Appendix B

R code

**Random data**

n\_iterations <- 1000

effect\_sizes <- c(300, 400, 500, 600, 700, 800, 900, 1000, 1500, 2000, 2500, 3000)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

results <- round(replicate(5, runif(n = effect\_sizes[j], min = 0, max = 100)), digits = 0);

write.table(results, file = paste0("C:/Users/Tiffany Shader/Desktop/Dissertation Random Final/samlpe\_size\_", effect\_sizes[j], "\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

**One Group**

##Simulation Package

install.packages('SimMultiCorrData', repos='http://cran.us.r-project.org')

library (SimMultiCorrData)

**No growth**

## Loop with skew(0,1) and Kurtosis (1,3,6); Change skew and kurtosis for other values

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

skew = c(0,1)

kurtosis = c(1,3,6)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(skew)) {

for (l in seq\_along(kurtosis)) {

seed = runif(1, min = 0, max = 10000)

x = nonnormvar1(method = c("Fleishman"), means = 50, vars = 100, skews = skew[k],

skurts = kurtosis[l], n = effect\_sizes[j], seed = seed)

results = round(x$continuous\_variable)

error1 = round(rnorm(effect\_sizes[j],0,2))

error2 = round(rnorm(effect\_sizes[j],0,2))

error3 = round(rnorm(effect\_sizes[j],0,2))

error4 = round(rnorm(effect\_sizes[j],0,2))

error5 = round(rnorm(effect\_sizes[j],0,2))

RandomError1 = cbind(error1)

RandomError2 = cbind(error2)

RandomError3 = cbind(error3)

RandomError4 = cbind(error4)

RandomError5 = cbind(error5)

Combine1 = rowSums(cbind(results,RandomError1), na.rm = TRUE)

Combine2 = rowSums(cbind(results,RandomError2), na.rm = TRUE)

Combine3 = rowSums(cbind(results,RandomError3), na.rm = TRUE)

Combine4 = rowSums(cbind(results,RandomError4), na.rm = TRUE)

Combine5 = rowSums(cbind(results,RandomError5), na.rm = TRUE)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/One Group/NoGrowth/",effect\_sizes[j],"/S",skew[k],"K",kurtosis[l], "/SS",effect\_sizes[j],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear growth with decrease**

## Loop with skew(0,1) and Kurtosis (1,3,6); Change skew and kurtosis for other values

n\_iterations = 1000

effect\_sizes = c(300,500, 800, 1000, 2000)

skew = c(0,1)

kurtosis = c(1,3,6)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(skew)) {

for (l in seq\_along(kurtosis)) {

seed = runif(1, min = 0, max = 10000)

x = nonnormvar1(method = c("Fleishman"), means = 50, vars = 100, skews = skew[k],

skurts = kurtosis[l], n = effect\_sizes[j], seed = seed)

results = round(x$continuous\_variable)

error1 = round(rnorm(effect\_sizes[j],0,2))

error2 = round(rnorm(effect\_sizes[j],0,2))

error3 = round(rnorm(effect\_sizes[j],0,2))

error4 = round(rnorm(effect\_sizes[j],0,2))

error5 = round(rnorm(effect\_sizes[j],0,2))

RandomError1 = cbind(error1)

RandomError2 = cbind(error2)

RandomError3 = cbind(error3)

RandomError4 = cbind(error4)

RandomError5 = cbind(error5)

growth1 = 0

growth2 = -1

growth3 = -2

growth4 = -3

growth5 = -4

Combine1 = rowSums(cbind(results,RandomError1,growth1), na.rm = TRUE)

Combine2 = rowSums(cbind(results,RandomError2,growth2), na.rm = TRUE)

Combine3 = rowSums(cbind(results,RandomError3,growth3), na.rm = TRUE)

Combine4 = rowSums(cbind(results,RandomError4,growth4), na.rm = TRUE)

Combine5 = rowSums(cbind(results,RandomError5,growth5), na.rm = TRUE)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/One Group/LinearDec/",effect\_sizes[j],"/S",skew[k],"K",kurtosis[l] ,"/SS\_", effect\_sizes[j],"\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear growth with a large increase**

## Loop with skew(0,1) and Kurtosis (1,3,6); Change skew and kurtosis for other values

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

skew = c(0,1)

kurtosis = c(1,3,6)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(skew)) {

for (l in seq\_along(kurtosis)) {

seed = runif(1, min = 0, max = 10000)

x = nonnormvar1(method = c("Fleishman"), means = 50, vars = 100, skews = skew[k],

skurts = kurtosis[l], n = effect\_sizes[j], seed =seed)

results = round(x$continuous\_variable)

error1 = round(rnorm(effect\_sizes[j],0,2))

error2 = round(rnorm(effect\_sizes[j],0,2))

error3 = round(rnorm(effect\_sizes[j],0,2))

error4 = round(rnorm(effect\_sizes[j],0,2))

error5 = round(rnorm(effect\_sizes[j],0,2))

RandomError1 = cbind(error1)

RandomError2 = cbind(error2)

RandomError3 = cbind(error3)

RandomError4 = cbind(error4)

RandomError5 = cbind(error5)

growth1 = 0

growth2 = 2

growth3 = 4

growth4 = 6

growth5 = 8

Combine1 = rowSums(cbind(results,RandomError1,growth1), na.rm = TRUE)

Combine2 = rowSums(cbind(results,RandomError2,growth2), na.rm = TRUE)

Combine3 = rowSums(cbind(results,RandomError3,growth3), na.rm = TRUE)

