

Validate Power: d3.3

December 25, 2021

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

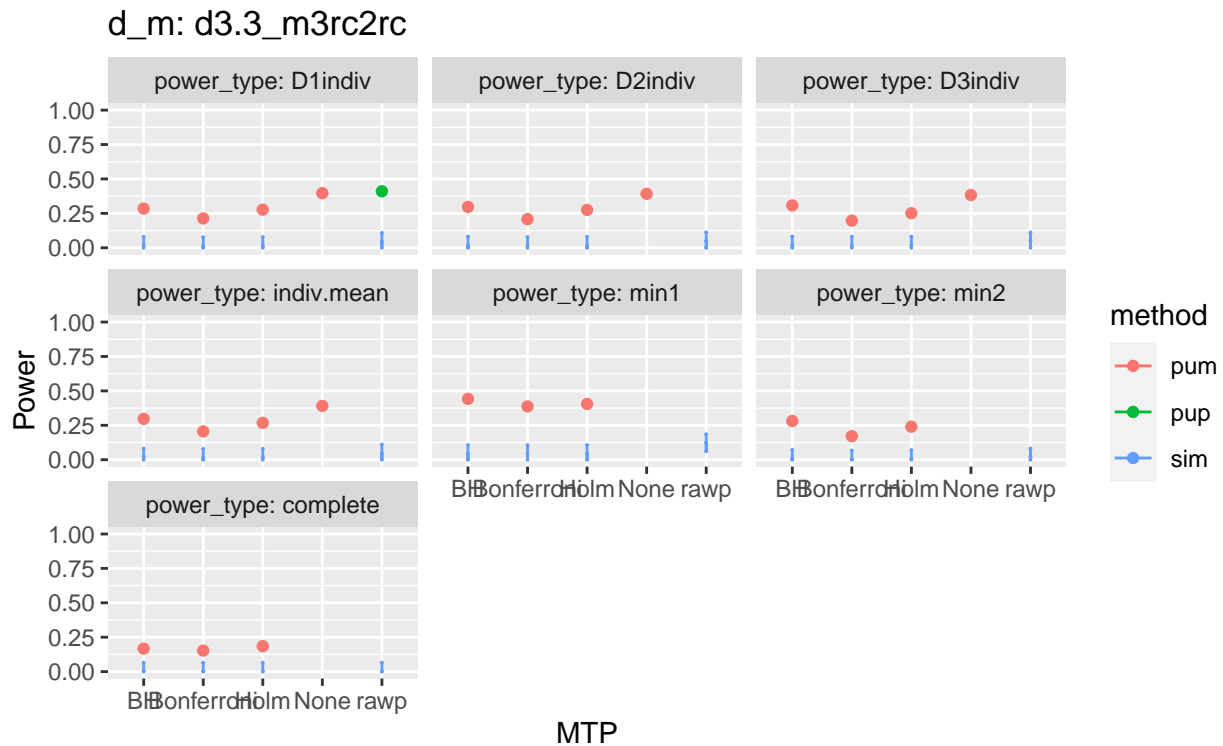
Models: random treatment effects.

Power Validation

Default parameters:

- $M = 3$
- $J = 40$
- $K = 20$
- rho: $\rho = 0.5$
- MDES = 0.25, 0.25, 0.25
- R2: $R_1^2 = 0.1, 0.1, 0.1, R_2^2 = 0.1, 0.1, 0.1, R_3^2 = 0.1, 0.1, 0.1$
- ICC: $ICC_2 = 0.1, 0.1, 0.1, ICC_3 = 0.1, 0.1, 0.1$
- Omega: $\omega_2 = 0, \omega_3 = 0$

