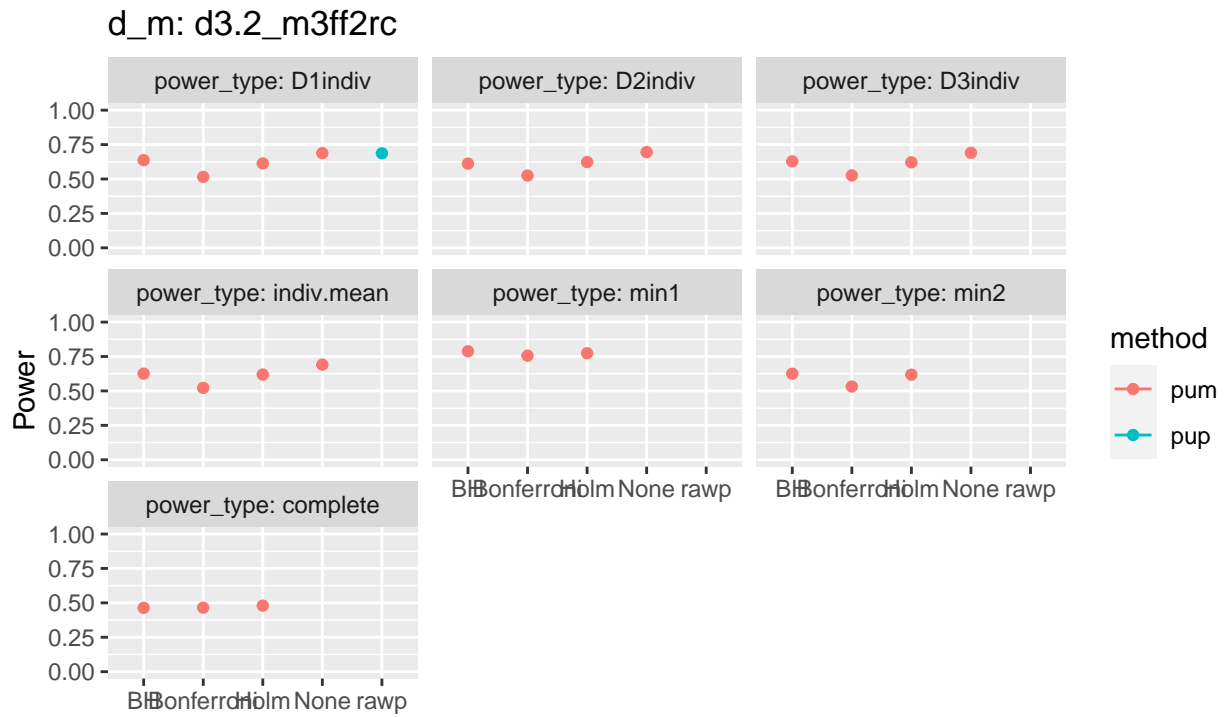
ICC<sub>3</sub> = 0.7, 0.7, 0.7



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



ICC<sub>2</sub> = 0.2, 0.2, 0.2

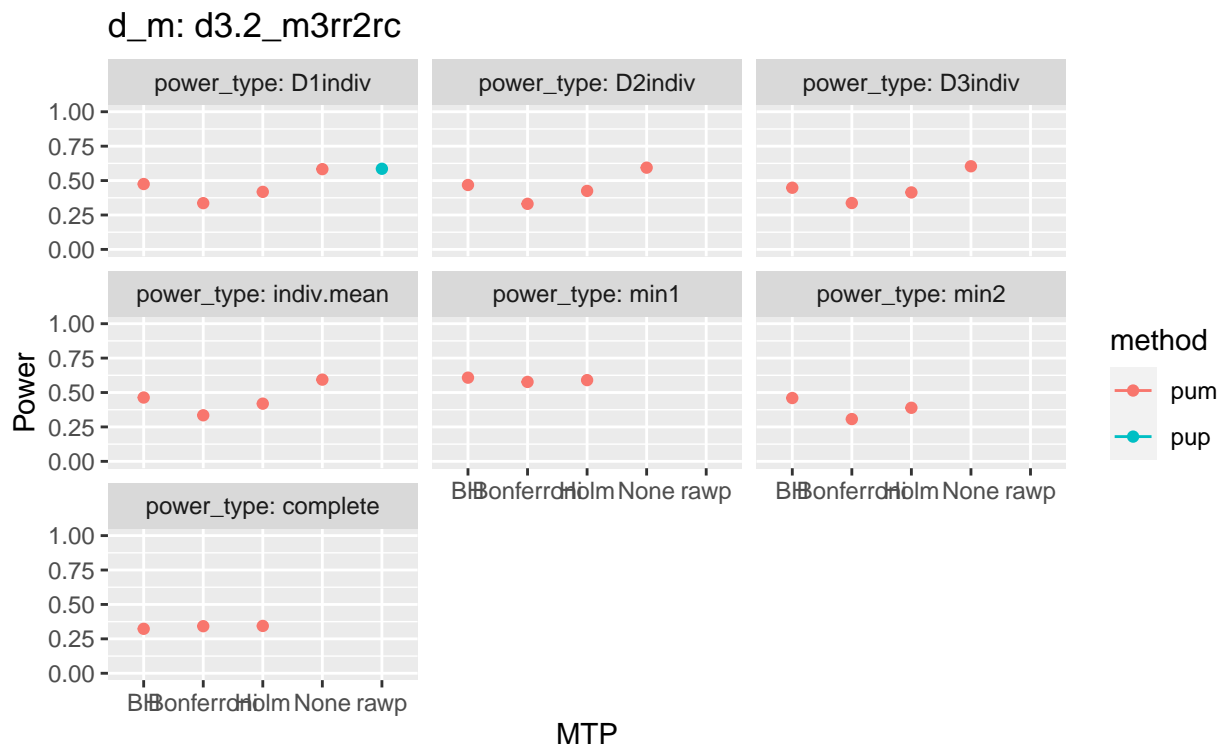


## Varying Omega

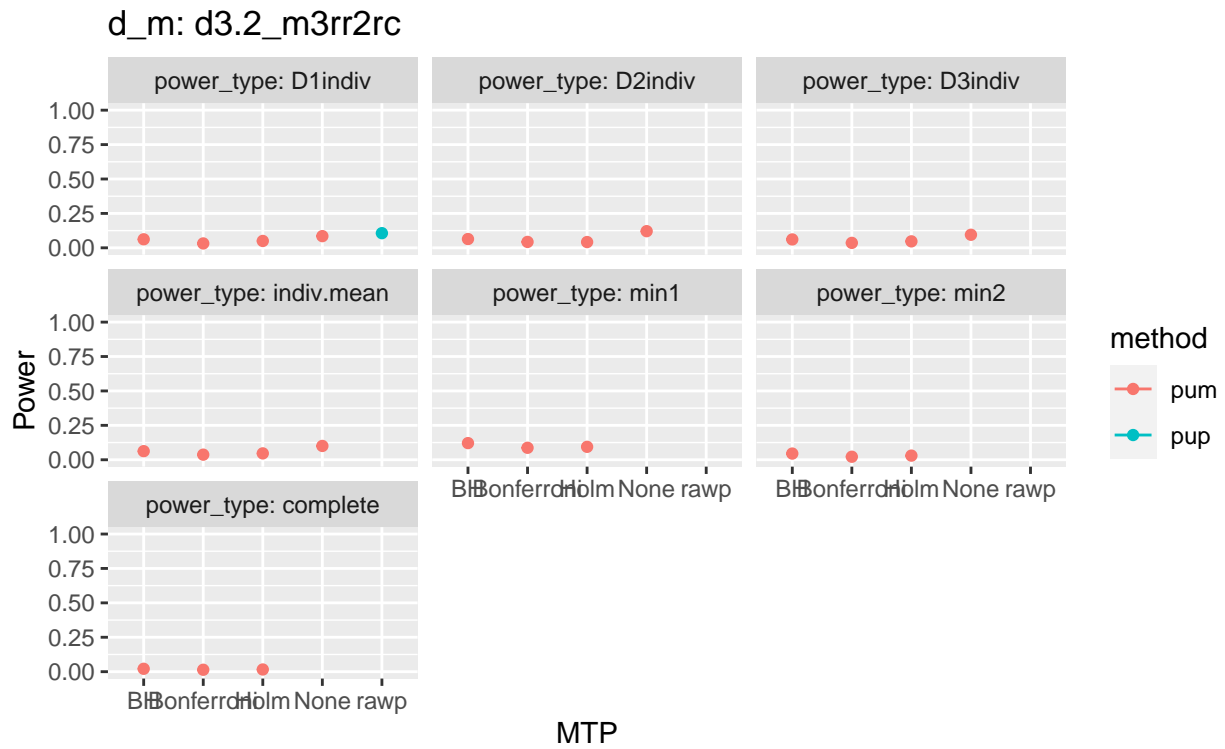
$$\omega_3 = 0.8, 0.8, 0.8$$



$\omega_3 = 0, 0, 0$  ICC<sub>3</sub> = 0.2, 0.2, 0.2

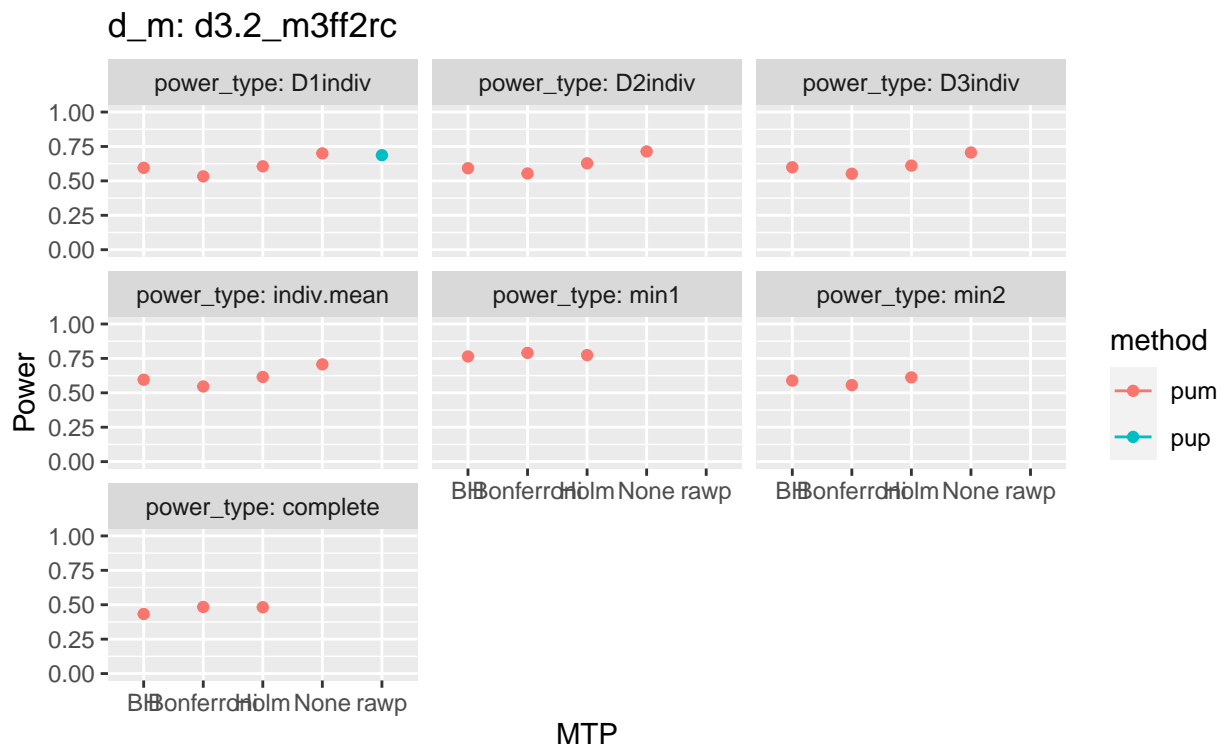


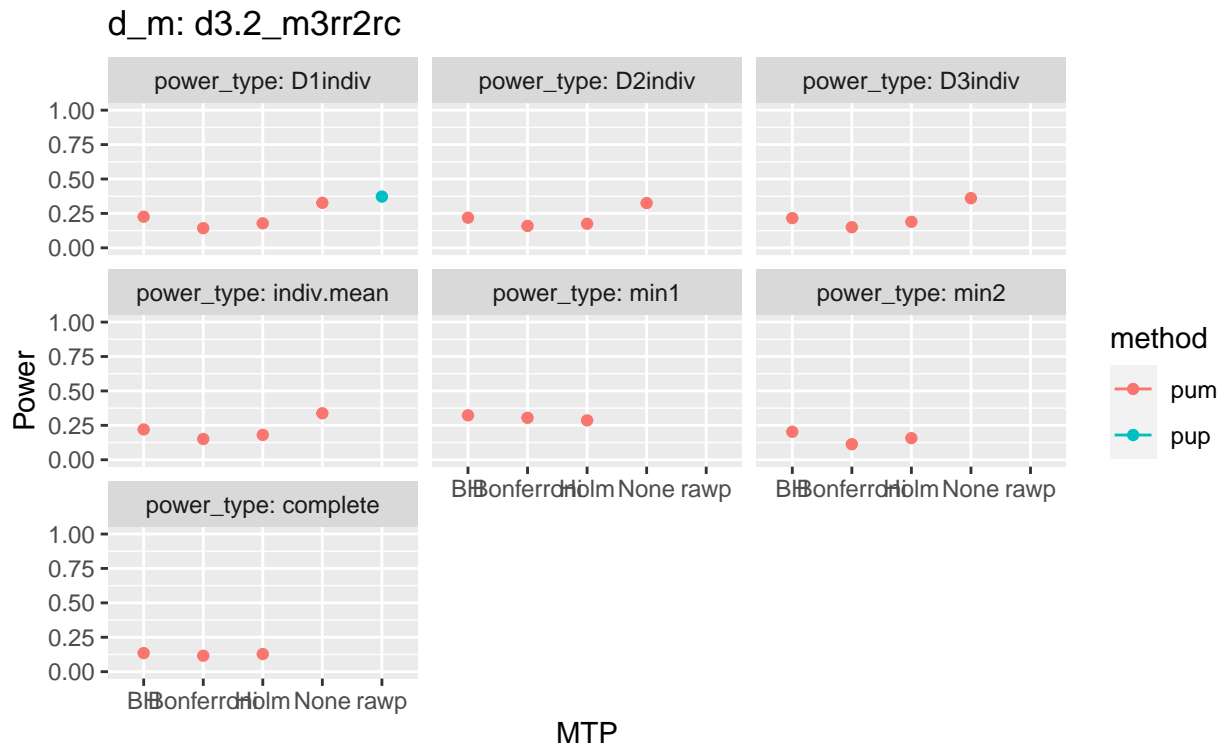
$\omega_3 = 0.8, 0.8, 0.8$  ICC<sub>3</sub> = 0.7, 0.7, 0.7



## Kappa

$\kappa = 0.4$





## MDES validation

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Adjusted MDES | D1indiv Power | Target MDES |
## +-----+-----+-----+-----+
## | Bonferroni |      0.126    |      0.533    |      0.125    |
## +-----+-----+-----+-----+
## |      BH      |      0.122    |      0.602    |      0.125    |
## +-----+-----+-----+-----+
## |      Holm     |      0.125    |      0.61     |      0.125    |
## +-----+-----+-----+-----+
##
## Table: d3.2_m3ff2rc
##
##
## +-----+-----+-----+-----+
## |      MTP      | Adjusted MDES | D1indiv Power | Target MDES |
## +-----+-----+-----+-----+
## | Bonferroni |      0.121    |      0.143    |      0.125    |
## +-----+-----+-----+-----+
## |      BH      |      0.124    |      0.219    |      0.125    |
## +-----+-----+-----+-----+
## |      Holm     |      0.122    |      0.183    |      0.125    |
## +-----+-----+-----+-----+
##
## Table: d3.2_m3rr2rc
```

## Sample size validation

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      J      |      30      |      0.533      |
## +-----+-----+-----+-----+
## |      BH      |      J      |      29      |      0.591      |
## +-----+-----+-----+-----+
## |      Holm     |      J      |      30      |      0.601      |
## +-----+-----+-----+-----+
##
## Table: d3.2_m3ff2rc
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      K      |      10      |      0.533      |
## +-----+-----+-----+-----+
## |      BH      |      K      |      10      |      0.597      |
## +-----+-----+-----+-----+
## |      Holm     |      K      |      10      |      0.598      |
## +-----+-----+-----+-----+
##
## Table: d3.2_m3ff2rc
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |     nbar     |     61.38     |      0.533      |
## +-----+-----+-----+-----+
## |      BH      |     nbar     |      NA      |      NA      |
## +-----+-----+-----+-----+
## |      Holm     |     nbar     |      NA      |      NA      |
## +-----+-----+-----+-----+
##
## Table: d3.2_m3ff2rc
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      J      |      27      |      0.143      |
## +-----+-----+-----+-----+
## |      BH      |      J      |      30      |      0.222      |
## +-----+-----+-----+-----+
## |      Holm     |      J      |      28      |      0.18      |
## +-----+-----+-----+-----+
```



```
##
## Table: d3.2_m3rr2rc
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      K      |      10     |      0.143     |
## +-----+-----+-----+-----+
## |      BH      |      K      |      10     |      0.222     |
## +-----+-----+-----+-----+
## |      Holm     |      K      |      10     |      0.169     |
## +-----+-----+-----+-----+
##
## Table: d3.2_m3rr2rc
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |     nbar    |     16.84    |      0.143     |
## +-----+-----+-----+-----+
## |      BH      |     nbar    |      45     |      0.223     |
## +-----+-----+-----+-----+
## |      Holm     |     nbar    |      13     |      0.169     |
## +-----+-----+-----+-----+
##
## Table: d3.2_m3rr2rc
```