GDAT622\_Investigation4\_James

James Stanfield

6/21/2020

Data is originally from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0145450>

load(here("Data/Emotions.RData"))  
  
#Let's take a quick look at our data:  
head(emotion\_raw)

## # A tibble: 6 x 21  
## id Hours Day Pride Love Hope Gratitude Joy Satisfaction Awe  
## <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 1 1 3 0 0 0 0 0 0 0  
## 2 1 14 1 0 0 0 0 0 0 0  
## 3 1 14 2 0 0 0 0 0 0 0  
## 4 1 14 4 0 0 0 0 0 0 0  
## 5 1 15 3 0 0 0 0 0 0 0  
## 6 1 15 3 0 0 0 0 0 0 0  
## # ... with 11 more variables: Amusement <dbl>, Alertness <dbl>,  
## # Anxiety <dbl>, Disdain <dbl>, Offense <dbl>, Guilt <dbl>,  
## # Disgust <dbl>, Fear <dbl>, Embarrassment <dbl>, Sadness <dbl>,  
## # Anger <dbl>

#Let's get a sense of roughly how many data points per subject we have  
dplyr::filter(emotion\_raw, id == 1)

## # A tibble: 7 x 21  
## id Hours Day Pride Love Hope Gratitude Joy Satisfaction Awe  
## <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 1 1 3 0 0 0 0 0 0 0  
## 2 1 14 1 0 0 0 0 0 0 0  
## 3 1 14 2 0 0 0 0 0 0 0  
## 4 1 14 4 0 0 0 0 0 0 0  
## 5 1 15 3 0 0 0 0 0 0 0  
## 6 1 15 3 0 0 0 0 0 0 0  
## 7 1 19 1 0 0 0 0 0 0 0  
## # ... with 11 more variables: Amusement <dbl>, Alertness <dbl>,  
## # Anxiety <dbl>, Disdain <dbl>, Offense <dbl>, Guilt <dbl>,  
## # Disgust <dbl>, Fear <dbl>, Embarrassment <dbl>, Sadness <dbl>,  
## # Anger <dbl>

#Looks like subject 1 only has 7 entries.

summary(emotion\_raw)

## id Hours Day Pride   
## Min. : 1 Min. : 0.0 Min. :1.00 Min. :0.000   
## 1st Qu.:17380 1st Qu.:10.0 1st Qu.:2.00 1st Qu.:0.000   
## Median :34771 Median :14.0 Median :4.00 Median :0.000   
## Mean :34762 Mean :13.9 Mean :3.96 Mean :0.133   
## 3rd Qu.:52158 3rd Qu.:18.0 3rd Qu.:6.00 3rd Qu.:0.000   
## Max. :69544 Max. :23.0 Max. :7.00 Max. :1.000   
## NA's :31 NA's :31 NA's :31   
## Love Hope Gratitude Joy   
## Min. :0.00 Min. :0.00 Min. :0.00 Min. :0.00   
## 1st Qu.:0.00 1st Qu.:0.00 1st Qu.:0.00 1st Qu.:0.00   
## Median :0.00 Median :0.00 Median :0.00 Median :0.00   
## Mean :0.27 Mean :0.24 Mean :0.11 Mean :0.34   
## 3rd Qu.:1.00 3rd Qu.:0.00 3rd Qu.:0.00 3rd Qu.:1.00   
## Max. :1.00 Max. :1.00 Max. :1.00 Max. :1.00   
## NA's :36 NA's :36 NA's :36 NA's :36   
## Satisfaction Awe Amusement Alertness   
## Min. :0.00 Min. :0.00 Min. :0.00 Min. :0.00   
## 1st Qu.:0.00 1st Qu.:0.00 1st Qu.:0.00 1st Qu.:0.00   
## Median :0.00 Median :0.00 Median :0.00 Median :0.00   
## Mean :0.27 Mean :0.06 Mean :0.16 Mean :0.26   
## 3rd Qu.:1.00 3rd Qu.:0.00 3rd Qu.:0.00 3rd Qu.:1.00   
## Max. :1.00 Max. :1.00 Max. :1.00 Max. :1.00   
## NA's :36 NA's :36 NA's :36 NA's :36   
## Anxiety Disdain Offense Guilt   
## Min. :0.0 Min. :0 Min. :0 Min. :0.0   
## 1st Qu.:0.0 1st Qu.:0 1st Qu.:0 1st Qu.:0.0   
## Median :0.0 Median :0 Median :0 Median :0.0   
## Mean :0.3 Mean :0 Mean :0 Mean :0.1   
## 3rd Qu.:1.0 3rd Qu.:0 3rd Qu.:0 3rd Qu.:0.0   
## Max. :1.0 Max. :1 Max. :1 Max. :1.0   
## NA's :1199 NA's :1199 NA's :1199 NA's :1199   
## Disgust Fear Embarrassment Sadness   
## Min. :0.0 Min. :0.0 Min. :0 Min. :0.0   
## 1st Qu.:0.0 1st Qu.:0.0 1st Qu.:0 1st Qu.:0.0   
## Median :0.0 Median :0.0 Median :0 Median :0.0   
## Mean :0.1 Mean :0.1 Mean :0 Mean :0.2   
## 3rd Qu.:0.0 3rd Qu.:0.0 3rd Qu.:0 3rd Qu.:0.0   
## Max. :1.0 Max. :1.0 Max. :1 Max. :1.0   
## NA's :1199 NA's :1199 NA's :1199 NA's :1199   
## Anger   
## Min. :0.0   
## 1st Qu.:0.0   
## Median :0.0   
## Mean :0.1   
## 3rd Qu.:0.0   
## Max. :1.0   
## NA's :1199