Combine4 = rowSums(cbind(results,RandomError4,growth4), na.rm = TRUE)

Combine5 = rowSums(cbind(results,RandomError5,growth5), na.rm = TRUE)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/One Group/LinearLarge/",effect\_sizes[j],"/S",skew[k],"K",kurtosis[l] ,"/SS", effect\_sizes[j],"\_S",skew[k],"K",kurtosis[l], "\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear growth with a small increase**

## Loop with skew(0,1) and Kurtosis (1,3,6) ; Change skew and kurtosis for other values

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

skew = c(0,1)

kurtosis = c(1,3,6)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(skew)) {

for (l in seq\_along(kurtosis)) {

seed = runif(1, min = 0, max = 10000)

x = nonnormvar1(method = c("Fleishman"), means = 50, vars = 100, skews = skew[k],

skurts = kurtosis[l], n = effect\_sizes[j], seed =seed)

results = round(x$continuous\_variable)

error1 = round(rnorm(effect\_sizes[j],0,2))

error2 = round(rnorm(effect\_sizes[j],0,2))

error3 = round(rnorm(effect\_sizes[j],0,2))

error4 = round(rnorm(effect\_sizes[j],0,2))

error5 = round(rnorm(effect\_sizes[j],0,2))

RandomError1 = cbind(error1)

RandomError2 = cbind(error2)

RandomError3 = cbind(error3)

RandomError4 = cbind(error4)

RandomError5 = cbind(error5)

growth1 = 0

growth2 = .5

growth3 = 1.0

growth4 = 1.5

growth5 = 2.0

Combine1 = rowSums(cbind(results,RandomError1,growth1), na.rm = TRUE)

Combine2 = rowSums(cbind(results,RandomError2,growth2), na.rm = TRUE)

Combine3 = rowSums(cbind(results,RandomError3,growth3), na.rm = TRUE)

Combine4 = rowSums(cbind(results,RandomError4,growth4), na.rm = TRUE)

Combine5 = rowSums(cbind(results,RandomError5,growth5), na.rm = TRUE)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/One Group/LinearSmall/",effect\_sizes[j],"/samlpe\_size\_", effect\_sizes[j],"\_skew\_",skew[k],"\_kurtosis\_",kurtosis[l], "\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Exponential small growth**

## Loop with skew(0,1) and Kurtosis (1,3,6); Change skew and kurtosis for other values

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

skew = c(0,1)

kurtosis = c(1,3,6)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(skew)) {

for (l in seq\_along(kurtosis)) {

seed = runif(1, min = 0, max = 10000)

x = nonnormvar1(method = c("Fleishman"), means = 50, vars = 100, skews = skew[k],

skurts = kurtosis[l], n = effect\_sizes[j], seed = seed)

results = round(x$continuous\_variable)

error1 = round(rnorm(effect\_sizes[j],0,2))

error2 = round(rnorm(effect\_sizes[j],0,2))

error3 = round(rnorm(effect\_sizes[j],0,2))

error4 = round(rnorm(effect\_sizes[j],0,2))

error5 = round(rnorm(effect\_sizes[j],0,2))

RandomError1 = cbind(error1)

RandomError2 = cbind(error2)

RandomError3 = cbind(error3)

RandomError4 = cbind(error4)

RandomError5 = cbind(error5)

growth1 = 0

growth2 = 0

growth3 = .25

growth4 = .75

growth5 = 1.5

Combine1 = rowSums(cbind(results,RandomError1,growth1), na.rm = TRUE)

Combine2 = rowSums(cbind(results,RandomError2,growth2), na.rm = TRUE)

Combine3 = rowSums(cbind(results,RandomError3,growth3), na.rm = TRUE)

Combine4 = rowSums(cbind(results,RandomError4,growth4), na.rm = TRUE)

Combine5 = rowSums(cbind(results,RandomError5,growth5), na.rm = TRUE)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/One Group/QuadInSmall/",effect\_sizes[j],"/samlpe\_size\_", effect\_sizes[j],"\_skew\_",skew[k],"\_kurtosis\_",kurtosis[l], "\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Exponential steep growth**

## Loop with skew(0,1) and Kurtosis (1,3,6); Change skew and kurtosis for other values

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

skew = c(0,1)

kurtosis = c(1,3,6)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(skew)) {

for (l in seq\_along(kurtosis)) {

seed = runif(1, min = 0, max = 10000)

x = nonnormvar1(method = c("Fleishman"), means = 50, vars = 100, skews = skew[k],

skurts = kurtosis[l], n = effect\_sizes[j], seed =seed)

results = round(x$continuous\_variable)

error1 = round(rnorm(effect\_sizes[j],0,2))

error2 = round(rnorm(effect\_sizes[j],0,2))

error3 = round(rnorm(effect\_sizes[j],0,2))

error4 = round(rnorm(effect\_sizes[j],0,2))

error5 = round(rnorm(effect\_sizes[j],0,2))

RandomError1 = cbind(error1)

RandomError2 = cbind(error2)

RandomError3 = cbind(error3)

RandomError4 = cbind(error4)

RandomError5 = cbind(error5)

growth1 = 0

growth2 = 0

growth3 = 2

growth4 = 6

growth5 = 12

Combine1 = rowSums(cbind(results,RandomError1,growth1), na.rm = TRUE)

Combine2 = rowSums(cbind(results,RandomError2,growth2), na.rm = TRUE)

Combine3 = rowSums(cbind(results,RandomError3,growth3), na.rm = TRUE)

