

APPENDIX 18.1

The code below was used to produce the results included in the chapter for cognitive trust. There are two models below—a null model and a prediction model. An expanded version of this code, with detailed annotations and comments that explain what each of the lines of code mean is available at <http://apknights.org/pdsrm-example.R>.

Before running the models below, you must input a set of specialized functions. To do so, run the following command, which loads a structure for the social relations model

```
source("http://apknights.org/pdSRM.R")
```

This is a null social relations model, which provides the parameters needed to conduct a variance decomposition

```
cog.0 <-
lme(trust_cog ~
  1,
  random = list(
    team_id = pdBlocked(list(
      pdIdent(~1),
      pdSRM(~-1
        + a1 + a2 + a3 + a4
        + p1 + p2 + p3 + p4))))),
  correlation = corCompSymm(form = ~1 | team_id/dyad_id),
  data = d.sub, na.action=na.omit)
```

```
summary(cog.0)
```

The results of this summary statement are

Linear mixed-effects model fit by REML

Data: d.sub

AIC	BIC	logLik
3021.952	3057.518	-1503.976

Random effects:

Composite Structure: Blocked

Block 1: (Intercept)

Formula: ~1 | team_id

(Intercept)

StdDev: 0.4564505

Block 2: a1, a2, a3, a4, p1, p2, p3, p4

Formula: ~-1 + a1 + a2 + a3 + a4 + p1 + p2 + p3 + p4 | team_id

Structure: Social Relations Model

	StdDev	Corr						
a1	0.8978951							
a2	0.8978951	0.000						
a3	0.8978951	0.000	0.000					
a4	0.8978951	0.000	0.000	0.000				
p1	0.1459404	-0.311	0.000	0.000	0.000			
p2	0.1459404	0.000	-0.311	0.000	0.000	0.000		
p3	0.1459404	0.000	0.000	-0.311	0.000	0.000	0.000	
p4	0.1459404	0.000	0.000	0.000	-0.311	0.000	0.000	0.000

Residual 0.5668108

Correlation Structure: Compound symmetry

Formula: ~1 | team_id/dyad_id

Parameter estimate(s):

Rho

0.1379389

Fixed effects: trust_cog ~ 1

	Value	Std.Error	DF	t-value	p-value
(Intercept)	5.520423	0.06377217	1082	86.56477	0

Standardized Within-Group Residuals:

Min	Q1	Med	Q3	Max
-6.6440216	-0.2198626	0.0502427	0.2611959	4.4251627

Number of Observations: 1190

Number of Groups: 108

END summary STATEMENT RESULTS

srm.pct(aff.0)

The results of this srm.pct statement are

	variances.and.covariances	percents.and.correlations
Group	0.208	15.352
Actor	0.806	59.406
Partner	0.021	1.569
Dyad	0.321	23.673
Generalized Reciprocity	-0.041	-0.311
Dyadic Reciprocity	0.044	0.138

END srm.pct STATEMENT RESULTS

This is a model that includes fixed effects parameters to predict the group, actor, partner, and dyadic variance

```
cog.l <- lme(trust_cog ~
  gender_pct_grd + social_skills_x_grd
  + act_gender + act_social_skills_grd
```

```
+ part_gender + part_social_skills_grd
+ act_gender*part_gender + absdif_social_skills_grd
,
random = list(
  team_id = pdBlocked(list(
    pdIdent(~1),
    pdSRM(~-1 + a1 + a2 + a3 + a4
    + p1 + p2 + p3 + p4))),
  correlation=corCompSymm(form=~1 | team_id/dyad_id),
  data=d, na.action=na.omit)

summary(cog.1)

### The results of this summary statement are ###

Linear mixed-effects model fit by REML
Data: d.sub
      AIC      BIC      logLik
3045.212  3121.324  -1507.606

Random effects:
Composite Structure: Blocked

Block 1: (Intercept)
Formula: ~1 | team_id
      (Intercept)
StdDev: 0.4525179

Block 2: a1, a2, a3, a4, p1, p2, p3, p4
Formula: ~-1 + a1 + a2 + a3 + a4 + p1 + p2 + p3 + p4 | team_id
Structure: Social Relations Model
      StdDev      Corr
a1      0.8887494
a2      0.8887494    0.000
a3      0.8887494    0.000    0.000
a4      0.8887494    0.000    0.000    0.000
p1      0.1462831   -0.355    0.000    0.000    0.000
p2      0.1462831    0.000   -0.355    0.000    0.000    0.000
p3      0.1462831    0.000    0.000   -0.355    0.000    0.000    0.000
p4      0.1462831    0.000    0.000    0.000   -0.355    0.000    0.000    0.000
Residual 0.5628685
Correlation Structure: Compound symmetry
Formula: ~1 | team_id/dyad_id
Parameter estimate(s):
      Rho
0.1257927
Fixed effects: trust_cog ~ 1 + gender_pct_grd + social_skills_x_grd + act_gender + act_social_skills_grd +
      part_gender + part_social_skills_grd + act_gender * part_gender + absdif_social_skills_grd
```

	Value	Std.Error	DF	t-value	p-value
(Intercept)	5.544265	0.06513712	1076	85.11683	0.0000
gender_pct_grd	-0.276140	0.27638097	105	-0.99913	0.3200
social_skills_x_grd	-0.128293	0.15933052	105	-0.80520	0.4225
act_gender	-0.058049	0.05810358	1076	-0.99906	0.3180
act_social_skills_grd	0.184720	0.06129098	1076	3.01382	0.0026
part_gender	-0.050029	0.02410284	1076	-2.07565	0.0382
part_social_skills_grd	0.057971	0.02489518	1076	2.32860	0.0201
absdif_social_skills_grd	-0.010907	0.03031094	1076	-0.35984	0.7190
act_gender:part_gender	0.047186	0.02265628	1076	2.08271	0.0375

Correlation:

(Intr)	gndr__ scl__	act_gn act__	prt_gn prt__	abs__				
gender_pct_grd	0.118							
social_skills_x_grd	0.006	−0.016						
act_gender	−0.239	−0.422	0.006					
act_social_skills_grd	0.000	0.015	−0.399	−0.009				
part_gender	−0.103	−0.180	0.004	0.051	−0.002			
part_social_skills_grd	0.000	0.008	−0.173	−0.002	0.031	−0.015		
absdif_social_skills_grd	−0.003	−0.016	0.012	0.008	−0.008	0.026	−0.033	
act_gender:part_gender	0.002	−0.032	0.004	−0.076	0.004	−0.186	0.010	−0.009

Standardized Within-Group Residuals:

Min	Q1	Med	Q3	Max
-6.61434986	-0.23963132	0.03880915	0.28392874	4.32217245

Number of Observations: 1190

Number of Groups: 108