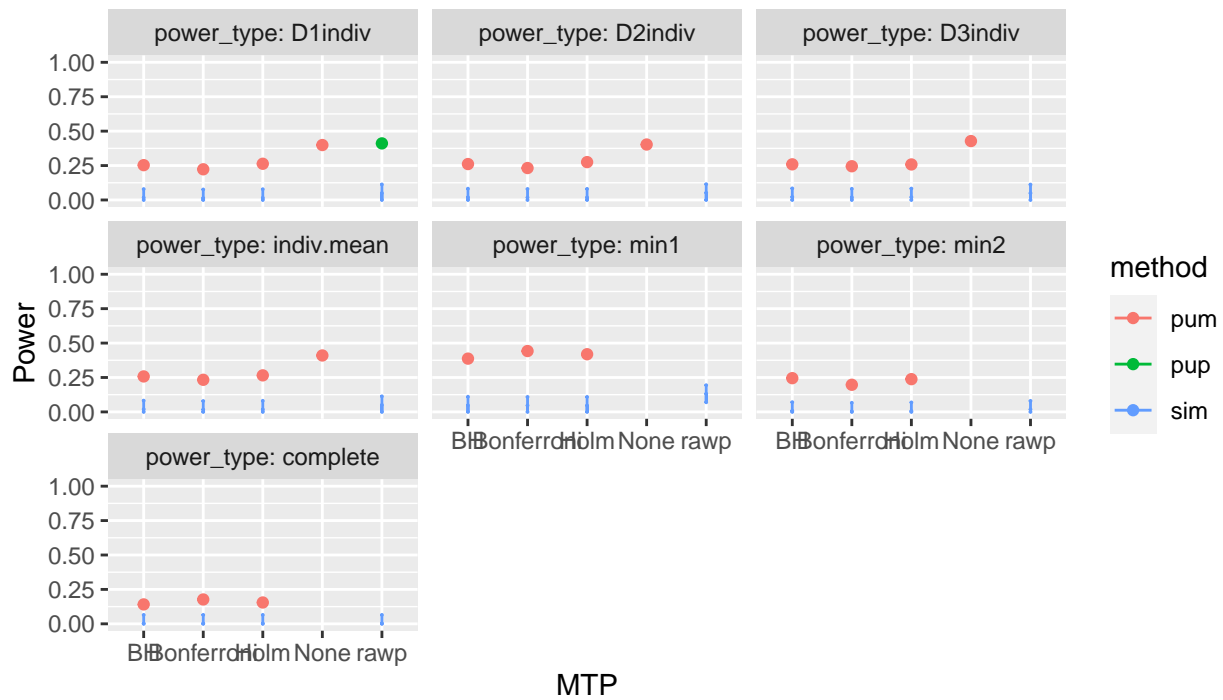
Base case



Varying school size

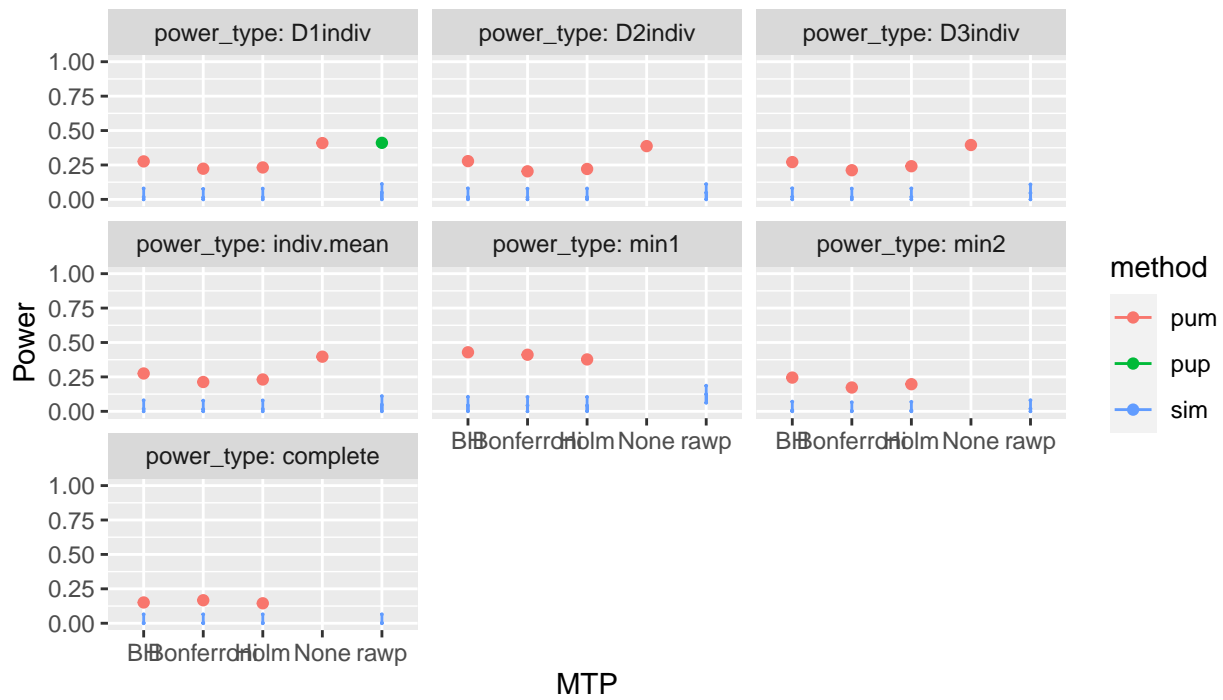
$\bar{n} = 100$

d_m: d3.3_m3rc2rc



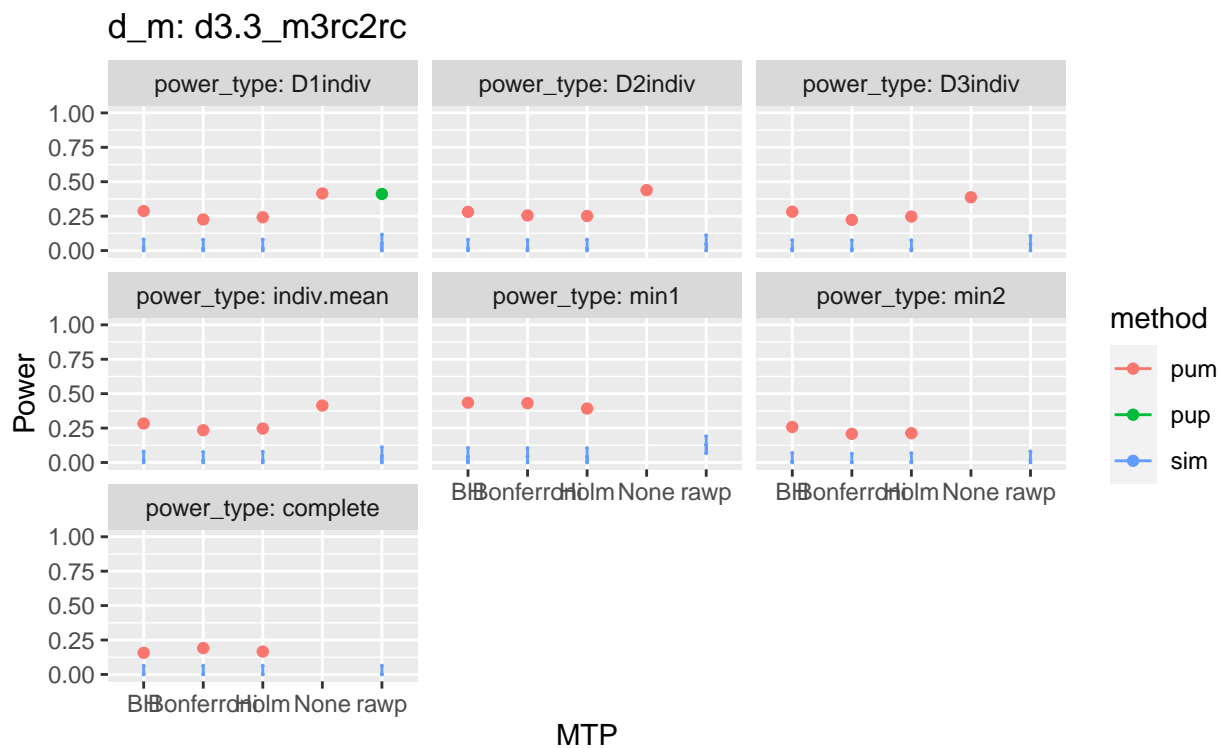
$\bar{n} = 75$

d_m: d3.3_m3rc2rc

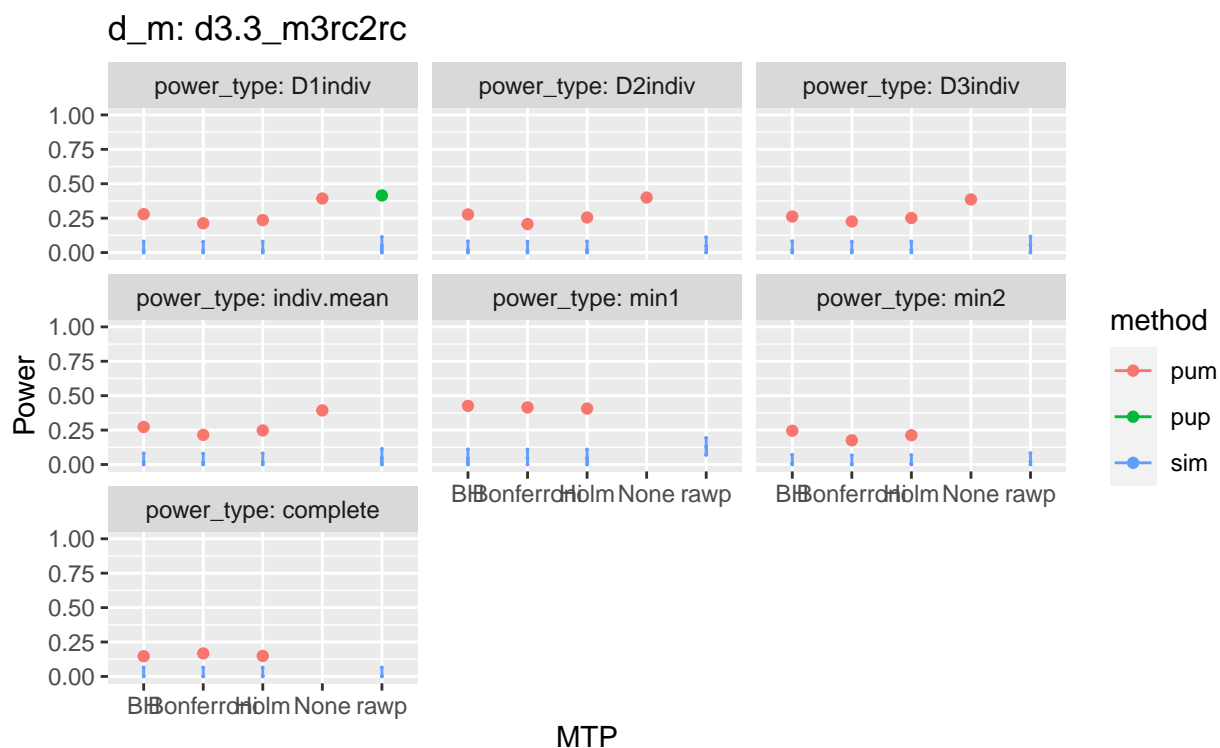


Varying R2

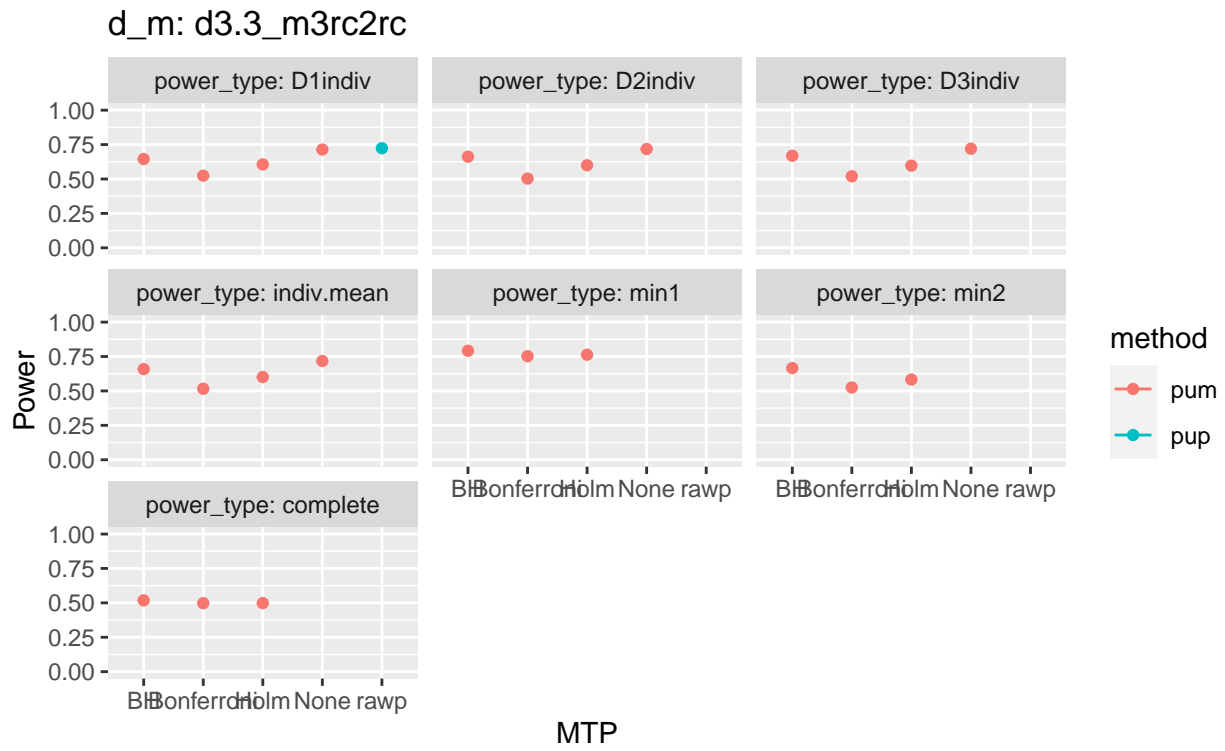
$$R_1^2 = 0.6, 0.6, 0.6$$



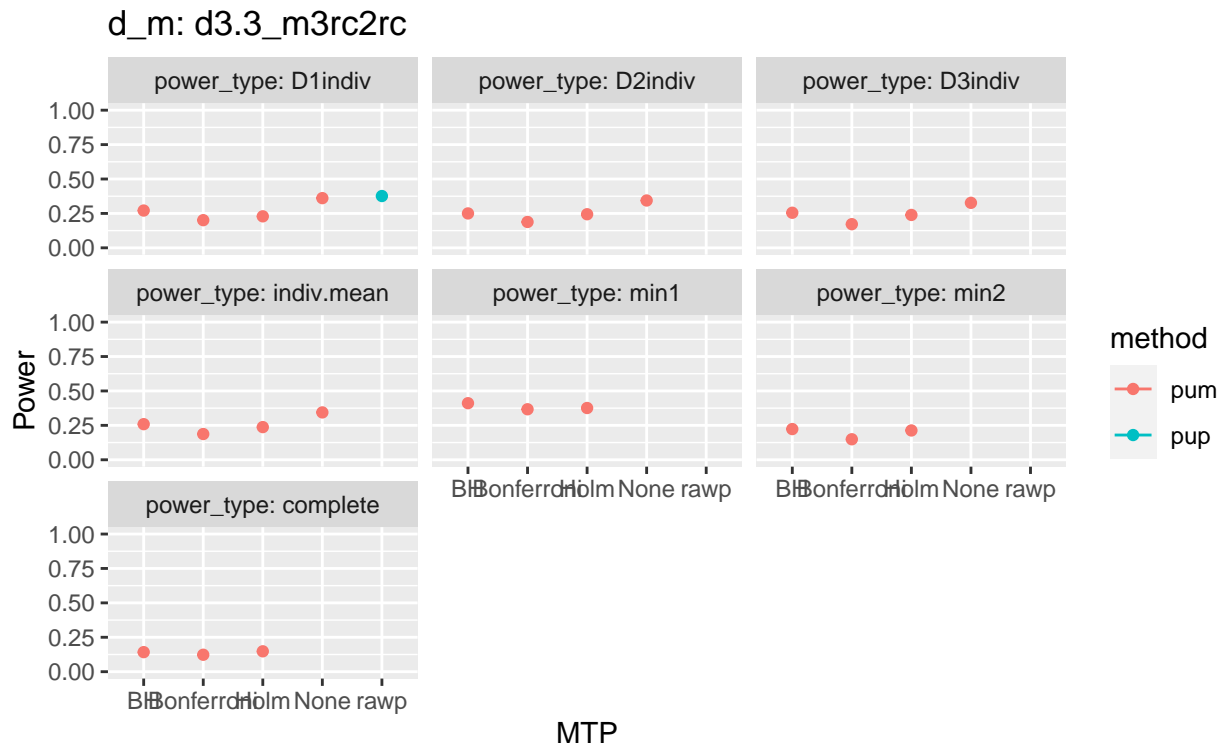