Combine4 = rowSums(cbind(results,RandomError4,growth4), na.rm = TRUE)

Combine5 = rowSums(cbind(results,RandomError5,growth5), na.rm = TRUE)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/One Group/QuadInLarge/",effect\_sizes[j],"/samlpe\_size\_", effect\_sizes[j],"\_skew\_",skew[k],"\_kurtosis\_",kurtosis[l], "\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Quadratic inverted U-shaped growth**

## Loop with skew(0,1) and Kurtosis (1,3,6); Change skew and kurtosis for other values

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

skew = c(0,1)

kurtosis = c(1,3,6)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(skew)) {

for (l in seq\_along(kurtosis)) {

seed = runif(1, min = 0, max = 10000)

x = nonnormvar1(method = c("Fleishman"), means = 50, vars = 100, skews = skew[k],

skurts = kurtosis[l], n = effect\_sizes[j], seed = seed)

results = round(x$continuous\_variable)

error1 = round(rnorm(effect\_sizes[j],0,2))

error2 = round(rnorm(effect\_sizes[j],0,2))

error3 = round(rnorm(effect\_sizes[j],0,2))

error4 = round(rnorm(effect\_sizes[j],0,2))

error5 = round(rnorm(effect\_sizes[j],0,2))

RandomError1 = cbind(error1)

RandomError2 = cbind(error2)

RandomError3 = cbind(error3)

RandomError4 = cbind(error4)

RandomError5 = cbind(error5)

growth1 = 0

growth2 = 6

growth3 = 8

growth4 = 6

growth5 = 0

Combine1 = rowSums(cbind(results,RandomError1,growth1), na.rm = TRUE)

Combine2 = rowSums(cbind(results,RandomError2,growth2), na.rm = TRUE)

Combine3 = rowSums(cbind(results,RandomError3,growth3), na.rm = TRUE)

Combine4 = rowSums(cbind(results,RandomError4,growth4), na.rm = TRUE)

Combine5 = rowSums(cbind(results,RandomError5,growth5), na.rm = TRUE)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/One Group/QuadLarge/",effect\_sizes[j],"/samlpe\_size\_", effect\_sizes[j],"\_skew\_",skew[k],"\_kurtosis\_",kurtosis[l], "\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Two Groups**

###Simulation package

install.packages("moments")

library(moments)

**No growth**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.70, .85, .95, .90)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

Na = effect\_sizes[j] \* sizeA[k]

Nb = effect\_sizes[j] - Na

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,error1B), na.rm = TRUE)

Combine1 = c(Time1A, Time1B)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,error2B), na.rm = TRUE)

Combine2 = c(Time2A, Time2B)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,error3B), na.rm = TRUE)

Combine3 = c(Time3A, Time3B)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,error4B), na.rm = TRUE)

Combine4 = c(Time4A, Time4B)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,error5B), na.rm = TRUE)

Combine5 = c(Time5A, Time5B)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/2Group/NoGrowth/ES0.3/",effect\_sizes[j],"/P",sizeA[k],"/NG\_SS\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

**Linear growth with a large increase**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.70, .85, .95, .90)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

Na = effect\_sizes[j] \* sizeA[k]

Nb = effect\_sizes[j] - Na

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

growth1 = 0

growth2 = 2

growth3 = 4

growth4 = 6

growth5 = 8

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1,error1B), na.rm = TRUE)

Combine1 = c(Time1A, Time1B)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2,error2B), na.rm = TRUE)

Combine2 = c(Time2A, Time2B)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3,error3B), na.rm = TRUE)

Combine3 = c(Time3A, Time3B)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4,error4B), na.rm = TRUE)

Combine4 = c(Time4A, Time4B)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5,error5B), na.rm = TRUE)

Combine5 = c(Time5A, Time5B)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/2Group/LinearL/ES0.3/",effect\_sizes[j],"/P",sizeA[k],"/LL\_SS\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

**Linear growth with a small increase**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.70, .85, .95, .90)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

Na = effect\_sizes[j] \* sizeA[k]

Nb = effect\_sizes[j] - Na

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

growth1 = 0

growth2 = .5

growth3 = 1.0

growth4 = 1.5

growth5 = 2.0

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1,error1B), na.rm = TRUE)

Combine1 = c(Time1A, Time1B)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2,error2B), na.rm = TRUE)

Combine2 = c(Time2A, Time2B)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3,error3B), na.rm = TRUE)

Combine3 = c(Time3A, Time3B)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4,error4B), na.rm = TRUE)

Combine4 = c(Time4A, Time4B)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5,error5B), na.rm = TRUE)

Combine5 = c(Time5A, Time5B)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/2Group/LinearSmall/ES0.3/",effect\_sizes[j],"/P",sizeA[k],"/S\_SS\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

**Linear growth with a small increase and a large increase**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.70, .85, .95, .90)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

Na = effect\_sizes[j] \* sizeA[k]

Nb = effect\_sizes[j] - Na

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

growth1L = 0

growth2L = 2

growth3L = 4

growth4L = 6

growth5L = 8

growth1S = 0

growth2S = .5

growth3S = 1.0

growth4S = 1.5

growth5S = 2.0

Time1A = rowSums(cbind(xA,growth1S,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1L,error1B), na.rm = TRUE)

Combine1 = c(Time1A, Time1B)

Time2A = rowSums(cbind(xA,growth2S,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2L,error2B), na.rm = TRUE)

Combine2 = c(Time2A, Time2B)

Time3A = rowSums(cbind(xA,growth3S,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3L,error3B), na.rm = TRUE)