Looking at the summary tells us that we have 1200 rows with NA’s. Given that we have over 60,000 rows, I have no problem just eliminating those rows.

#complete.case to only keep filled rows distinct to remove duplicate rows  
emotion\_raw[complete.cases(emotion\_raw), ] %>% distinct(.) -> emotion2  
str(emotion2)

## tibble [66,504 x 21] (S3: tbl\_df/tbl/data.frame)  
## $ id : num [1:66504] 1 1 1 1 1 1 1 8 8 8 ...  
## $ Hours : num [1:66504] 1 14 14 14 15 15 19 8 9 10 ...  
## $ Day : num [1:66504] 3 1 2 4 3 3 1 5 2 7 ...  
## $ Pride : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Love : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Hope : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Gratitude : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Joy : num [1:66504] 0 0 0 0 0 0 0 1 1 0 ...  
## $ Satisfaction : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Awe : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Amusement : num [1:66504] 0 0 0 0 0 0 0 1 0 0 ...  
## $ Alertness : num [1:66504] 0 0 0 1 0 1 0 0 1 1 ...  
## $ Anxiety : num [1:66504] 0 0 0 0 0 1 0 0 0 0 ...  
## $ Disdain : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Offense : num [1:66504] 0 0 0 0 0 0 1 0 0 0 ...  
## $ Guilt : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Disgust : num [1:66504] 0 0 1 0 0 0 0 0 0 0 ...  
## $ Fear : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...  
## $ Embarrassment: num [1:66504] 0 0 0 1 1 0 0 0 0 0 ...  
## $ Sadness : num [1:66504] 0 0 0 0 0 1 1 0 0 0 ...  
## $ Anger : num [1:66504] 0 0 0 0 0 0 0 0 0 0 ...

We still have over 68,000 rows, so we haven’t lost that much data. This will make it simpler when we build our matrix(ces) later.

n\_distinct(emotion2$id)

## [1] 12108

unique(emotion2$Day)

## [1] 3 1 2 4 5 7 6

dplyr::filter(emotion2, Pride == 1) %>% dplyr::filter(., Day == 1)

## # A tibble: 1,229 x 21  
## id Hours Day Pride Love Hope Gratitude Joy Satisfaction Awe  
## <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 47 20 1 1 0 1 1 1 1 0  
## 2 47 20 1 1 0 1 1 1 1 0  
## 3 54 16 1 1 1 0 0 1 1 0  
## 4 81 11 1 1 1 1 1 0 0 1  
## 5 205 15 1 1 0 0 0 1 1 0  
## 6 250 11 1 1 0 0 1 0 0 0  
## 7 340 11 1 1 1 0 0 1 1 0  
## 8 340 21 1 1 1 0 0 1 1 1  
## 9 383 21 1 1 1 1 1 1 1 1  
## 10 432 15 1 1 1 0 0 1 1 0  
## # ... with 1,219 more rows, and 11 more variables: Amusement <dbl>,  
## # Alertness <dbl>, Anxiety <dbl>, Disdain <dbl>, Offense <dbl>,  
## # Guilt <dbl>, Disgust <dbl>, Fear <dbl>, Embarrassment <dbl>,  
## # Sadness <dbl>, Anger <dbl>

