new ES calculations

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6/9/2017

Contents

Read in data & calc ES

```
read.csv("ids_ma.csv")->x
table(x$coder,x$participant_design)
```

```
##
##                    between within_two
##   Alex Cristia           9         41
##   Alvaro Iturralde       0         12
```

```
#new entries don't have ES, they are all within_two
summary(x$corr) #all NA
```

```
##    Mode    NA's
## logical      62
```

```
x$pooled_SD=x$corr_imp=x$d_calc=x$d_calc_var=x$es_method=NA
x$corr_imp=0

#between calc
x$pooled_SD[x$participant_design=="between"]<- sqrt(((x$n_1[x$participant_design=="between"] - 1) * x$SD
x$es_method[x$participant_design=="between"]  <- "between"

#within_two calc
#summary(x[x$participant_design=="within_two",c("x_1","x_2","SD_1","SD_2")]) #checking - 41 NAs corresp
x$pooled_SD[x$participant_design=="within_two"]<- sqrt((x$SD_1[x$participant_design=="within_two"] ^ 2 +
x$es_method[x$participant_design=="within_two"]  <- "group_means_two"

x$d_calc <- (x$x_1 - x$x_2) / x$pooled_SD # Lipsey & Wilson (2001)
x$d_var_calc <- (2 * (1 - x$corr_imp)/ x$n_1) + (x$d_calc ^ 2 / (2 *x$n_1)) # Lipsey & Wilson (2001)

summary(x$d_var_calc) #50 NAs
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
## 0.05562 0.08525 0.09494 0.13370 0.17570 0.27230      50
```

```
x$d_calc[x$coder=="Alex Cristia"]<-x$d[x$coder=="Alex Cristia"]
x$d_var_calc[x$coder=="Alex Cristia"]<-x$d_var[x$coder=="Alex Cristia"]
summary(x$d_var_calc) #no NAs
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## 0.04277 0.08647 0.12310 0.13610 0.16510 0.37340
```

```
x$se=sqrt(x$d_var_calc)
x$w=1/sqrt(x$d_var_calc)
```

Fit MA: All data

This is the MA on the Dunst data

```
original=rma.uni(yi=d_calc, sei=se, weights=w,data=x,subset=c(coder=="Alex Cristia"))
summary(original)
```

```
##
## Random-Effects Model (k = 50; tau^2 estimator: REML)
##
##   logLik  deviance       AIC       BIC      AICc
## -51.3253  102.6507  106.6507  110.4343  106.9115
##
## tau^2 (estimated amount of total heterogeneity): 0.3193 (SE = 0.0890)
## tau (square root of estimated tau^2 value):      0.5650
## I^2 (total heterogeneity / total variability):   75.84%
## H^2 (total variability / sampling variability):  4.14
##
## Test for Heterogeneity:
## Q(df = 49) = 215.1498, p-val < .0001
##
## Model Results:
##
## estimate       se     zval     pval    ci.lb    ci.ub
##   0.7176   0.0953   7.5334   <.0001   0.5309   0.9043      ***
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Next, we consider in addition papers entered by the MetaLab team

```
withNew=rma.uni(yi=d_calc, sei=se, weights=w,data=x)
summary(withNew)
```

```
##
## Random-Effects Model (k = 62; tau^2 estimator: REML)
##
##   logLik  deviance       AIC       BIC      AICc
## -59.8050  119.6101  123.6101  127.8318  123.8170
##
## tau^2 (estimated amount of total heterogeneity): 0.2666 (SE = 0.0698)
## tau (square root of estimated tau^2 value):      0.5163
## I^2 (total heterogeneity / total variability):   72.35%
## H^2 (total variability / sampling variability):  3.62
##
## Test for Heterogeneity:
## Q(df = 61) = 237.2985, p-val < .0001
##
## Model Results:
```

```
##
## estimate       se     zval     pval    ci.lb    ci.ub
##   0.6404   0.0799   8.0124   <.0001   0.4837   0.7970      ***
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Contents of MA table

This is a rather diverse dataset, as the following levels portray.

```
table(x$infant_type)
```

```
##
##             AD_risk Hearing Impairement       down_syndrome
##                   2                   1                   1
##             typical
##                  58
```

```
table(x$stim_language)
```

```
##
## Cantonese   English
##         4        58
```

```
table(x$setting)
```

```
##
##                                Home                       Hospital room
##                                   2                                   1
##                          Laboratory Laboratory living room like setting
##                                  47                                  12
```

```
table(x$speaker)
```

```
##
## Child\342\200\231s mother         Unfamiliar female
##                         4                        27
##        Unfamiliar females           Unfamiliar male
##                         2                         2
##         Unfamiliar mother
##                        27
```

```
table(x$speech_type)
```

```
##
##     Filtered Naturalistic    Simulated  Synthesized
##            4           16           39            3
```

```
table(x$dependent_measure)
```

```
##
## facial_expression      looking_time  target_selection
##                 7                48                 7
```

Subset analyses: Most relevant

Focus on:

