MR-Meeting updates

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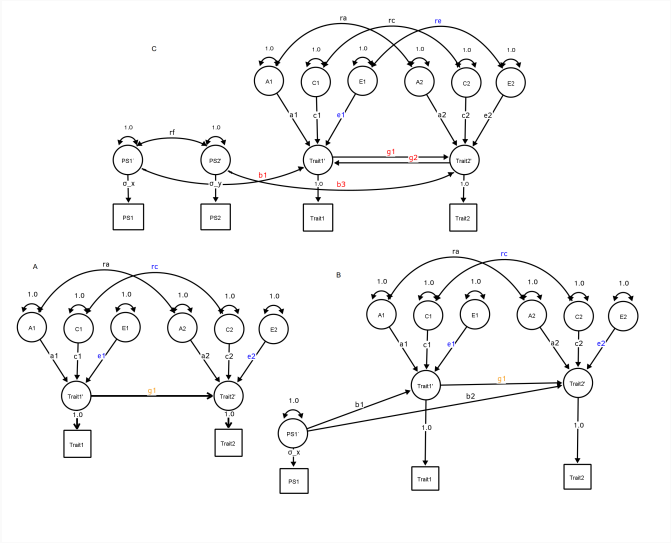
MRDoC Power Comparisons

MRDoC Power Comparisons - Data generating model is MRDOC2

Longitudinal model

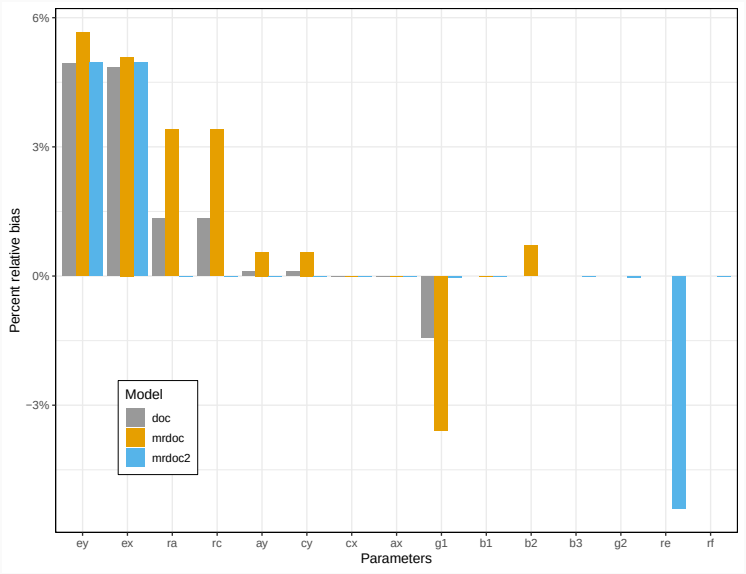
MRDoC Power Comparisons

Specification

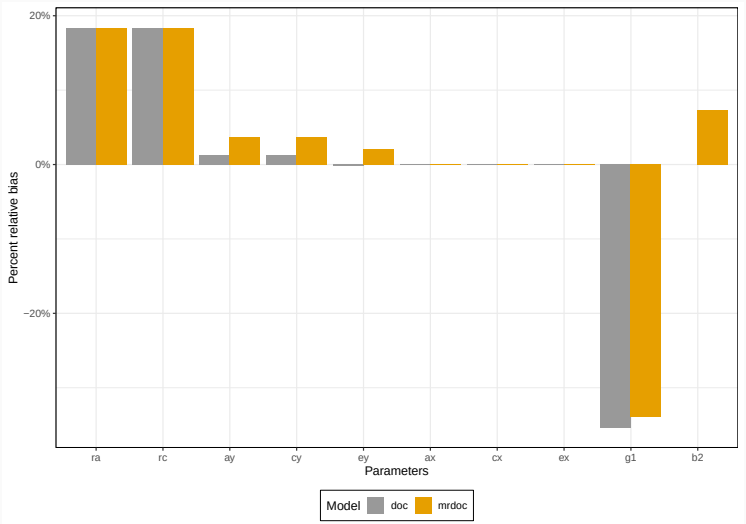


MR-DoC (A), DoC (B), and MR-DoC2 (C) model specifications for a single twin member. They include the effects of additive genetic (A), common environment (C) and specific environment (E) factors for both Trait 1 and Trait 2, and their effects may correlate (parameters ra, rc, and re). Path labels in red are important to the model's overall power, those susceptible to measurement error in blue, and in orange are those that are both susceptible to measurement error and are important to the model's overall power.