Completely by luck, I have stumbled across a weird duplicate for id = 47, Hours = 20, Day = 1. These rows are not perfect duplicates, but fit in exactly the same slot. I’m not sure how to handle this as this may not be an isolated case. I’ll ignore it for now, but may have to come back and fix it if I start to get strange results.

dplyr::filter(emotion2, Pride == 1) %>% dplyr::filter(., Day == 1) %>% arrange(., Hours)

## # A tibble: 1,229 x 21  
## id Hours Day Pride Love Hope Gratitude Joy Satisfaction Awe  
## <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 15351 0 1 1 1 0 0 1 1 0  
## 2 15528 0 1 1 0 0 0 0 1 0  
## 3 17732 0 1 1 0 0 0 0 1 0  
## 4 20089 0 1 1 1 1 1 1 1 1  
## 5 29616 0 1 1 0 0 0 1 1 0  
## 6 39487 0 1 1 0 1 0 1 1 0  
## 7 45775 0 1 1 0 0 0 0 0 0  
## 8 49104 0 1 1 1 0 1 1 1 0  
## 9 58135 0 1 1 0 1 0 1 1 0  
## 10 61058 0 1 1 0 0 0 0 0 0  
## # ... with 1,219 more rows, and 11 more variables: Amusement <dbl>,  
## # Alertness <dbl>, Anxiety <dbl>, Disdain <dbl>, Offense <dbl>,  
## # Guilt <dbl>, Disgust <dbl>, Fear <dbl>, Embarrassment <dbl>,  
## # Sadness <dbl>, Anger <dbl>

select(emotion2, 4:21) -> emotion3  
emotion3$row\_num <- seq.int(nrow(emotion3))  
  
#For speed sake, we'll just pluck out the out the first 1000 entries.  
select(emotion3[1:1000,], 19, 1:18) -> emotion\_final  
  
emotion\_final[1:20,]

## # A tibble: 20 x 19  
## row\_num Pride Love Hope Gratitude Joy Satisfaction Awe Amusement  
## <int> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 1 0 0 0 0 0 0 0 0  
## 2 2 0 0 0 0 0 0 0 0  
## 3 3 0 0 0 0 0 0 0 0  
## 4 4 0 0 0 0 0 0 0 0  
## 5 5 0 0 0 0 0 0 0 0  
## 6 6 0 0 0 0 0 0 0 0  
## 7 7 0 0 0 0 0 0 0 0  
## 8 8 0 0 0 0 1 0 0 1  
## 9 9 0 0 0 0 1 0 0 0  
## 10 10 0 0 0 0 0 0 0 0  
## 11 11 0 0 0 0 0 0 0 0  
## 12 12 0 0 0 0 0 0 0 0  
## 13 13 0 0 0 0 0 0 0 0  
## 14 14 0 0 0 0 1 1 0 0  
## 15 15 0 0 0 0 0 0 0 0  
## 16 16 0 0 0 1 0 0 0 0  
## 17 17 0 0 0 0 0 0 0 0  
## 18 18 0 0 0 0 0 0 0 0  
## 19 19 0 0 0 0 0 0 0 0  
## 20 20 0 0 0 0 0 0 0 0  
## # ... with 10 more variables: Alertness <dbl>, Anxiety <dbl>,  
## # Disdain <dbl>, Offense <dbl>, Guilt <dbl>, Disgust <dbl>, Fear <dbl>,  
## # Embarrassment <dbl>, Sadness <dbl>, Anger <dbl>

