Text Mining Approach for Adapting a School-Based Sexual Health Promotion Program in Colombia

Pablo Vallejo-Medina¹, Juan C. Correa¹, Mayra Gómez-Lugo¹, Diego Alejandro Saavedra¹, Eileen García-Montaño², Diana Pérez-Pedraza², Janivys Niebles-Charris², Paola García-Roncallo³, Daniella Abello-Luque³, José Pedro Espada³, Alexandra Morales³

¹Fundación Universitaria Konrad Lorenz, Faculty of Psychology, ²Universidad de la Costa, Social Sciences Department, ³Universidad Miguel Hernandez de Elche, Health Psychology Department

On July 10, 2019, we performed our analysis in the following machine:

R version 3.6.0 (2019-04-26)
Platform: x86_64-pc-linux-gnu (64-bit)
Running under: elementary OS 0.4.1 Loki

locale:
[1] LC_CTYPE=en_US.UTF-8 LC_NUMERIC=C
[3] LC_TIME=es_CO.UTF-8 LC_COLLATE=en_US.UTF-8
[5] LC_MONETARY=es_CO.UTF-8 LC_MESSAGES=en_US.UTF-8
[7] LC_PAPER=es_CO.UTF-8 LC_NAME=C
[9] LC_ADDRESS=C LC_TELEPHONE=C
[11] LC_MEASUREMENT=es_CO.UTF-8 LC_IDENTIFICATION=C

attached base packages:
[1] stats graphics grDevices utils datasets methods
[7] base

other attached packages:
[1] koRpus_0.11-5 sylly_0.1-5

loaded via a namespace (and not attached):
[1] Rcpp_1.0.1 assertthat_0.2.1 crayon_1.3.4
[4] dplyr_0.8.3 grid_3.6.0 R6_2.4.0
[7] magrittr_1.5 scales_1.0.0
[10] ggplot2_3.2.0 pillar_1.4.2 rlang_0.4.0
[13] lazyeval_0.2.2 data.table_1.12.2 rstudioapi_0.10
[16] tools_3.6.0 glue_1.3.1 purr_0.3.2
[19] munsell_0.5.0 compiler_3.6.0 pkgconfig_2.0.2

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Before starting

Make sure you have downloaded and installed the following softwares:

1) R from https://cran.r-project.org/
2) Rstudio from https://www.rstudio.com/products/rstudio/download/
3) koRpus by running install.packages("koRpus") in the console
4) koRpus.lang.es by running install.koRpus.lang("es") in the console
5) KH Coder from https://khcoder.net/en/

1 Download the following five txt-formatted files. [Session1.txt] [Session2.txt] [Session3.txt] [Session4.txt] [Session5.txt] and put these files inside a folder with the name "COMPAS".

2 If you are using a Linux distro, you can put that folder in the following path: "/home/juan/Documents/COMPAS". In Windows, you can put it in the following path: "C:\Users\juan\Documents\COMPAS".

3 Download the following R-script and run it accordingly. [CompasProgramAnalysis.R]

Note, that in line 10 of this script you will see this code:

```r
folder <- setwd("/home/juan/Documents/COMPAS")
```

Make sure to replace the path where you downloaded the folder COMPAS and edit the above code accordingly.

4 In line 11 you will see this code:

```r
sesiones <- dir(folder)
```

After running that code, check that the following output is true

```r
sesiones
[1] "Session1.txt" "Session2.txt" "Session3.txt" "Session4.txt" "Session5.txt"
```

Otherwise, run line 11 again.
Run the following code

```r
library(koRpus)
ID <- paste("session",1:length(sesiones), sep = "")
results <- vector("list", length(sesiones))
tok <- vector("list", length(sesiones))
Escolaridad <- vector("double", length(sesiones))
Edad <- vector("double", length(sesiones))
library(koRpus.lang.es)
for(i in seq_along(sesiones)){
  results[[i]] <- tokenize(sesiones[[i]], lang="es")
tok[[i]] <- SMOG(results[[i]])
Escolaridad[[i]] <- tok[[i]]@SMOG[[2]]
Edad[[i]] <- tok[[i]]@SMOG[[3]]
}
DifText <- data.frame(ID, sesiones, Escolaridad, Edad)
hist(DifText$Escolaridad, xlab = "Años de Escolaridad", col = "lightblue")
library(ggplot2)
ggplot(DifText, aes(DifText$ID, DifText$Escolaridad)) + geom_bar(stat = "identity", fill="red") +
xlab("Session Number") + ylab("Years of Education")

df2 <- data.frame(Variable=rep(c("Scholarity", "Age"), each=5),
  Session=rep(c("Session1", "Session2", "Session3","Session4","Session5"),2),
  Years=c(13.12, 12.93, 12.67, 11.62, 14.46, 18.12, 17.93,17.67, 16.62, 19.46))
ggplot(data=df2, aes(x=Session, y=Years, fill=Variable)) +
  geom_bar(stat="identity", position=position_dodge()) +
  geom_text(aes(label=Years), vjust=1.6, color="white",position = position_dodge(0.9), size=3.5)
```

A second part of the analyses entails the visualization of the network of words co-occurrence in KH Coder. For this process, we removed Spanish stopwords (e.g., articles, prepositions, etc.) as well as frequent verbs such as: "can," "to be," "to have," and non-informative words such as "case," "question" and "answer.". Secondly, we removed regular expressions (i.e., hola, bienvenido, etc.) and ordinal adjectives (firstly, second, etc.) from the corpus analysis (i.e., a total of 8 new words irrelevant for the program). We set the sentences as the unit of analysis and employed a minimum term frequency of 10 as a threshold to depict words co-occurrence, along with a Jaccard similarity index as the filter for connexions between words. We colored our resulting networks following a betweenness centrality criterion, which stands for a metric that quantifies the statistical importance of a word, represented as a node within a network that shows the connexion between words. In addition, we used the following coding rules for merging semantic similar words.

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