

APPENDIX 23.1: R SYNTAX FOR FORMAL MODEL OF CLIMATE EMERGENCE

Paste the following text into R:

```
# Computational Linear Model of Aggregate True-
score Emergence (CLiMATE)
```

```
# Parameters that can be configured are below
```

```
n = 30          # Number of people
iter = 20       # Number of time steps or iterations
rho = .2        # Contagion parameter
densityk = .2   # Probability of two people being
                # connected
```

```
stochast = 0    # 1 for Yes, 0 for No
```

```
# _____
```

```
# No need to configure parameters below
this point
```

```
# _____
```

```
# This vector will hold the SD of Y across time
sd.vec = rep(NA,iter)
```

```
# Create social network matrix
```

```
# with given size and density
```

```
# W is raw connections (0, 1)
```

```
W = matrix(rbinom(n*n,1,densityk),n,n,
            byrow=T)
diag(W) <- 0
```

```
# Row standardize W
```

```
z<-apply(W,1,sum) + .000000000001
```

```
W2 = W/z
```

```
#diag(W2) = 0
```

```
A = W2
```

```
# Starting values for y (T = 0)
```

```
y = runif(n)*(5-1) + 1 # rnorm(n, 0, 1)
```

```
# Create an empty matrix to hold Y scores for
each person (rows) across time (columns)
```

```
Y = matrix(NA,n,iter, byrow=T)
```

```
Y[,1] = y
```

```
# If someone has zero ties, put a 1 on diagonal
```

```
for(j in 1:n){
  if(z[j] < .001){
    A[j,j] = 1
  }
}
```

```
# _____
```

```
# Simulate dynamics across time
```

```
# _____
```

```
for(i in 2:iter){
  Y[,i] = Y[,i-1] + rho*(A%*%Y[,i-1] -
    Y[,i-1]) + stochast*rnorm(n,0,.20)
}
```

```
# _____
```

```
# Create graphs
```

```
# _____
```

```
par(mfrow=c(1,2)) # 1 row, 2 columns
plot(Y[1,],ylim=c(min(Y),max(Y)),type="n",
      xlab="Time",ylab="Climate Perception")
```

```
# cycle through each person and plot his or her
trajectory for Y
```

```
for(i in 1:n){
  lines(Y[i,],col=i)
}
```

```
# Compute SD of Y for each iteration
```

```
for(i in 1:iter){
  sd.vec[i] = sd(Y[,i])
}
```

```
plot(sd.vec,type="l",xlab="Time", ylab="SD
(Climate Strength)", ylim=c(0.0, 1.2))
```