$$R_2^2 = 0.6, 0.6, 0.6$$



$$R_3^2 = 0.6, 0.6, 0.6$$

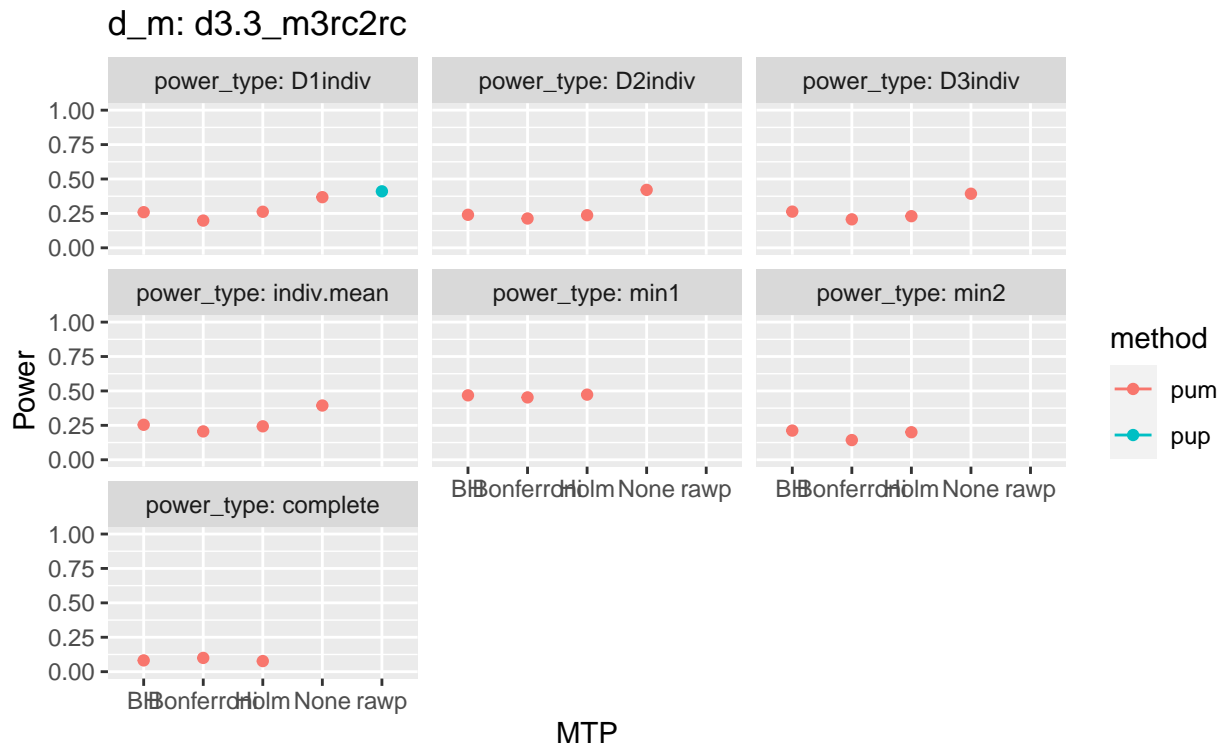


$$R_1^2 = 0, 0, 0 \quad R_2^2 = 0, 0, 0 \quad R_3^2 = 0, 0, 0$$

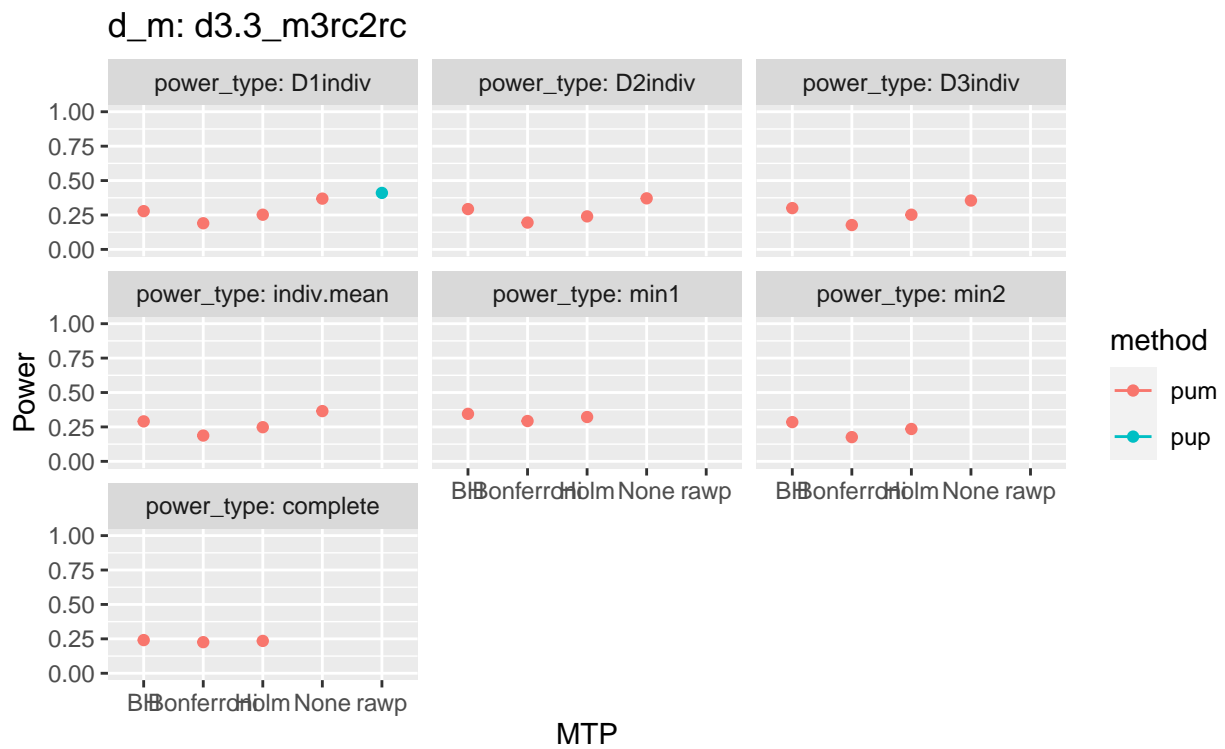


Varying rho

$$\rho = 0.2$$

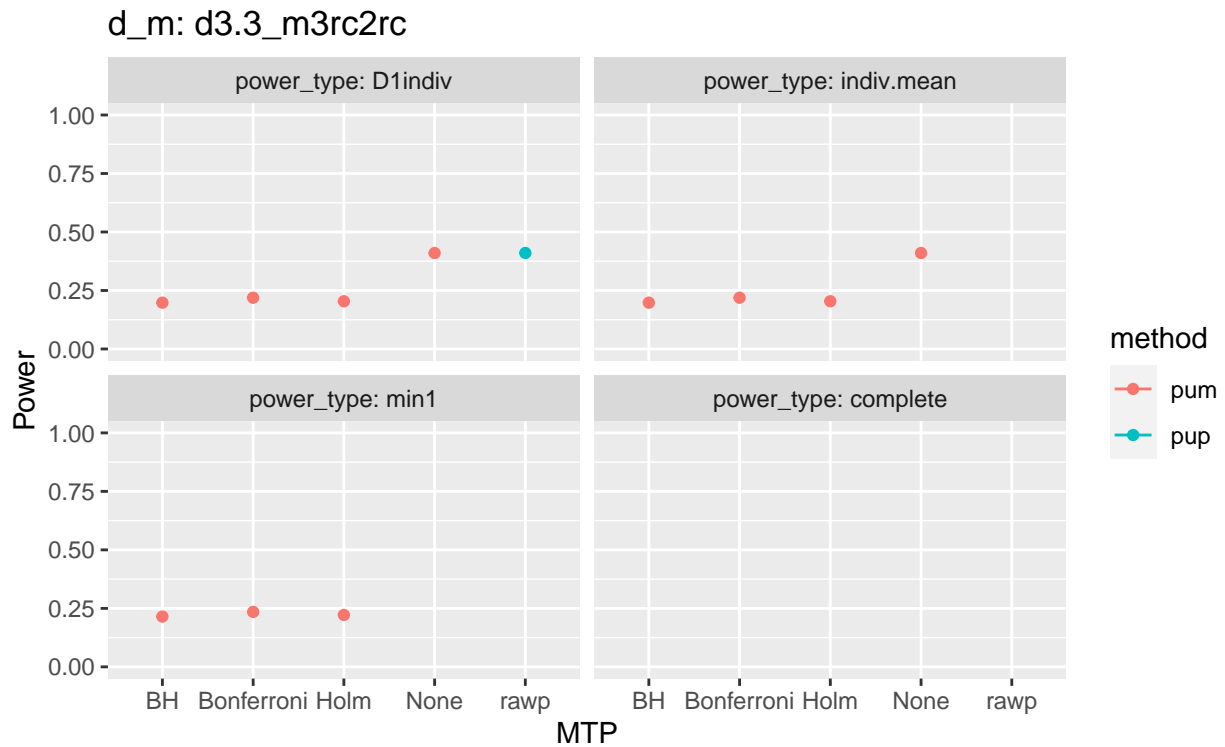


$\rho = 0.8$



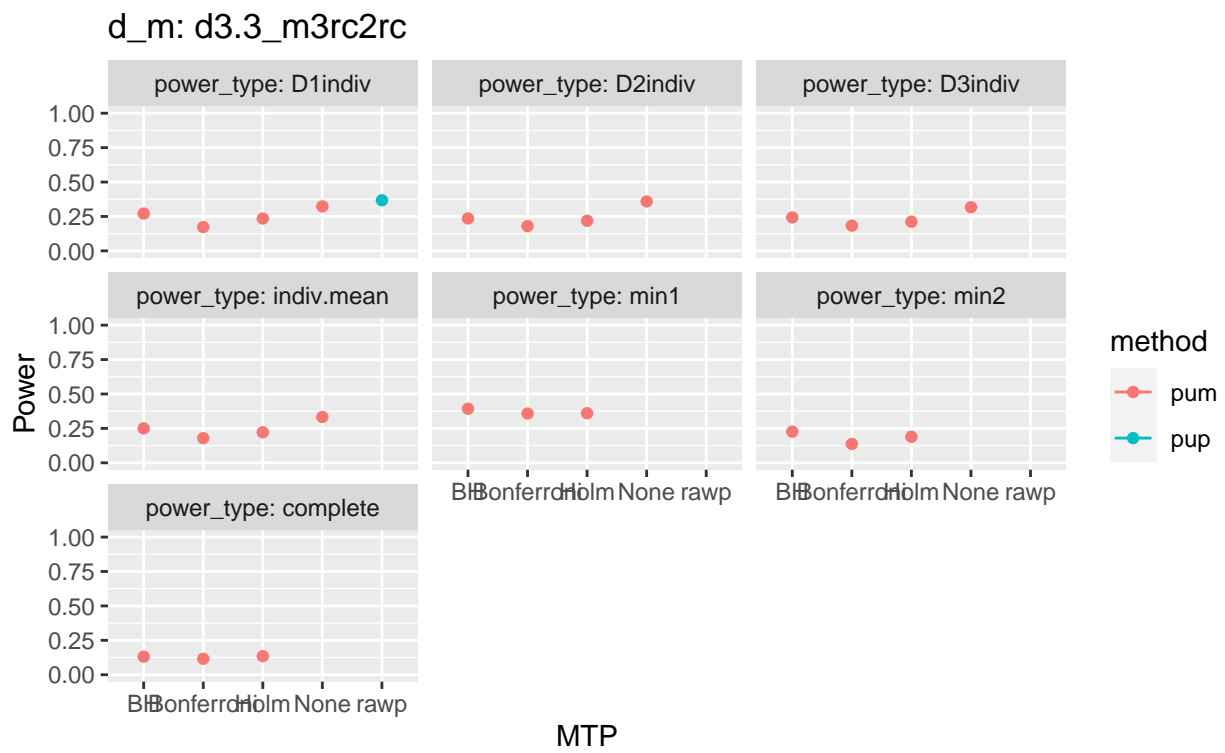
Varying true positives

