20181008a combining outcomes within a study

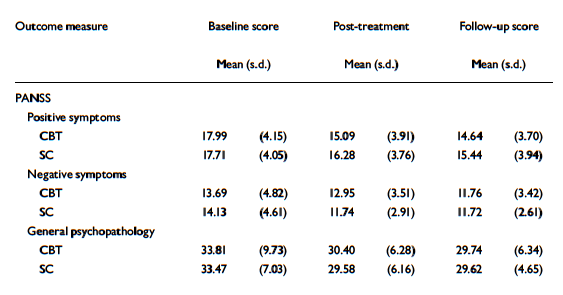
cheungngo

8 October 2018

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Sometimes we may need to combine the data reported from a study, e.g. they are reporting two related scales, or, they are reporting subscales separately without the aggregate scores.

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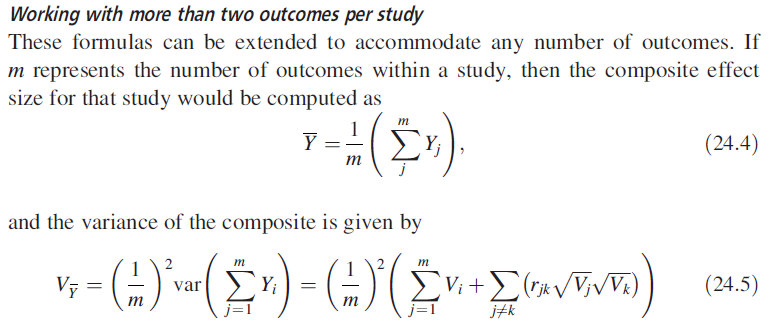


LUCIA R. VALMAGGIA 2005

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For example, in an RCT conducted in 2005, they are trying to look for any improvements in PANSS score after CBT in schiz patients. However, only the subscale has been reported. Therefore, we need to combine the scores before the meta-analysis.

### 



Borenstein

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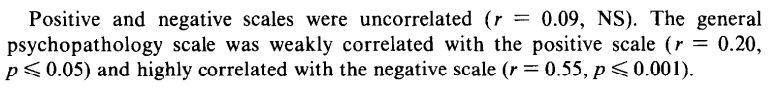
### Setting up the functions

m\_subgroup = function(m) {  
 sum(m) / length(m)  
}

sd\_subgroup = function(sd,r) {  
 k = length(sd)  
 a = (1/k)^2  
 b = sum(sd^2)  
 x = matrix(rep(0,k^2),nrow = k)  
 for (i in 1:k) {  
 for(j in 1:k) {  
 x[i,j] = r[i,j]\*sd[i]\*sd[j]  
 }  
 }  
 x[lower.tri(x,diag = T)] = 0  
 c = sum(x)  
 sqrt(a\*(b+c))  
}

### 

### Defining r



r between the PANSS subgroup

r\_PANSS = matrix(c(0,0.09,0.2,0.09,0,0.55,0.2,0.55,0),byrow = T,nrow = 3)  
r\_PANSS

## [,1] [,2] [,3]  
## [1,] 0.00 0.09 0.20  
## [2,] 0.09 0.00 0.55  
## [3,] 0.20 0.55 0.00

### 

### Combining the scores

pre\_CBT\_m = m\_subgroup(c(17.99,13.69,33.81))  
pre\_CBT\_sd = sd\_subgroup(c(4.15,4.82,9.73),r\_PANSS)  
c(pre\_CBT\_m,pre\_CBT\_sd)

## [1] 21.830000 4.356326

### Verify by hand

a = (1/3)^2  
b = sum(c(4.15,4.82,9.73)^2)  
c = 0.09\*4.15\*4.82 + 0.2\*4.15\*9.73 + 0.55\*4.82\*9.73  
sqrt(a\*(b+c))

## [1] 4.356326

### Combining the others

pre\_SC\_m = m\_subgroup(c(17.71,14.13,33.47))  
pre\_SC\_sd = sd\_subgroup(c(4.05,4.61,7.03),r\_PANSS)  
post\_CBT\_m = m\_subgroup(c(15.09,12.95,30.4))  
post\_CBT\_sd = sd\_subgroup(c(3.91,3.51,6.28),r\_PANSS)  
post\_SC\_m = m\_subgroup(c(16.28,11.74,29.58))  
post\_SC\_sd = sd\_subgroup(c(3.76,2.91,6.16),r\_PANSS)

### The results

results = matrix(c(pre\_CBT\_m,pre\_CBT\_sd,post\_CBT\_m,post\_CBT\_sd,  
 pre\_SC\_m,pre\_SC\_sd,post\_SC\_m,post\_SC\_sd),  
 byrow = T,  
 nrow = 2)  
colnames(results) = c('Pre-mean','(SD)','Post-mean','(SD)')  
rownames(results) = c('CBT','SC')  
results

## Pre-mean (SD) Post-mean (SD)  
## CBT 21.83 4.356326 19.48 3.078894  
## SC 21.77 3.531992 19.20 2.906457

### For other guidelines for combinations of subscales in schizophrenia, please refer to ‘Cognitive–behavioural therapy for the symptoms of schizophrenia: systematic review and meta-analysis with examination of potential bias’ p.22