Combine3 = c(Time3A, Time3B)

Time4A = rowSums(cbind(xA,growth4S,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4L,error4B), na.rm = TRUE)

Combine4 = c(Time4A, Time4B)

Time5A = rowSums(cbind(xA,growth5S,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5L,error5B), na.rm = TRUE)

Combine5 = c(Time5A, Time5B)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/2Group/LinearSL/ES0.3/",effect\_sizes[j],"/P",sizeA[k],"/SL\_SS\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

**Exponential growth**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.70, .85, .95, .90)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

Na = effect\_sizes[j] \* sizeA[k]

Nb = effect\_sizes[j] - Na

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

growth1A = 0

growth2A = 0

growth3A = -.25

growth4A = -.75

growth5A = -1.5

growth1B = 0

growth2B = 0

growth3B = 2

growth4B = 6

growth5B = 12

Time1A = rowSums(cbind(xA,growth1A, error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1B,error1B), na.rm = TRUE)

Combine1 = c(Time1A, Time1B)

Time2A = rowSums(cbind(xA,growth2A,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2B,error2B), na.rm = TRUE)

Combine2 = c(Time2A, Time2B)

Time3A = rowSums(cbind(xA,growth3A,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3B,error3B), na.rm = TRUE)

Combine3 = c(Time3A, Time3B)

Time4A = rowSums(cbind(xA,growth4A,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4B,error4B), na.rm = TRUE)

Combine4 = c(Time4A, Time4B)

Time5A = rowSums(cbind(xA,growth5A,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5B,error5B), na.rm = TRUE)

Combine5 = c(Time5A, Time5B)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/2Group/Exponential/ES0.3/",effect\_sizes[j],"/P",sizeA[k],"/QLC\_SS\_", effect\_sizes[j],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

**Quadratic inverted U-shaped growth**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.70, .85, .95, .90)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

Na = effect\_sizes[j] \* sizeA[k]

Nb = effect\_sizes[j] - Na

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

growth1 = 0

growth2 = 6

growth3 = 8

growth4 = 6

growth5 = 0

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1,error1B), na.rm = TRUE)

Combine1 = c(Time1A, Time1B)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2,error2B), na.rm = TRUE)

Combine2 = c(Time2A, Time2B)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3,error3B), na.rm = TRUE)

Combine3 = c(Time3A, Time3B)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4,error4B), na.rm = TRUE)

Combine4 = c(Time4A, Time4B)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5,error5B), na.rm = TRUE)

Combine5 = c(Time5A, Time5B)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/2Group/QuadLarge/ES0.3/",effect\_sizes[j],"/P",sizeA[k],"/QL\_SS\_", effect\_sizes[j],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

**Three Groups**

###Simulation package

install.packages("moments")

library(moments)

**No Growth**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

## Esize changes with xB; example when xB mean= 55 Esize = c(58,62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.50, .60, .70)

Esize = c(55, 58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k]<.65){

Nb = effect\_sizes[j]\*.30} else {

Nb = effect\_sizes[j]\*.20

}

Nc = effect\_sizes[j] - Na - Nb

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = Esize[l], sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, error1C), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, error2C), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, error3C), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, error4C), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, error5C), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/3Group/NoGrowth/ES0.3\_",Esize[l],"/",effect\_sizes[j],"/P",sizeA[k] ,"/LG3I\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear growth with a gradual increase for Group 2**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

## Esize changes with xB; example when xB mean= 55 Esize = c(58,62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(0.5, 0.6, 0.7)

Esize = c(55, 58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k]<.65){

Nb = effect\_sizes[j]\*.30} else {

Nb = effect\_sizes[j]\*.20

}

Nc = effect\_sizes[j] - Na - Nb

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = Esize[l], sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

growth1 = 0

growth2 = .5

growth3 = 1.0

growth4 = 1.5

growth5 = 2.0

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB, growth1, error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, error1C), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, error2C), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, error3C), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4, error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, error4C), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, error5C), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/3Group /Linear\_G2I/ES0.3\_",Esize[l],"/",effect\_sizes[j],"/P",sizeA[k] ,"/LG2I\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear growth with a steep increase for Group 2 and gradual decrease for Group 3**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

## Esize changes with xB; example when xB mean= 55 Esize = c(58,62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.50, .60, .70)

Esize = c(55, 58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k]<.65){

Nb = effect\_sizes[j]\*.30} else {

Nb = effect\_sizes[j]\*.20

}

Nc = effect\_sizes[j] - Na - Nb

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = Esize[l], sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

growth1 = 0

growth2 = 2

growth3 = 4

growth4 = 6

growth5 = 8

growth1B = 0

growth2B = -.5

growth3B = -1.0

growth4B = -1.5

growth5B = -2.0

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB, growth1, error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1B, error1C), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, growth2B, error2C), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, growth3B, error3C), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4, error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, growth4B, error4C), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5B, error5C), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/3Group /Linear\_G3D/ES0.3\_",Esize[l],"/",effect\_sizes[j],"/P",sizeA[k] ,"/LG3D\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear growth with a gradual decrease for Group 1 and a steep increase for Group 3**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

## Esize changes with xB; example when xB mean= 55 Esize = c(58,62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(0.50, 0.60, 0.70)