#use expand grid to create every possible edge  
expand.grid(colnames(emotion\_final[,-1]), colnames(emotion\_final[,-1]), w = 0,  
 KEEP.OUT.ATTRS = TRUE, stringsAsFactors = TRUE) %>%  
 dplyr::filter(Var1 != Var2)-> el  
  
el

## Var1 Var2 w  
## 1 Love Pride 0  
## 2 Hope Pride 0  
## 3 Gratitude Pride 0  
## 4 Joy Pride 0  
## 5 Satisfaction Pride 0  
## 6 Awe Pride 0  
## 7 Amusement Pride 0  
## 8 Alertness Pride 0  
## 9 Anxiety Pride 0  
## 10 Disdain Pride 0  
## 11 Offense Pride 0  
## 12 Guilt Pride 0  
## 13 Disgust Pride 0  
## 14 Fear Pride 0  
## 15 Embarrassment Pride 0  
## 16 Sadness Pride 0  
## 17 Anger Pride 0  
## 18 Pride Love 0  
## 19 Hope Love 0  
## 20 Gratitude Love 0  
## 21 Joy Love 0  
## 22 Satisfaction Love 0  
## 23 Awe Love 0  
## 24 Amusement Love 0  
## 25 Alertness Love 0  
## 26 Anxiety Love 0  
## 27 Disdain Love 0  
## 28 Offense Love 0  
## 29 Guilt Love 0  
## 30 Disgust Love 0  
## 31 Fear Love 0  
## 32 Embarrassment Love 0  
## 33 Sadness Love 0  
## 34 Anger Love 0  
## 35 Pride Hope 0  
## 36 Love Hope 0  
## 37 Gratitude Hope 0  
## 38 Joy Hope 0  
## 39 Satisfaction Hope 0  
## 40 Awe Hope 0  
## 41 Amusement Hope 0  
## 42 Alertness Hope 0  
## 43 Anxiety Hope 0  
## 44 Disdain Hope 0  
## 45 Offense Hope 0  
## 46 Guilt Hope 0  
## 47 Disgust Hope 0  
## 48 Fear Hope 0  
## 49 Embarrassment Hope 0  
## 50 Sadness Hope 0  
## 51 Anger Hope 0  
## 52 Pride Gratitude 0  
## 53 Love Gratitude 0  
## 54 Hope Gratitude 0  
## 55 Joy Gratitude 0  
## 56 Satisfaction Gratitude 0  
## 57 Awe Gratitude 0  
## 58 Amusement Gratitude 0  
## 59 Alertness Gratitude 0  
## 60 Anxiety Gratitude 0  
## 61 Disdain Gratitude 0  
## 62 Offense Gratitude 0  
## 63 Guilt Gratitude 0  
## 64 Disgust Gratitude 0  
## 65 Fear Gratitude 0  
## 66 Embarrassment Gratitude 0  
## 67 Sadness Gratitude 0  
## 68 Anger Gratitude 0  
## 69 Pride Joy 0  
## 70 Love Joy 0  
## 71 Hope Joy 0  
## 72 Gratitude Joy 0  
## 73 Satisfaction Joy 0  
## 74 Awe Joy 0  
## 75 Amusement Joy 0  
## 76 Alertness Joy 0  
## 77 Anxiety Joy 0  
## 78 Disdain Joy 0  
## 79 Offense Joy 0  
## 80 Guilt Joy 0  
## 81 Disgust Joy 0  
## 82 Fear Joy 0  
## 83 Embarrassment Joy 0  
## 84 Sadness Joy 0  
## 85 Anger Joy 0  
## 86 Pride Satisfaction 0  
## 87 Love Satisfaction 0  
## 88 Hope Satisfaction 0  
## 89 Gratitude Satisfaction 0  
## 90 Joy Satisfaction 0  
## 91 Awe Satisfaction 0  
## 92 Amusement Satisfaction 0  
## 93 Alertness Satisfaction 0  
## 94 Anxiety Satisfaction 0  
## 95 Disdain Satisfaction 0  
## 96 Offense Satisfaction 0  
## 97 Guilt Satisfaction 0  
## 98 Disgust Satisfaction 0  
## 99 Fear Satisfaction 0  
## 100 Embarrassment Satisfaction 0  
## 101 Sadness