Percent bias - unreliability factor

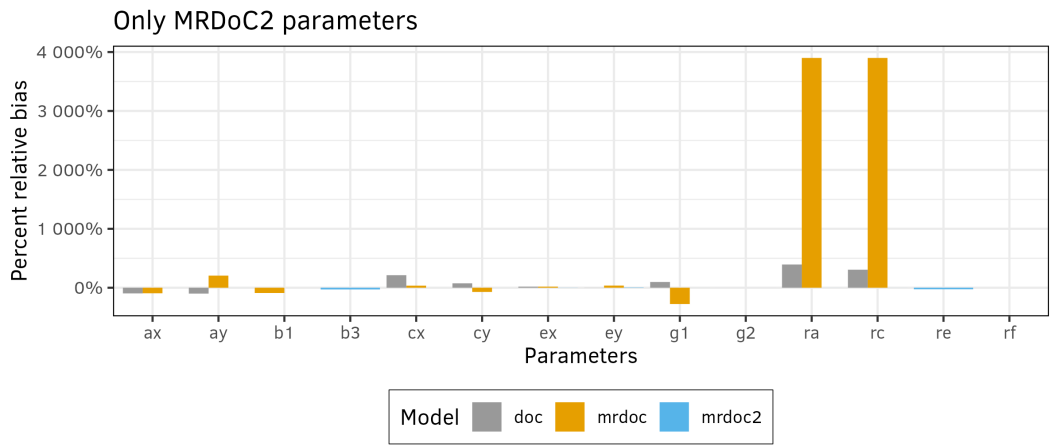


PERCENT BIAS - RE UNMODELLED

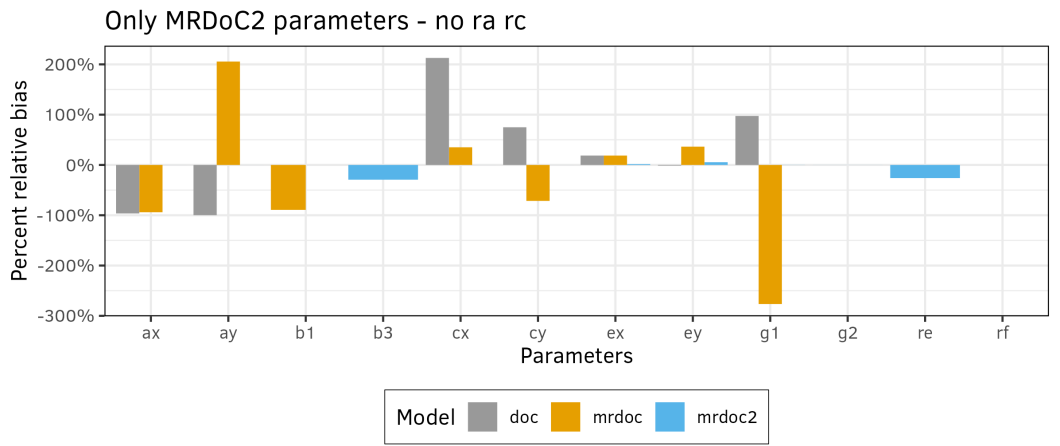


