MetaAnalysis Assignment

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Introduction

In this notebook, we try to reproduce the Meta-Analysis of Hornsey & al 2016. We start by loading libraries.

```
library(haven)
library(metafor)
```

```
## Loading required package: Matrix
```

```
## Loading 'metafor' package (version 2.4-0). For an overview
## and introduction to the package please type: help(metafor).
```

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.0 --
```

```
## v ggplot2 3.3.2     v purrr   0.3.4
## v tibble  3.0.4     v dplyr   1.0.2
## v tidyr   1.1.2     v stringr 1.4.0
## v readr   1.4.0     v forcats 0.5.0
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x tidyr::expand() masks Matrix::expand()
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## x tidyr::pack()   masks Matrix::pack()
## x tidyr::unpack() masks Matrix::unpack()
```

```
NEP <- read_sav("NEP.sav")
ObjKnow      <- read_sav("Objective Knowledge.sav")
SubjKnow <- read_sav("Subjective Knowledge.sav")
FreeMark <- read_sav("Support for Free-market Ideology.sav")
TrustScientist <- read_sav("Trust in Scientists.sav")
```

Objective knowledge

First, we will start with one dataset, objective knowledge. A bit of datacleaning is required (shortening name of one study).

```
ObjKnow[15,1] <- "Hine, D. W., Reser et al (2013)"
```

Also, we need an estimate of the variance of the effect size. Since these are correctional studies, the correlations coefficients have been transformed to Fisher Z scores[1] for inferential purposes. The correctional coefficient is given by :

$$r = \frac{cov(X,Y)}{\sigma_X \sigma_Y}$$

Fisher transformation is given by :

$$z = \frac{1}{2} ln\left(\frac{1+r}{1-r}\right)$$

If $X_1..X_n$ and $Y_1, .., Y_n$ are i.i.d paired data, then z is asymptotically normally distributed[2] :

$$z \sim \mathcal{N}\left(\frac{1}{2} ln\left(\frac{1+r}{1-r}\right), \frac{1}{N-3}\right)$$

We can then compute the variance of the Fisher Z-scores.

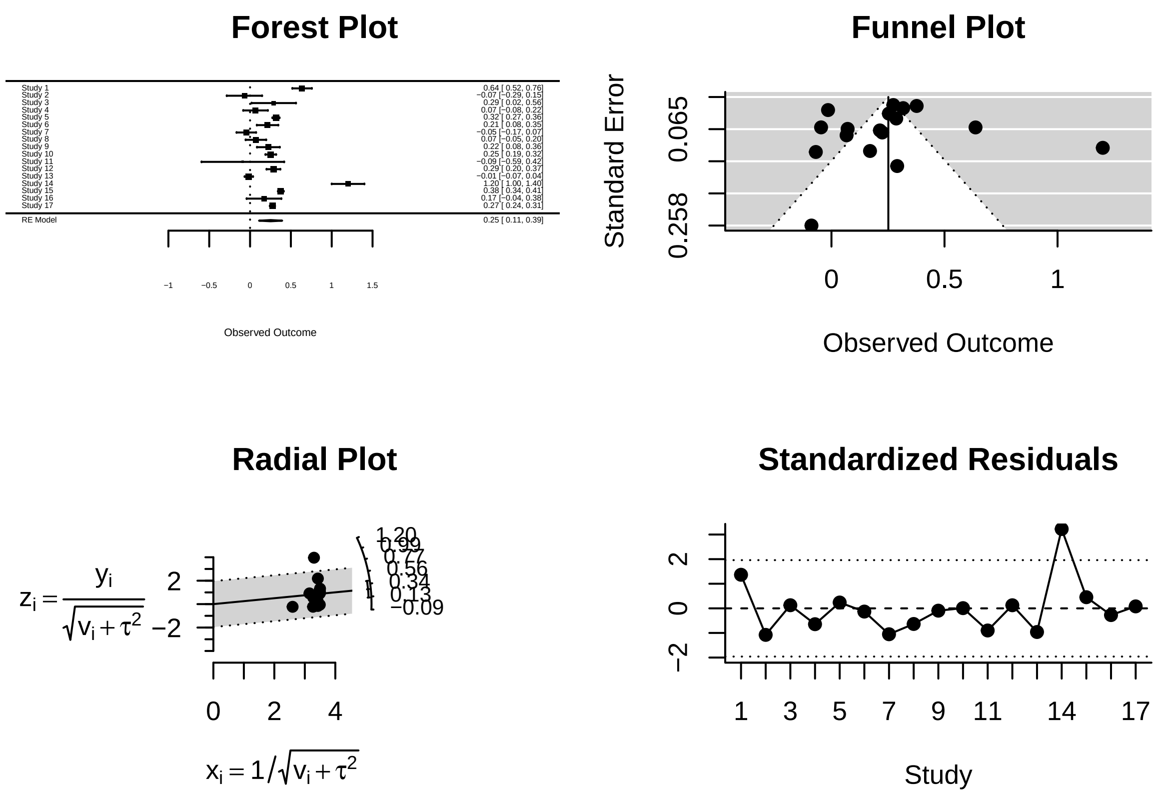
```
ObjKnow <- ObjKnow %>% mutate(var=1/(ObjKnow$Sample_size-3 ))
```

We now have at our disposal point estimate of the effect size (Z scores) and of the variance of this effect size. We start by fitting a Random Effect model (because it is standard and I don't know what else to do at this stage).

```
REM <- rma(yi = ObjKnow$FishersZ,vi = ObjKnow$var,method = "REML")
```

Let's look at fancy plots.

```
plot.rma.uni(REM)
```



References

[1] Fisher, R. A. (1915). "Frequency distribution of the values of the correlation coefficient in samples of an indefinitely large population". Biometrika. 10 (4): 507–521. doi:10.2307/2331838. hdl:2440/15166. JSTOR 2331838 [2] Fisher, R. A. (1921). "On the 'probable error' of a coefficient of correlation deduced from a small sample" (PDF). Metron. 1: 3–32.