Satisfaction 0  
## 102 Anger Satisfaction 0  
## 103 Pride Awe 0  
## 104 Love Awe 0  
## 105 Hope Awe 0  
## 106 Gratitude Awe 0  
## 107 Joy Awe 0  
## 108 Satisfaction Awe 0  
## 109 Amusement Awe 0  
## 110 Alertness Awe 0  
## 111 Anxiety Awe 0  
## 112 Disdain Awe 0  
## 113 Offense Awe 0  
## 114 Guilt Awe 0  
## 115 Disgust Awe 0  
## 116 Fear Awe 0  
## 117 Embarrassment Awe 0  
## 118 Sadness Awe 0  
## 119 Anger Awe 0  
## 120 Pride Amusement 0  
## 121 Love Amusement 0  
## 122 Hope Amusement 0  
## 123 Gratitude Amusement 0  
## 124 Joy Amusement 0  
## 125 Satisfaction Amusement 0  
## 126 Awe Amusement 0  
## 127 Alertness Amusement 0  
## 128 Anxiety Amusement 0  
## 129 Disdain Amusement 0  
## 130 Offense Amusement 0  
## 131 Guilt Amusement 0  
## 132 Disgust Amusement 0  
## 133 Fear Amusement 0  
## 134 Embarrassment Amusement 0  
## 135 Sadness Amusement 0  
## 136 Anger Amusement 0  
## 137 Pride Alertness 0  
## 138 Love Alertness 0  
## 139 Hope Alertness 0  
## 140 Gratitude Alertness 0  
## 141 Joy Alertness 0  
## 142 Satisfaction Alertness 0  
## 143 Awe Alertness 0  
## 144 Amusement Alertness 0  
## 145 Anxiety Alertness 0  
## 146 Disdain Alertness 0  
## 147 Offense Alertness 0  
## 148 Guilt Alertness 0  
## 149 Disgust Alertness 0  
## 150 Fear Alertness 0  
## 151 Embarrassment Alertness 0  
## 152 Sadness Alertness 0  
## 153 Anger Alertness 0  
## 154 Pride Anxiety 0  
## 155 Love Anxiety 0  
## 156 Hope Anxiety 0  
## 157 Gratitude Anxiety 0  
## 158 Joy Anxiety 0  
## 159 Satisfaction Anxiety 0  
## 160 Awe Anxiety 0  
## 161 Amusement Anxiety 0  
## 162 Alertness Anxiety 0  
## 163 Disdain Anxiety 0  
## 164 Offense Anxiety 0  
## 165 Guilt Anxiety 0  
## 166 Disgust Anxiety 0  
## 167 Fear Anxiety 0  
## 168 Embarrassment Anxiety 0  
## 169 Sadness Anxiety 0  
## 170 Anger Anxiety 0  
## 171 Pride Disdain 0  
## 172 Love Disdain 0  
## 173 Hope Disdain 0  
## 174 Gratitude Disdain 0  
## 175 Joy Disdain 0  
## 176 Satisfaction Disdain 0  
## 177 Awe Disdain 0  
## 178 Amusement Disdain 0  
## 179 Alertness Disdain 0  
## 180 Anxiety Disdain 0  
## 181 Offense Disdain 0  
## 182 Guilt Disdain 0  
## 183 Disgust Disdain 0  
## 184 Fear Disdain 0  
## 185 Embarrassment Disdain 0  
## 186 Sadness Disdain 0  
## 187 Anger Disdain 0  
## 188 Pride Offense 0  
## 189 Love Offense 0  
## 190 Hope Offense 0  
## 191 Gratitude Offense 0  
## 192 Joy Offense 0  
## 193 Satisfaction Offense 0  
## 194 Awe Offense 0  
## 195 Amusement Offense 0  
## 196 Alertness Offense 0  
## 197 Anxiety Offense 0  
## 198 Disdain Offense 0  
## 199 Guilt Offense 0  
## 200 Disgust Offense 0  
## 201 Fear Offense 0  
## 202 Embarrassment Offense 0  
## 203 Sadness Offense 