Esize = c(55, 58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k]<.65){

Nb = effect\_sizes[j]\*.30} else {

Nb = effect\_sizes[j]\*.20

}

Nc = effect\_sizes[j] - Na - Nb

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = Esize[l], sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

growth1B = 0

growth2B = 2

growth3B = 4

growth4B = 6

growth5B = 8

growth1 = 0

growth2 = -.5

growth3 = -1.0

growth4 = -1.5

growth5 = -2.0

Time1A = rowSums(cbind(xA, growth1, error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB, error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1B, error1C), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C)

Time2A = rowSums(cbind(xA,growth2, error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, growth2B, error2C), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C)

Time3A = rowSums(cbind(xA,growth3, error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, growth3B, error3C), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C)

Time4A = rowSums(cbind(xA, growth4, error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB, error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, growth4B, error4C), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C)

Time5A = rowSums(cbind(xA,growth5, error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5B, error5C), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/3Group /Linear\_G3I/ES0.3\_",Esize[l],"/",effect\_sizes[j],"/P",sizeA[k] ,"/LG3I\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Exponential growth**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

## Esize changes with xB; example when xB mean= 55 Esize = c(58,62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.50, .60, .70)

Esize = c(55, 58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k]<.65){

Nb = effect\_sizes[j]\*.30} else {

Nb = effect\_sizes[j]\*.20

}

Nc = effect\_sizes[j] - Na - Nb

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = Esize[l], sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

growth1 = 0

growth2 = 0

growth3 = -.25

growth4 = -.75

growth5 = -1.5

growth1B = 0

growth2B = 0

growth3B = .25

growth4B = .75

growth5B = 1.5

growth1C = 0

growth2C = 0

growth3C = 2

growth4C = 6

growth5C = 12

Time1A = rowSums(cbind(xA,Growth1, error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB, growth1B, error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1C,error1C), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C)

Time2A = rowSums(cbind(xA,growth2, error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2B, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC,growth2C, error2C), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C)

Time3A = rowSums(cbind(xA,growth3, error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3B, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC,growth3C, error3C), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C)

Time4A = rowSums(cbind(xA,growth4, error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4B, error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC,growth4C, error4C), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C)

Time5A = rowSums(cbind(xA,growth5, error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5B, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5C, error5C), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/3Group /Quad\_SmallIn\_LargeIn/ES.3\_",Esize[l],"/",effect\_sizes[j],"/Quad\_SmallIn\_LargeIn\_samlpe\_size\_", effect\_sizes[j],"proportion",sizeA[k],"\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Quadratic inverted U-shaped growth**

## Intercept Effect Size: .30;

## Change xB mean from 53 to 55 (ES 0.5), 58 (ES 0.8), 62 (ES 1.2), or 70 (Es 2.0)

## Esize changes with xB; example when xB mean= 55 Esize = c(58,62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.50, .60, .70)

Esize = c(55, 58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k]<.65){

Nb = effect\_sizes[j]\*.30} else {

Nb = effect\_sizes[j]\*.20

}

Nc = effect\_sizes[j] - Na - Nb

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = Esize[l], sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

growth1 = 0

growth2 = 6

growth3 = 8

growth4 = 6

growth5 = 0

growth1B = 0

growth2B = 1.5

growth3B = 2

growth4B = 1.5

growth5B = 0

Time1A = rowSums(cbind(xA, error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB, growth1, error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1B, error1C), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C)

Time2A = rowSums(cbind(xA, error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB, growth2, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, growth2B, error2C), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C)

Time3A = rowSums(cbind(xA, error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, growth3B, error3C), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C)

Time4A = rowSums(cbind(xA, error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB, growth4, error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, growth4B, error4C), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C)

Time5A = rowSums(cbind(xA, error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5B, error5C), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/3Group /Quad\_LBell/ES.3\_",Esize[l],"/",effect\_sizes[j],"/Quad\_LBell\_samlpe\_size\_", effect\_sizes[j],"proportion",sizeA[k],"\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Four Groups**

###Simulation Package

install.packages("moments")

library(moments)

**No growth**

## Intercept Effect Sizes 0.3/0.5/0.8, 0.3/0.5/1.2, 0.3/.5/2.0,

## For 0.3/0.8/1.2 and ES 0.3/0.8/2.0 xC mean = 58, Esize = c(62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.50, .60, .40)

Esize = c(58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k] == .50){

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .10

Nd = effect\_sizes[j]\*.10

} else {

if (sizeA[k] == .60){

Nb = effect\_sizes[j]\*.20

Nc = effect\_sizes[j]\* .15

Nd = effect\_sizes[j]\*.05

} else {

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .20

Nd = effect\_sizes[j]\*.10

}

}

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = 55, sd =10)))

xD = cbind(round(rnorm (n = Nd, mean = Esize[l],sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

error1D = cbind(round(rnorm(Nd,0,2)))

error2D = cbind(round(rnorm(Nd,0,2)))

error3D = cbind(round(rnorm(Nd,0,2)))

error4D = cbind(round(rnorm(Nd,0,2)))

error5D = cbind(round(rnorm(Nd,0,2)))

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, error1C), na.rm = TRUE)

Time1D = rowSums(cbind(xD, error1D), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C, Time1D)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, error2C), na.rm = TRUE)

Time2D = rowSums(cbind(xD, error2D), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C, Time2D)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, error3C), na.rm = TRUE)

Time3D = rowSums(cbind(xD, error3D), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C, Time3D)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, error4C), na.rm = TRUE)

Time4D = rowSums(cbind(xD, error4D), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C, Time4D)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, error5C), na.rm = TRUE)