MDES = 0.25, 0, 0

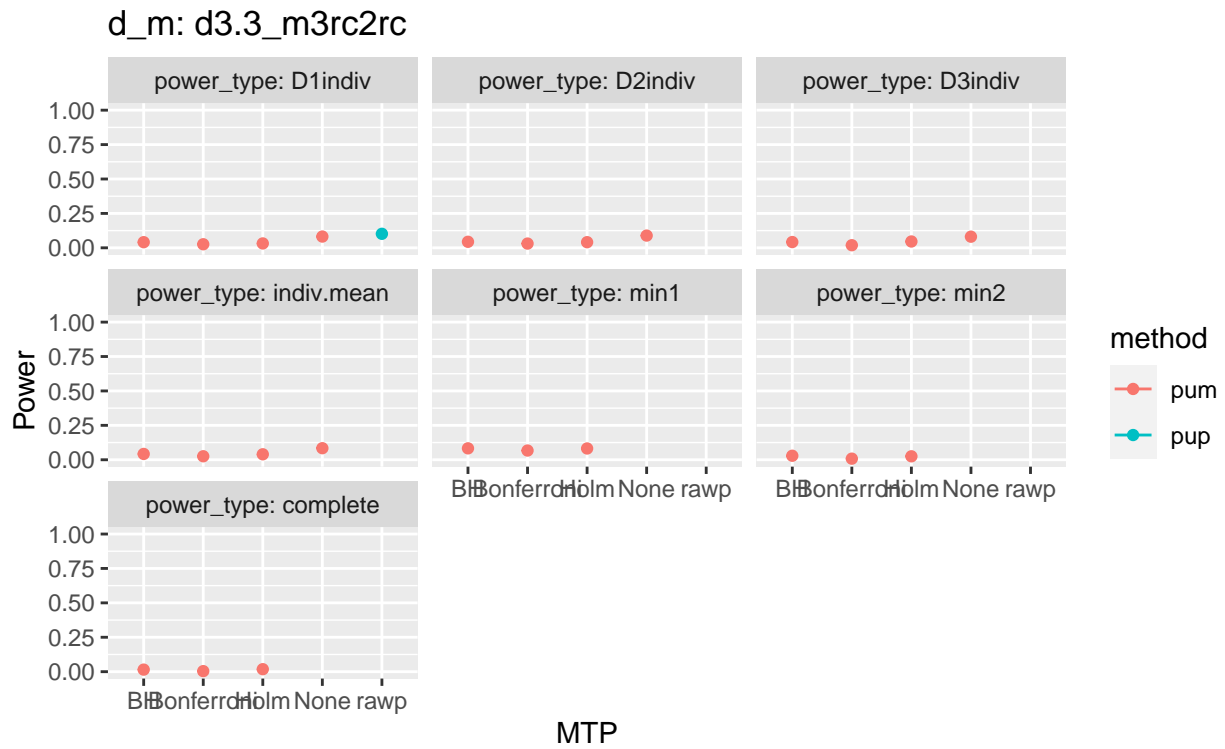


Varying ICC

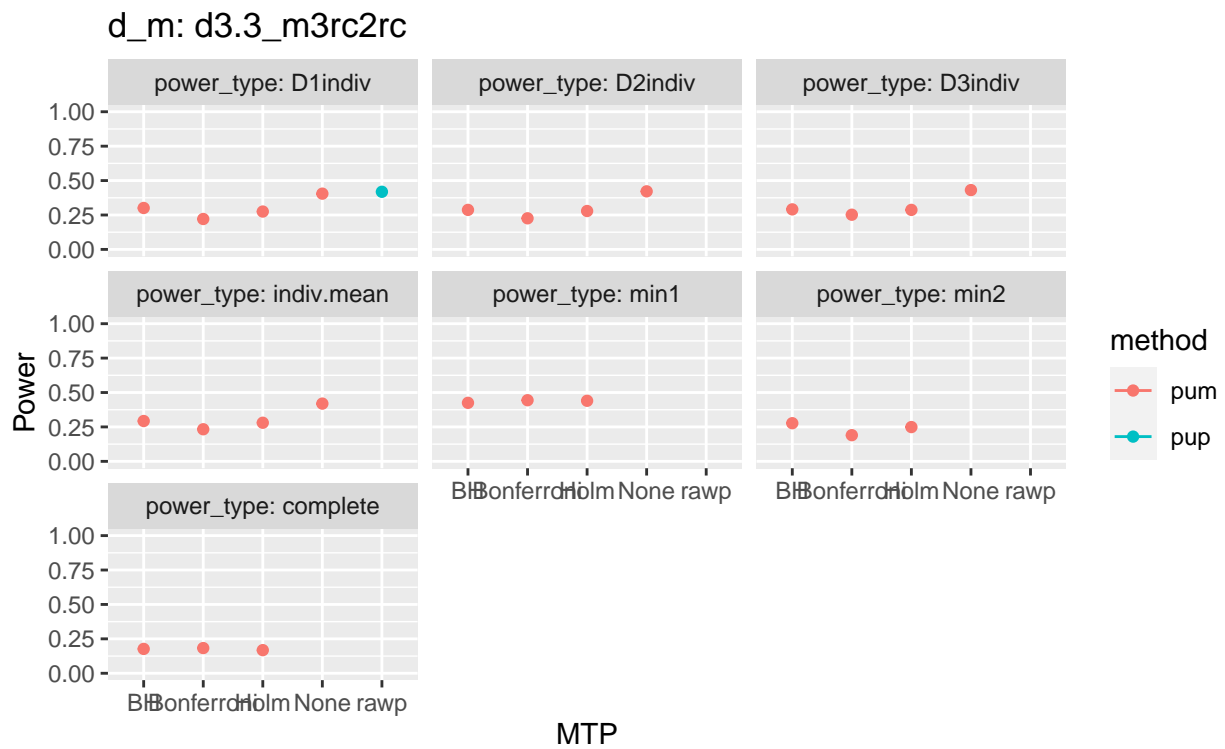
ICC₂ = 0.7, 0.7, 0.7



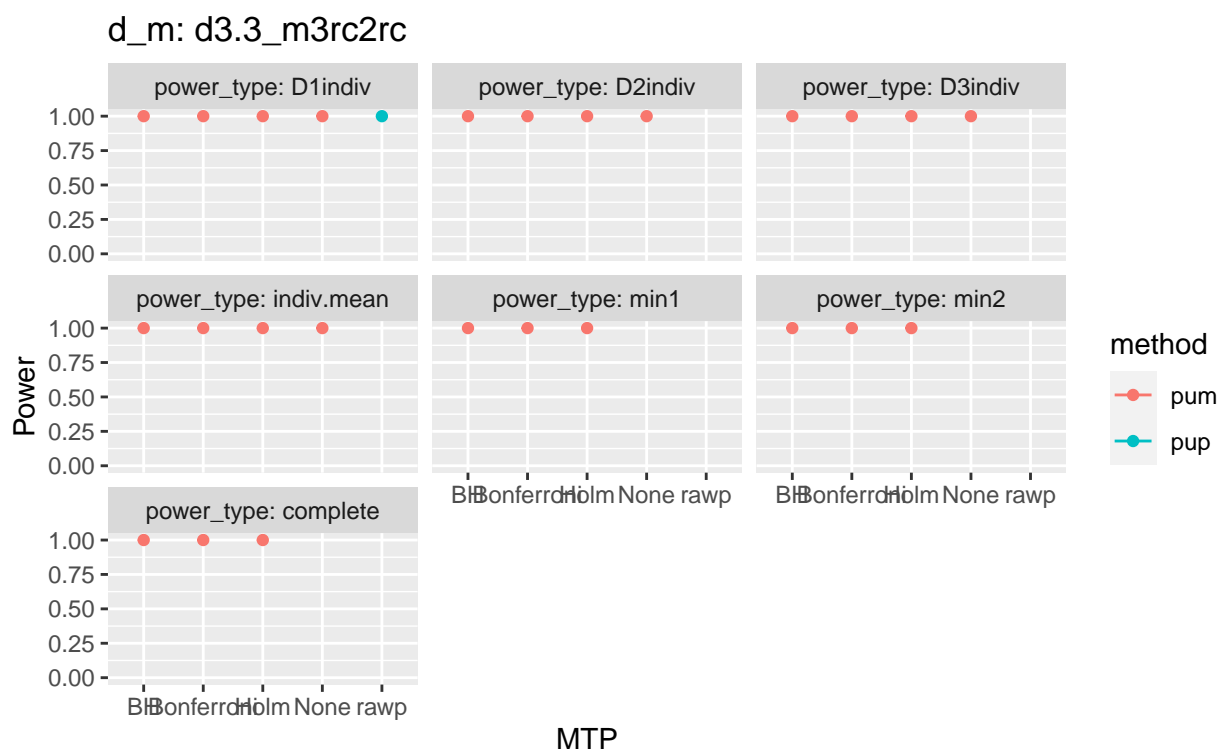
ICC₃ = 0.7, 0.7, 0.7



ICC₂ = 0, 0, 0

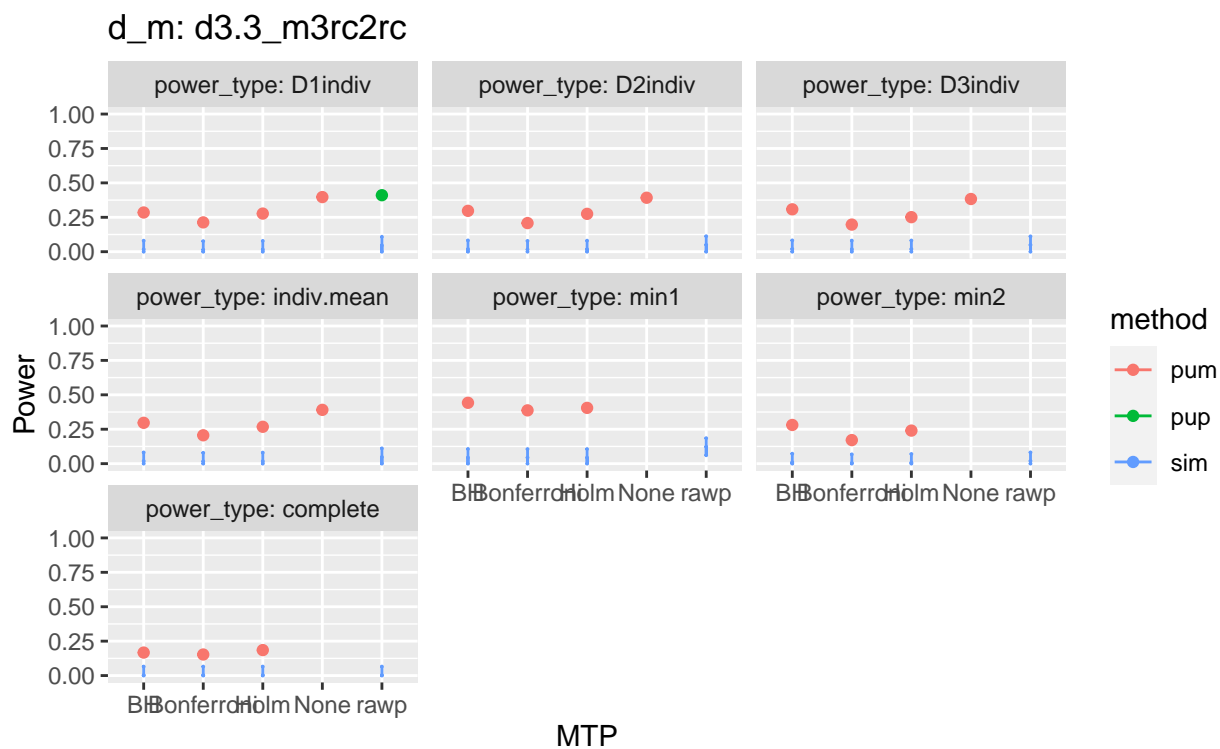


ICC₃ = 0, 0, 0



Kappa

$\kappa = 0.4$



MDES validation