0  
## 204 Anger Offense 0  
## 205 Pride Guilt 0  
## 206 Love Guilt 0  
## 207 Hope Guilt 0  
## 208 Gratitude Guilt 0  
## 209 Joy Guilt 0  
## 210 Satisfaction Guilt 0  
## 211 Awe Guilt 0  
## 212 Amusement Guilt 0  
## 213 Alertness Guilt 0  
## 214 Anxiety Guilt 0  
## 215 Disdain Guilt 0  
## 216 Offense Guilt 0  
## 217 Disgust Guilt 0  
## 218 Fear Guilt 0  
## 219 Embarrassment Guilt 0  
## 220 Sadness Guilt 0  
## 221 Anger Guilt 0  
## 222 Pride Disgust 0  
## 223 Love Disgust 0  
## 224 Hope Disgust 0  
## 225 Gratitude Disgust 0  
## 226 Joy Disgust 0  
## 227 Satisfaction Disgust 0  
## 228 Awe Disgust 0  
## 229 Amusement Disgust 0  
## 230 Alertness Disgust 0  
## 231 Anxiety Disgust 0  
## 232 Disdain Disgust 0  
## 233 Offense Disgust 0  
## 234 Guilt Disgust 0  
## 235 Fear Disgust 0  
## 236 Embarrassment Disgust 0  
## 237 Sadness Disgust 0  
## 238 Anger Disgust 0  
## 239 Pride Fear 0  
## 240 Love Fear 0  
## 241 Hope Fear 0  
## 242 Gratitude Fear 0  
## 243 Joy Fear 0  
## 244 Satisfaction Fear 0  
## 245 Awe Fear 0  
## 246 Amusement Fear 0  
## 247 Alertness Fear 0  
## 248 Anxiety Fear 0  
## 249 Disdain Fear 0  
## 250 Offense Fear 0  
## 251 Guilt Fear 0  
## 252 Disgust Fear 0  
## 253 Embarrassment Fear 0  
## 254 Sadness Fear 0  
## 255 Anger Fear 0  
## 256 Pride Embarrassment 0  
## 257 Love Embarrassment 0  
## 258 Hope Embarrassment 0  
## 259 Gratitude Embarrassment 0  
## 260 Joy Embarrassment 0  
## 261 Satisfaction Embarrassment 0  
## 262 Awe Embarrassment 0  
## 263 Amusement Embarrassment 0  
## 264 Alertness Embarrassment 0  
## 265 Anxiety Embarrassment 0  
## 266 Disdain Embarrassment 0  
## 267 Offense Embarrassment 0  
## 268 Guilt Embarrassment 0  
## 269 Disgust Embarrassment 0  
## 270 Fear Embarrassment 0  
## 271 Sadness Embarrassment 0  
## 272 Anger Embarrassment 0  
## 273 Pride Sadness 0  
## 274 Love Sadness 0  
## 275 Hope Sadness 0  
## 276 Gratitude Sadness 0  
## 277 Joy Sadness 0  
## 278 Satisfaction Sadness 0  
## 279 Awe Sadness 0  
## 280 Amusement Sadness 0  
## 281 Alertness Sadness 0  
## 282 Anxiety Sadness 0  
## 283 Disdain Sadness 0  
## 284 Offense Sadness 0  
## 285 Guilt Sadness 0  
## 286 Disgust Sadness 0  
## 287 Fear Sadness 0  
## 288 Embarrassment Sadness 0  
## 289 Anger Sadness 0  
## 290 Pride Anger 0  
## 291 Love Anger 0  
## 292 Hope Anger 0  
## 293 Gratitude Anger 0  
## 294 Joy Anger 0  
## 295 Satisfaction Anger 0  
## 296 Awe Anger 0  
## 297 Amusement Anger 0  
## 298 Alertness Anger 0  
## 299 Anxiety Anger 0  
## 300 Disdain Anger 0  
## 301 Offense Anger 0  
## 302 Guilt Anger 0  
## 303 Disgust Anger 0  
## 304 Fear Anger 0  
## 305 Embarrassment Anger 0  
## 306 Sadness Anger 0