MRDoC Power Comparisons - Data generating model is MRDOC2

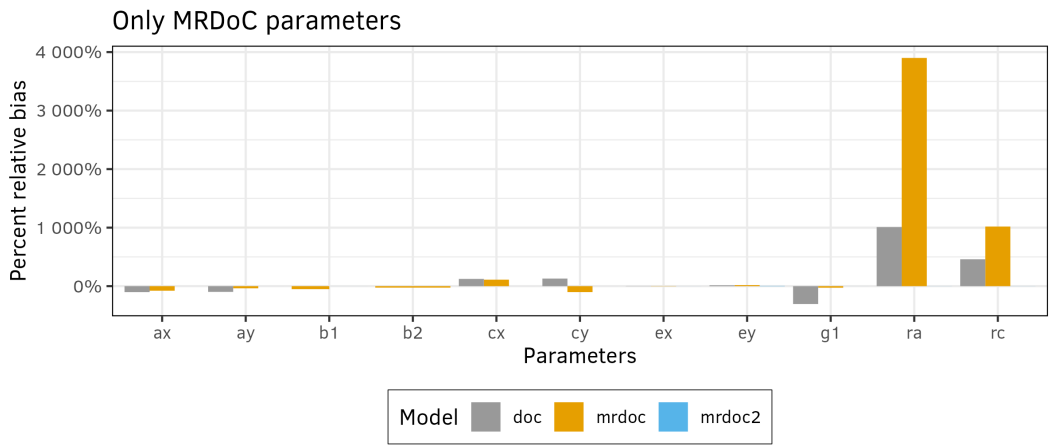
ALL MRDOC2 PARS



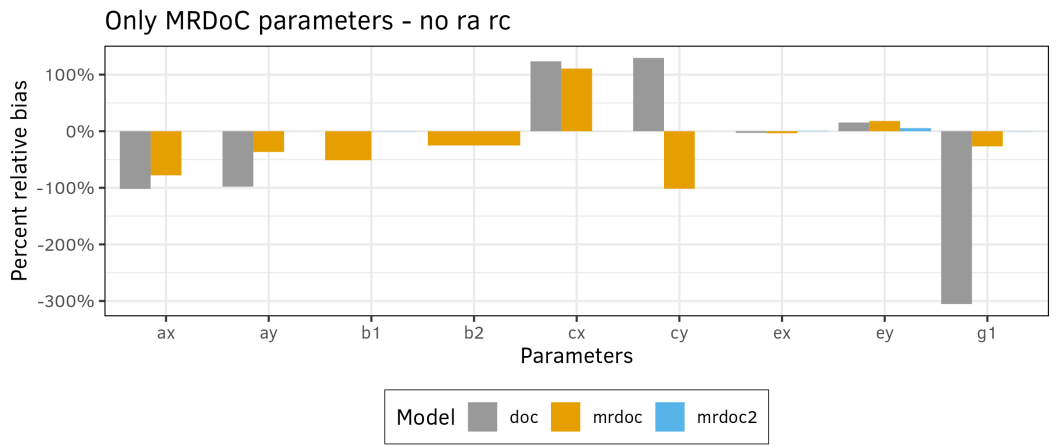
ALL MRDOC2 PARS - NOT PLOTTING RA AND RC