Time5D = rowSums(cbind(xD, error5D), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C, Time5D)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/4Group /NoGrowth/ES.3\_.5\_",Esize[l],"/",effect\_sizes[j],"/noGrowth\_samlpe\_size\_", effect\_sizes[j],"proportion",sizeA[k],"\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear steep growth with a crossover**

## Intercept Effect Sizes 0.3/0.5/0.8, 0.3/0.5/1.2, 0.3/.5/2.0,

## For 0.3/0.8/1.2 and ES 0.3/0.8/2.0 xC mean = 58, Esize = c(62,70)

n\_iterations = 1000

effect\_sizes = c(500,800,1000,2000)

sizeA = c(.50, .60, .40)

Esize = c(58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k] == .50){

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .10

Nd = effect\_sizes[j]\*.10

} else {

if (sizeA[k] == .60){

Nb = effect\_sizes[j]\*.20

Nc = effect\_sizes[j]\* .15

Nd = effect\_sizes[j]\*.05

} else {

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .20

Nd = effect\_sizes[j]\*.10

}

}

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = 55, sd =10)))

xD = cbind(round(rnorm (n = Nd, mean = Esize[l],sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

error1D = cbind(round(rnorm(Nd,0,2)))

error2D = cbind(round(rnorm(Nd,0,2)))

error3D = cbind(round(rnorm(Nd,0,2)))

error4D = cbind(round(rnorm(Nd,0,2)))

error5D = cbind(round(rnorm(Nd,0,2)))

growth1B = 0

growth2B = 2

growth3B = 4

growth4B = 6

growth5B = 8

growth1C = 0

growth2C = -2

growth3C = -4

growth4C = -6

growth5C = -8

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1B,error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1C, error1C), na.rm = TRUE)

Time1D = rowSums(cbind(xD, error1D), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C, Time1D)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2B, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, growth2C, error2C), na.rm = TRUE)

Time2D = rowSums(cbind(xD, error2D), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C, Time2D)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3B, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, growth3C, error3C), na.rm = TRUE)

Time3D = rowSums(cbind(xD, error3D), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C, Time3D)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4B,error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, growth4C,error4C), na.rm = TRUE)

Time4D = rowSums(cbind(xD, error4D), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C, Time4D)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5B, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5C, error5C), na.rm = TRUE)

Time5D = rowSums(cbind(xD, error5D), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C, Time5D)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/4Group /Linear\_LargeX/ES.3\_.5\_",Esize[l],"/",effect\_sizes[j],"/Linear\_LargeX\_samlpe\_size\_", effect\_sizes[j],"proportion",sizeA[k],"\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear gradual growth with a crossover**

## Intercept Effect Sizes 0.3/0.5/0.8, 0.3/0.5/1.2, 0.3/.5/2.0,

## For 0.3/0.8/1.2 and ES 0.3/0.8/2.0 xC mean = 58, Esize = c(62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.50, .60, .40)

Esize = c(58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k] == .50){

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .10

Nd = effect\_sizes[j]\*.10

} else {

if (sizeA[k] == .60){

Nb = effect\_sizes[j]\*.20

Nc = effect\_sizes[j]\* .15

Nd = effect\_sizes[j]\*.05

} else {

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .20

Nd = effect\_sizes[j]\*.10

}

}

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = 55, sd =10)))

xD = cbind(round(rnorm (n = Nd, mean = Esize[l],sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

error1D = cbind(round(rnorm(Nd,0,2)))

error2D = cbind(round(rnorm(Nd,0,2)))

error3D = cbind(round(rnorm(Nd,0,2)))

error4D = cbind(round(rnorm(Nd,0,2)))

error5D = cbind(round(rnorm(Nd,0,2)))

growth1B = 0

growth2B = .5

growth3B = 1.0

growth4B = 1.5

growth5B = 2.0

growth1C = 0

growth2C = -.5

growth3C = -1.0

growth4C = -1.5

growth5C = -2.0

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1B,error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1C, error1C), na.rm = TRUE)

Time1D = rowSums(cbind(xD, error1D), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C, Time1D)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2B, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, growth2C, error2C), na.rm = TRUE)

Time2D = rowSums(cbind(xD, error2D), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C, Time2D)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3B, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, growth3C, error3C), na.rm = TRUE)

Time3D = rowSums(cbind(xD, error3D), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C, Time3D)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4B,error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, growth4C,error4C), na.rm = TRUE)

Time4D = rowSums(cbind(xD, error4D), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C, Time4D)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5B, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5C, error5C), na.rm = TRUE)

Time5D = rowSums(cbind(xD, error5D), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C, Time5D)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/4Group /LSX/ES.3\_.5\_",Esize[l],"/",effect\_sizes[j],"/P",sizeA[k],"/LSX\_", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Linear Fan**

## Intercept Effect Sizes 0.3/0.5/0.8, 0.3/0.5/1.2, 0.3/.5/2.0,

## For 0.3/0.8/1.2 and ES 0.3/0.8/2.0 xC mean = 58, Esize = c(62,70)

n\_iterations = 1000

effect\_sizes = c(300,500,800,1000,2000)

sizeA = c(.50, .60, .40)