- looking times collected in a laboratory
- typically-developing infants
- aged 3???15 months
- natural IDS in English
- from an unfamiliar female speaker

```
subset(x, speech_type != "Filtered" & speech_type != "Synthesized" &
         speaker!="Child\342\200\231s mother" & speaker != "Unfamiliar male" &
         setting=="Laboratory" &
         stim_language=="English" &
         infant_type=="typical" &
         dependent_measure=="looking_time" &
         mean_age_1>=3*30.25 & mean_age_1<=15*30.25)->relevant
selected=rma.uni(yi=d_calc, sei=se, weights=w,data=relevant)
summary(selected)
```

```
##
## Random-Effects Model (k = 22; tau^2 estimator: REML)
##
##   logLik  deviance       AIC       BIC      AICc
## -24.4568   48.9136   52.9136   55.0026   53.5802
##
## tau^2 (estimated amount of total heterogeneity): 0.4580 (SE = 0.1731)
## tau (square root of estimated tau^2 value):      0.6767
## I^2 (total heterogeneity / total variability):   83.93%
## H^2 (total variability / sampling variability):  6.22
##
## Test for Heterogeneity:
## Q(df = 21) = 147.7741, p-val < .0001
##
## Model Results:
##
## estimate       se     zval     pval    ci.lb    ci.ub
##   0.5964   0.1617   3.6881   0.0002   0.2795   0.9134      ***
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

And with this estimate we can do a power ana for single studies.

```
pwr.t.test(d=selected$b[1],n=16,sig.level=.05,type="paired",alternative="greater")
```

```
##
##      Paired t test power calculation
##
##               n = 16
##               d = 0.5964164
##       sig.level = 0.05
##           power = 0.7360174
##     alternative = greater
##
## NOTE: n is number of *pairs*
```

Subset analyses: Split by age

Important: in our relevant subset, age is not a significant moderator.

```
relevant$age.c=relevant$mean_age_1-mean(relevant$mean_age_1,na.rm=T)
with_age=rma.uni(yi=d_calc, sei=se, weights=w,mods=age.c,data=relevant)
summary(with_age)
```

```
##
## Mixed-Effects Model (k = 22; tau^2 estimator: REML)
##
##   logLik  deviance       AIC       BIC      AICc
## -23.1395   46.2789   52.2789   55.2661   53.7789
##
## tau^2 (estimated amount of residual heterogeneity):     0.4505 (SE = 0.1754)
## tau (square root of estimated tau^2 value):             0.6712
## I^2 (residual heterogeneity / unaccounted variability): 83.50%
## H^2 (unaccounted variability / sampling variability):   6.06
## R^2 (amount of heterogeneity accounted for):            1.63%
##
## Test for Residual Heterogeneity:
## QE(df = 20) = 137.8546, p-val < .0001
##
## Test of Moderators (coefficient(s) 2):
## QM(df = 1) = 1.3769, p-val = 0.2406
##
## Model Results:
##
##          estimate      se     zval    pval    ci.lb   ci.ub
## intrcpt    0.6060  0.1606   3.7742  0.0002   0.2913  0.9207  ***
## mods      -0.0024  0.0021  -1.1734  0.2406  -0.0064  0.0016
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

However, to be informative, next I show results for age groups relevant to ManyBabies:

```
for(thisage in c(3,6,9,12)){
  subset(relevant,  mean_age_1>=thisage*30.25 & mean_age_1< (thisage+3) *30.25)->agesub
  print(paste("from", thisage, "to", thisage+3))
  if(dim(agesub)[1]>2) print(summary(rma.uni(yi=d_calc, sei=se, weights=w,data=agesub))) else print("no
}
```

```
## [1] "from 3 to 6"
##
## Random-Effects Model (k = 12; tau^2 estimator: REML)
##
##   logLik  deviance       AIC       BIC      AICc
## -15.7331   31.4662   35.4662   36.2620   36.9662
##
## tau^2 (estimated amount of total heterogeneity): 0.8601 (SE = 0.4099)
## tau (square root of estimated tau^2 value):      0.9274
## I^2 (total heterogeneity / total variability):   91.39%
## H^2 (total variability / sampling variability):  11.61
##
## Test for Heterogeneity:
```

```
## Q(df = 11) = 128.4465, p-val < .0001
##
## Model Results:
##
## estimate       se     zval     pval    ci.lb    ci.ub
##   0.8169   0.2880   2.8363   0.0046   0.2524   1.3814       **
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## [1] "from 6 to 9"
##
## Random-Effects Model (k = 7; tau^2 estimator: REML)
##
##   logLik  deviance       AIC       BIC      AICc
##   0.0422   -0.0845    3.9155    3.4990    7.9155
##
## tau^2 (estimated amount of total heterogeneity): 0 (SE = 0.0704)
## tau (square root of estimated tau^2 value):      0
## I^2 (total heterogeneity / total variability):   0.00%
## H^2 (total variability / sampling variability):  1.00
##
## Test for Heterogeneity:
## Q(df = 6) = 1.0265, p-val = 0.9846
##
## Model Results:
##
## estimate       se     zval     pval    ci.lb    ci.ub
##   0.3796   0.1350   2.8112   0.0049   0.1149   0.6442       **
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## [1] "from 9 to 12"
## [1] "not enough studies"
## [1] "from 12 to 15"
##
## Random-Effects Model (k = 3; tau^2 estimator: REML)
##
##   logLik  deviance       AIC       BIC      AICc
##   0.6941   -1.3882    2.6118   -0.0019   14.6118
##
## tau^2 (estimated amount of total heterogeneity): 0 (SE = 0.0649)
## tau (square root of estimated tau^2 value):      0
## I^2 (total heterogeneity / total variability):   0.00%
## H^2 (total variability / sampling variability):  1.00
##
## Test for Heterogeneity:
## Q(df = 2) = 0.3409, p-val = 0.8433
##
## Model Results:
##
## estimate       se     zval     pval    ci.lb    ci.ub
##   0.1826   0.1475   1.2381   0.2157  -0.1065   0.4717
```

```
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```