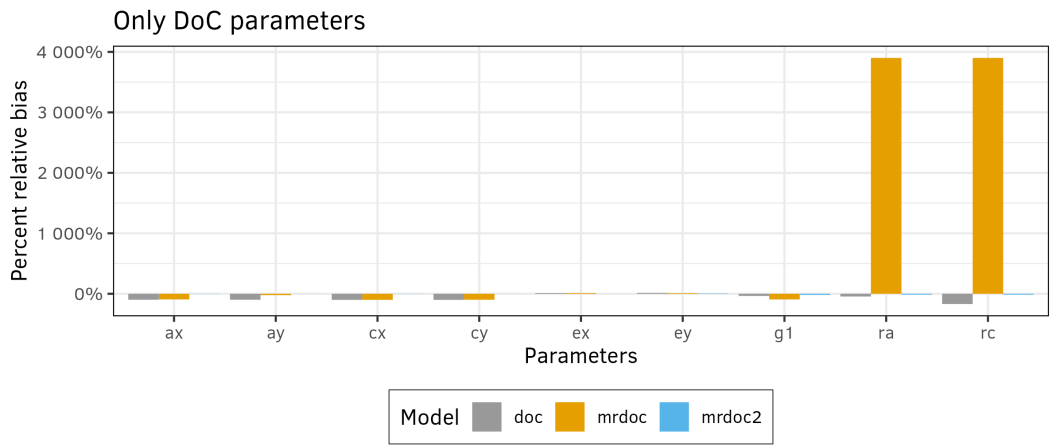
All MRDoC pars



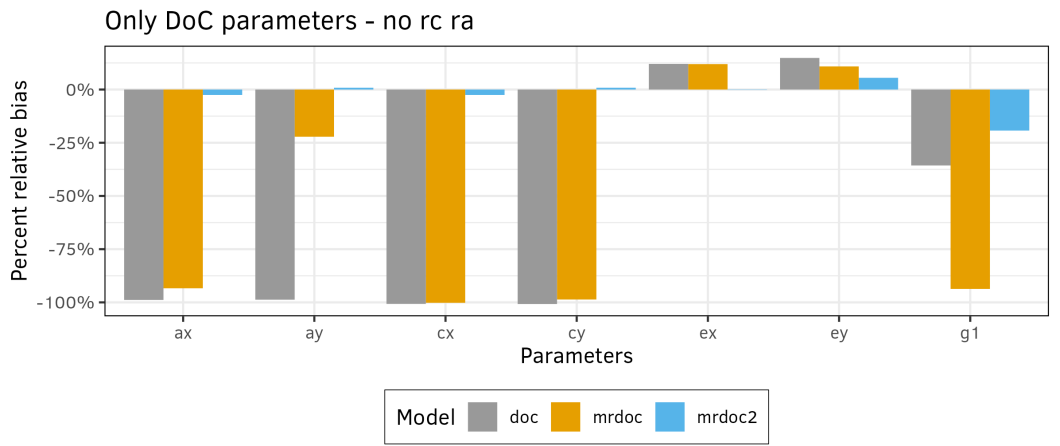
ALL MRDOC PARS - NOT PLOTTING RA AND RC



All DoC pars


Only DoC parameters
Percent relative bias
4 000%
3 000%
2 000%
1 000%
0%
ax
ay
cx
cy
ex
ey
g1
ra
rc
Parameters
Model
doc
mrdoc
mrdoc2

ALL DOC PARS - NOT PLOTTING RA AND RC



VARIANCE EXPLAINED IN STATISTICAL POWER BY MODEL PARAMETERS.

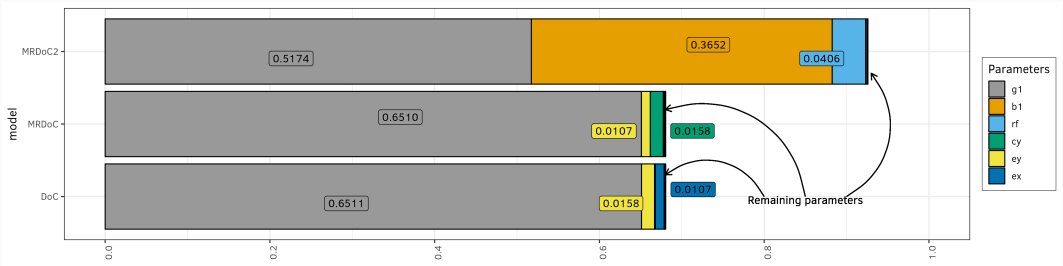
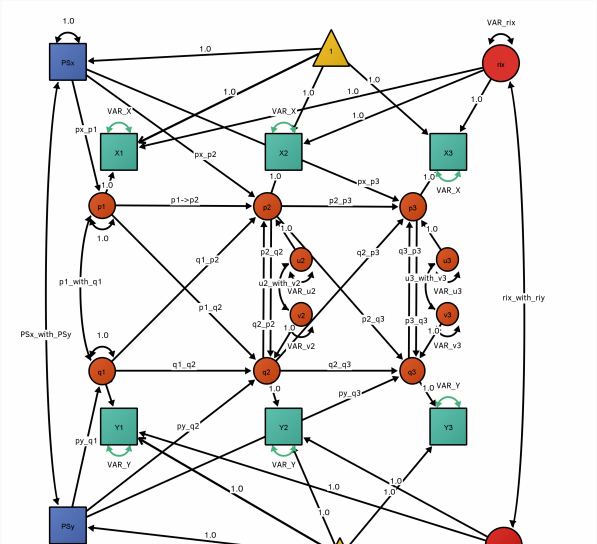


Figure 1: Linear regression of NCP on the parameter values used for 19683 and 4097 exact data simulation power analyses in the ACE model for DoC, MR-DoC and MR-DoC2, respectively. The hypotheses are g1=0 for all. These are stacked bar plots with semipartial correlation squared for each of the parameters. The total R2 for both DoC and MR-DoC models (including all parameters in the regression) was 0.945, and 0.93 for MR-DoC2. One can interpret these as g1 having the largest effect on DoC and MR-DoC overall power, and g1, b1 and rf having the largest effects on the MR-DoC2 overall power.