Esize = c(58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k] == .50){

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .10

Nd = effect\_sizes[j]\*.10

} else {

if (sizeA[k] == .60){

Nb = effect\_sizes[j]\*.20

Nc = effect\_sizes[j]\* .15

Nd = effect\_sizes[j]\*.05

} else {

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .20

Nd = effect\_sizes[j]\*.10

}

}

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = 55, sd =10)))

xD = cbind(round(rnorm (n = Nd, mean = Esize[l],sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

error1D = cbind(round(rnorm(Nd,0,2)))

error2D = cbind(round(rnorm(Nd,0,2)))

error3D = cbind(round(rnorm(Nd,0,2)))

error4D = cbind(round(rnorm(Nd,0,2)))

error5D = cbind(round(rnorm(Nd,0,2)))

growth1B = 0

growth2B = -.5

growth3B = -1

growth4B = -1.5

growth5B = -2

growth1C = 0

growth2C = 1

growth3C = 2

growth4C = 3

growth5C = 4

growth1D = 0

growth2D = 2

growth3D = 4

growth4D = 6

growth5D = 8

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1B,error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1C, error1C), na.rm = TRUE)

Time1D = rowSums(cbind(xD, growth1D, error1D), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C, Time1D)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2B, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, growth2C, error2C), na.rm = TRUE)

Time2D = rowSums(cbind(xD, growth2D,error2D), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C, Time2D)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3B, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, growth3C, error3C), na.rm = TRUE)

Time3D = rowSums(cbind(xD, growth3D,error3D), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C, Time3D)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4B,error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, growth4C,error4C), na.rm = TRUE)

Time4D = rowSums(cbind(xD, growth4D,error4D), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C, Time4D)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5B, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5C, error5C), na.rm = TRUE)

Time5D = rowSums(cbind(xD, growth5D,error5D), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C, Time5D)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/4Group /Linear\_Fan/ES.3\_.5\_",Esize[l],"/",effect\_sizes[j],"/P",sizeA[k],"/LF\_SS", effect\_sizes[j],"P",sizeA[k],"\_it\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Exponential/quadratic growth**

## Intercept Effect Sizes 0.3/0.5/0.8, 0.3/0.5/1.2, 0.3/.5/2.0,

## For 0.3/0.8/1.2 and ES 0.3/0.8/2.0 xC mean = 58, Esize = c(62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.50, .60, .40)

Esize = c(58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k] == .50){

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .10

Nd = effect\_sizes[j]\*.10

} else {

if (sizeA[k] == .60){

Nb = effect\_sizes[j]\*.20

Nc = effect\_sizes[j]\* .15

Nd = effect\_sizes[j]\*.05

} else {

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .20

Nd = effect\_sizes[j]\*.10

}

}

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = 55, sd =10)))

xD = cbind(round(rnorm (n = Nd, mean = Esize[l],sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

error1D = cbind(round(rnorm(Nd,0,2)))

error2D = cbind(round(rnorm(Nd,0,2)))

error3D = cbind(round(rnorm(Nd,0,2)))

error4D = cbind(round(rnorm(Nd,0,2)))

error5D = cbind(round(rnorm(Nd,0,2)))

growth1A = 0

growth2A = -1.5

growth3A = -2

growth4A = -1.5

growth5A = 0

growth1B = 0

growth2B = 0

growth3B = -.25

growth4B = -.75

growth5B = -1.5

growth1C = 0

growth2C = 0

growth3C = 2

growth4C = 6

growth5C = 12

growth1D = 0

growth2D = 1.5

growth3D = 2

growth4D = 1.5

growth5D = 0

Time1A = rowSums(cbind(xA,growth1A,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1B,error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1C, error1C), na.rm = TRUE)

Time1D = rowSums(cbind(xD, growth1D, error1D), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C, Time1D)

Time2A = rowSums(cbind(xA,growth2A,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2B, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, growth2C, error2C), na.rm = TRUE)

Time2D = rowSums(cbind(xD, growth2D,error2D), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C, Time2D)

Time3A = rowSums(cbind(xA,growth3A,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3B, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, growth3C, error3C), na.rm = TRUE)

Time3D = rowSums(cbind(xD, growth3D,error3D), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C, Time3D)

Time4A = rowSums(cbind(xA,growth4A,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4B,error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, growth4C,error4C), na.rm = TRUE)

Time4D = rowSums(cbind(xD, growth4D,error4D), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C, Time4D)

Time5A = rowSums(cbind(xA,growth5A,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5B, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5C, error5C), na.rm = TRUE)

Time5D = rowSums(cbind(xD, growth5D,error5D), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C, Time5D)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/4Group /Quad\_ExpIn/ES.3\_.5\_",Esize[l],"/",effect\_sizes[j],"/Quad\_ExpIn\_samlpe\_size\_", effect\_sizes[j],"proportion",sizeA[k],"\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

**Quadratic inverted U-shaped growth**

## Intercept Effect Sizes 0.3/0.5/0.8, 0.3/0.5/1.2, 0.3/.5/2.0,

## For 0.3/0.8/1.2 and ES 0.3/0.8/2.0 xC mean = 58, Esize = c(62,70)

n\_iterations = 1000

effect\_sizes = c(300, 500, 800, 1000, 2000)

sizeA = c(.50, .60, .40)