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Adjusted MDES | D1indiv Power | Target MDES |
## +=====+=====+=====+=====+
## | Bonferroni |    0.2503    |    0.213      |    0.25      |
## +-----+-----+-----+-----+
## |      BH      |    0.2485    |    0.2772     |    0.25      |
## +-----+-----+-----+-----+
## |      Holm     |    0.2566    |    0.2722     |    0.25      |
## +-----+-----+-----+-----+
##
## Table: d3.3_m3rc2rc
```

Sample size validation

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      J      |      44     |    0.213      |
## +-----+-----+-----+-----+
## |      BH      |      J      |     225     |    0.2899     |
## +-----+-----+-----+-----+
## |      Holm     |      J      |    1500     |    0.2679     |
## +-----+-----+-----+-----+
##
## Table: d3.3_m3rc2rc
```

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |      K      |      20     |    0.213      |
## +-----+-----+-----+-----+
## |      BH      |      K      |      20     |    0.2781     |
## +-----+-----+-----+-----+
## |      Holm     |      K      |      22     |    0.2849     |
## +-----+-----+-----+-----+
##
## Table: d3.3_m3rc2rc
```

```
##
##
## +-----+-----+-----+-----+
## |      MTP      | Sample.type | Sample.size | D1indiv.power |
## +=====+=====+=====+=====+
## | Bonferroni |    nbar     |    156.5    |    0.213      |
## +-----+-----+-----+-----+
```

##		BH		nbar		11		0.2796	
##	+-----+-----+-----+-----+								
##		Holm		nbar		NA		NA	
##	+-----+-----+-----+-----+								
##									
##	Table: d3.3_m3rc2rc								