LONGITUDINAL MODEL

Specification



The model is identified as depicted (3 waves). It comprises 5 main elements: (A) the observed variables in green; (B) the between-person variances in orange; (C) the polygenic scores in blue; (D) the means in yellow; and (E) the random intercepts in red. Free paths are in black, and named. Fixed paths are marked with 1. The specific variances for the observed variables are equal across study waves, marked in green.

STATIONARITY

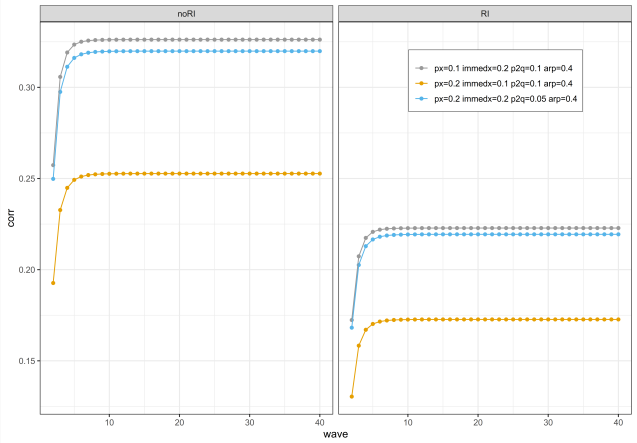
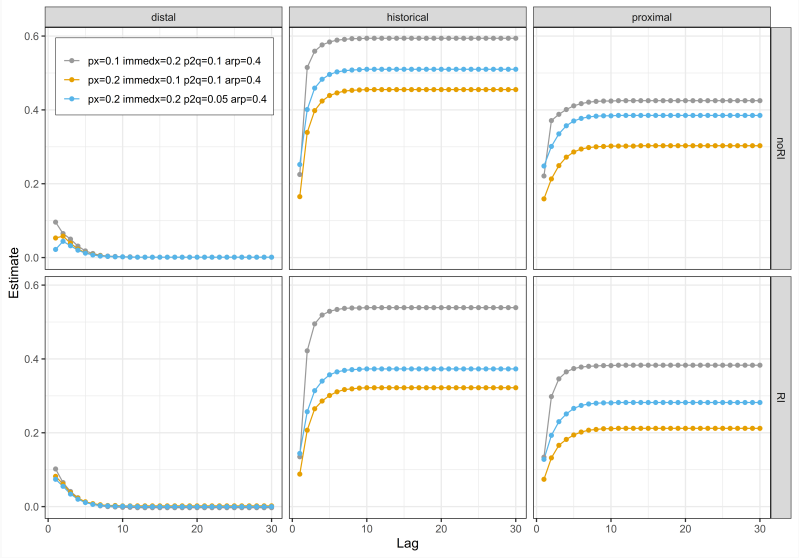
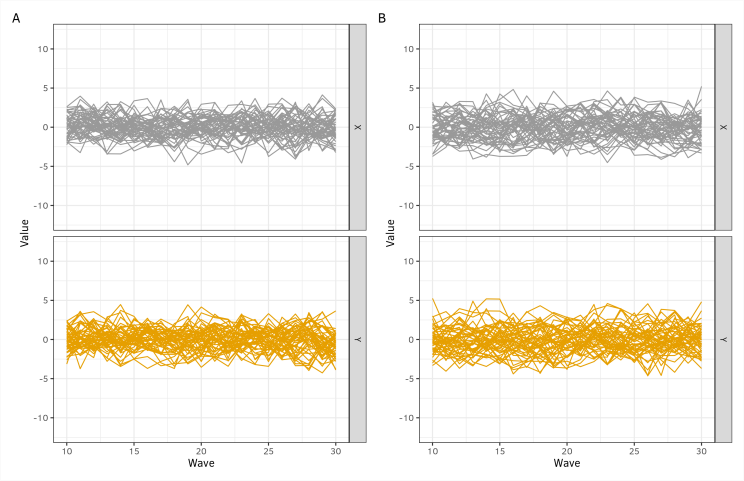


Figure 2: Correlation between Xt and Yt, where t is the study wave up to 40. With the extension of the model, the correlations stabilize. This model reaches stationarity at wave 10.