Esize = c(58, 62, 70)

for (i in 1:n\_iterations) {

for (j in seq\_along(effect\_sizes)) {

for (k in seq\_along(sizeA)) {

for (l in seq\_along(Esize)){

Na = effect\_sizes[j] \* sizeA[k]

if(sizeA[k] == .50){

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .10

Nd = effect\_sizes[j]\*.10

} else {

if (sizeA[k] == .60){

Nb = effect\_sizes[j]\*.20

Nc = effect\_sizes[j]\* .15

Nd = effect\_sizes[j]\*.05

} else {

Nb = effect\_sizes[j]\*.30

Nc = effect\_sizes[j]\* .20

Nd = effect\_sizes[j]\*.10

}

}

xA = cbind(round(rnorm(n = Na, mean =50, sd =10)))

xB = cbind(round(rnorm (n = Nb, mean = 53, sd =10)))

xC = cbind(round(rnorm (n = Nc, mean = 55, sd =10)))

xD = cbind(round(rnorm (n = Nd, mean = Esize[l],sd =10)))

error1A = cbind(round(rnorm(Na,0,2)))

error2A = cbind(round(rnorm(Na,0,2)))

error3A = cbind(round(rnorm(Na,0,2)))

error4A = cbind(round(rnorm(Na,0,2)))

error5A = cbind(round(rnorm(Na,0,2)))

error1B = cbind(round(rnorm(Nb,0,2)))

error2B = cbind(round(rnorm(Nb,0,2)))

error3B = cbind(round(rnorm(Nb,0,2)))

error4B = cbind(round(rnorm(Nb,0,2)))

error5B = cbind(round(rnorm(Nb,0,2)))

error1C = cbind(round(rnorm(Nc,0,2)))

error2C = cbind(round(rnorm(Nc,0,2)))

error3C = cbind(round(rnorm(Nc,0,2)))

error4C = cbind(round(rnorm(Nc,0,2)))

error5C = cbind(round(rnorm(Nc,0,2)))

error1D = cbind(round(rnorm(Nd,0,2)))

error2D = cbind(round(rnorm(Nd,0,2)))

error3D = cbind(round(rnorm(Nd,0,2)))

error4D = cbind(round(rnorm(Nd,0,2)))

error5D = cbind(round(rnorm(Nd,0,2)))

growth1B = 0

growth2B = 6

growth3B = 8

growth4B = 6

growth5B = 0

growth1C = 0

growth2C = -1.5

growth3C = -2

growth4C = -1.5

growth5C = 0

Time1A = rowSums(cbind(xA,error1A), na.rm = TRUE)

Time1B = rowSums(cbind(xB,growth1B,error1B), na.rm = TRUE)

Time1C = rowSums(cbind(xC, growth1C, error1C), na.rm = TRUE)

Time1D = rowSums(cbind(xD, error1D), na.rm = TRUE)

Combine1 = c(Time1A, Time1B, Time1C, Time1D)

Time2A = rowSums(cbind(xA,error2A), na.rm = TRUE)

Time2B = rowSums(cbind(xB,growth2B, error2B), na.rm = TRUE)

Time2C = rowSums(cbind(xC, growth2C, error2C), na.rm = TRUE)

Time2D = rowSums(cbind(xD, error2D), na.rm = TRUE)

Combine2 = c(Time2A, Time2B, Time2C, Time2D)

Time3A = rowSums(cbind(xA,error3A), na.rm = TRUE)

Time3B = rowSums(cbind(xB,growth3B, error3B), na.rm = TRUE)

Time3C = rowSums(cbind(xC, growth3C, error3C), na.rm = TRUE)

Time3D = rowSums(cbind(xD, error3D), na.rm = TRUE)

Combine3 = c(Time3A, Time3B, Time3C, Time3D)

Time4A = rowSums(cbind(xA,error4A), na.rm = TRUE)

Time4B = rowSums(cbind(xB,growth4B,error4B), na.rm = TRUE)

Time4C = rowSums(cbind(xC, growth4C,error4C), na.rm = TRUE)

Time4D = rowSums(cbind(xD, error4D), na.rm = TRUE)

Combine4 = c(Time4A, Time4B, Time4C, Time4D)

Time5A = rowSums(cbind(xA,error5A), na.rm = TRUE)

Time5B = rowSums(cbind(xB,growth5B, error5B), na.rm = TRUE)

Time5C = rowSums(cbind(xC, growth5C, error5C), na.rm = TRUE)

Time5D = rowSums(cbind(xD, error5D), na.rm = TRUE)

Combine5 = c(Time5A, Time5B, Time5C, Time5D)

data = cbind(Combine1, Combine2, Combine3, Combine4, Combine5)

write.table(data, file = paste0("C:/Users/Tiffany Shader/Desktop/4Group /Quad\_LargeX/ES.3\_.5\_",Esize[l],"/",effect\_sizes[j],"/Quad\_LargeX\_samlpe\_size\_", effect\_sizes[j],"proportion",sizeA[k],"\_iteration\_", i, ".txt"), row.names = F, col.names = F, sep = "\t")

}

}

}

}

Mplus Code

**Linear Growth**

TITLE: GMM Random Data, Linear growth, one class

Data:File is "C:/~/file\_name.txt";

Variable:Names are Y1 Y2 Y3 Y4 Y5;

CLASSES = c(1);

Analysis:Type = MIXTURE;

STARTS = 40 8;

LRTSTARTS = 0 0 200 40;

MODEL:

%OVERALL%

i s| Y1@0 Y2@1 Y3@2 Y4@3 Y5@4;

Plot: Type = plot3;

series = Y1-Y5 (s);

OUTPUT: TECH11 TECH14;

**Quadratic Growth**

TITLE: GMM Random Data, Quadratic growth, two class

Data:File is "C:/~/file\_name.txt";

Variable:Names are Y1 Y2 Y3 Y4 Y5;

CLASSES = c(2);

Analysis:Type = MIXTURE;

STARTS = 40 8;

LRTSTARTS = 0 0 200 40;

MODEL:

%OVERALL%

i s q | Y1@0 Y2@1 Y3@2 Y4@3 Y5@4;

Plot: Type = plot3;

series = Y1-Y5(q);

OUTPUT: TECH11 TECH14;