ESTIMATES WITH INCREASING LAG



Wireframe of the means of the measured variables across waves



The means of the observed variables are plotted individually for both Xt and Yt, when t is the study wave, starting in t = 20 . The panel B depict the means when the model with random intercepts. Panel A depict the model without random intercepts. Panel B shows more spread than panel A. Theta (px =py = 0.1; pt_qt+1=qt_pt+1 =0.05; pt_qt+1 = qt_pt+1 = 0.1; pt_pt+1 = qt_qt+1 = 0.4)

Heatmap for the expected cov

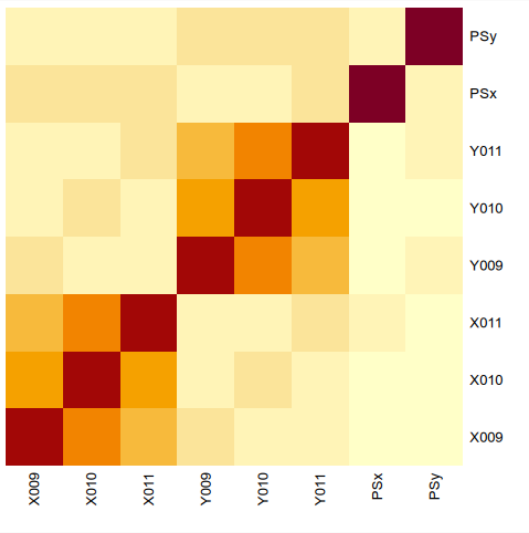
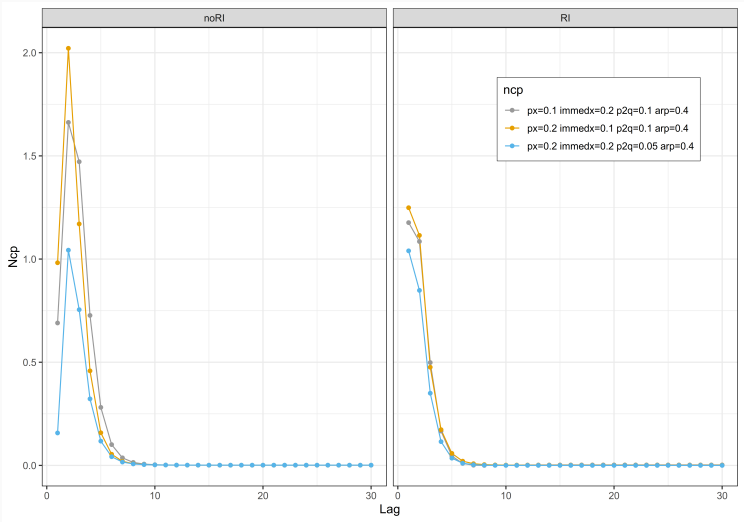
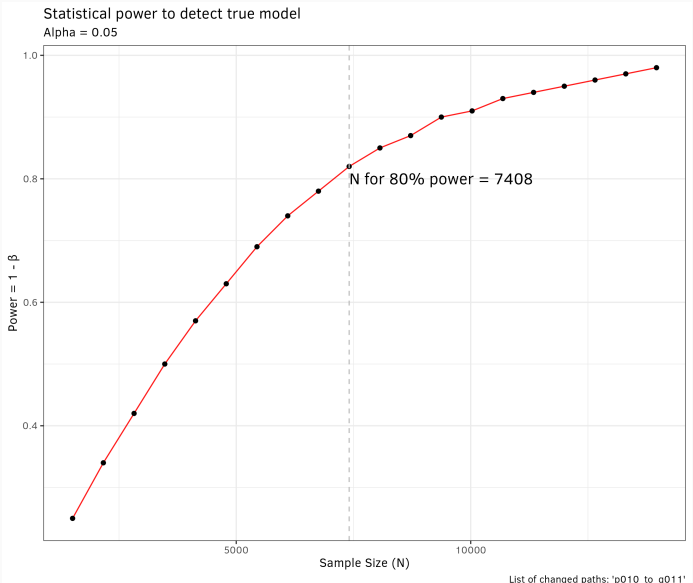


Figure 4: The expected covariance matrix for the observed variables.

POWER WITH INCREASING LAG



Power at the first stationary wave



Acknowledgements

Team

- Joshua Pritkin.
- Rob Kirkpatrick.

- Michael C Neale.
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Contact

- THANK YOU