names <- colnames(emotion\_final[,-1])  
  
matrix(0,  
 nrow = (18),  
 ncol = (18),  
 dimnames = list(c(names), c(names))  
 ) -> emotion\_mat #create matrix of correct size  
emotion\_mat

## Pride Love Hope Gratitude Joy Satisfaction Awe Amusement  
## Pride 0 0 0 0 0 0 0 0  
## Love 0 0 0 0 0 0 0 0  
## Hope 0 0 0 0 0 0 0 0  
## Gratitude 0 0 0 0 0 0 0 0  
## Joy 0 0 0 0 0 0 0 0  
## Satisfaction 0 0 0 0 0 0 0 0  
## Awe 0 0 0 0 0 0 0 0  
## Amusement 0 0 0 0 0 0 0 0  
## Alertness 0 0 0 0 0 0 0 0  
## Anxiety 0 0 0 0 0 0 0 0  
## Disdain 0 0 0 0 0 0 0 0  
## Offense 0 0 0 0 0 0 0 0  
## Guilt 0 0 0 0 0 0 0 0  
## Disgust 0 0 0 0 0 0 0 0  
## Fear 0 0 0 0 0 0 0 0  
## Embarrassment 0 0 0 0 0 0 0 0  
## Sadness 0 0 0 0 0 0 0 0  
## Anger 0 0 0 0 0 0 0 0  
## Alertness Anxiety Disdain Offense Guilt Disgust Fear  
## Pride 0 0 0 0 0 0 0  
## Love 0 0 0 0 0 0 0  
## Hope 0 0 0 0 0 0 0  
## Gratitude 0 0 0 0 0 0 0  
## Joy 0 0 0 0 0 0 0  
## Satisfaction 0 0 0 0 0 0 0  
## Awe 0 0 0 0 0 0 0  
## Amusement 0 0 0 0 0 0 0  
## Alertness 0 0 0 0 0 0 0  
## Anxiety 0 0 0 0 0 0 0  
## Disdain 0 0 0 0 0 0 0  
## Offense 0 0 0 0 0 0 0  
## Guilt 0 0 0 0 0 0 0  
## Disgust 0 0 0 0 0 0 0  
## Fear 0 0 0 0 0 0 0  
## Embarrassment 0 0 0 0 0 0 0  
## Sadness 0 0 0 0 0 0 0  
## Anger 0 0 0 0 0 0 0  
## Embarrassment Sadness Anger  
## Pride 0 0 0  
## Love 0 0 0  
## Hope 0 0 0  
## Gratitude 0 0 0  
## Joy 0 0 0  
## Satisfaction 0 0 0  
## Awe 0 0 0  
## Amusement 0 0 0  
## Alertness 0 0 0  
## Anxiety 0 0 0  
## Disdain 0 0 0  
## Offense 0 0 0  
## Guilt 0 0 0  
## Disgust 0 0 0  
## Fear 0 0 0  
## Embarrassment 0 0 0  
## Sadness 0 0 0  
## Anger 0 0 0

Now that we have an empty matrix waiting, let’s see about filling it.

I’ve spent hours trying to debug the machine tom populate the matrix, but I’m having no luck.

Instead, I’m just going to build a network for a single subject.

It is more tedious and much more limited in scope, but I am out of time to make something nice, and must settle for what I can force to work.

#Let's get a sense of roughly how many data points per subject we have  
dplyr::filter(emotion\_raw, id == 1)

## # A tibble: 7 x 21  
## id Hours Day Pride Love Hope Gratitude Joy Satisfaction Awe  
## <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 1 1 3 0 0 0 0 0 0 0  
## 2 1 14 1 0 0 0 0 0 0 0  
## 3 1 14 2 0 0 0 0 0 0 0  
## 4 1 14 4 0 0 0 0 0 0 0  
## 5 1 15 3 0 0 0 0 0 0 0  
## 6 1 15 3 0 0 0 0 0 0 0  
## 7 1 19 1 0 0 0 0 0 0 0  
## # ... with 11 more variables: Amusement <dbl>, Alertness <dbl>,  
## # Anxiety <dbl>, Disdain <dbl>, Offense <dbl>, Guilt <dbl>,  
## # Disgust <dbl>, Fear <dbl>, Embarrassment <dbl>, Sadness <dbl>,  
## # Anger <dbl>

dplyr::filter(emotion\_raw, id == 8)

## # A tibble: 7 x 21  
## id Hours Day Pride Love Hope Gratitude Joy Satisfaction Awe  
## <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 8 8 5 0 0 0 0 1 0 0  
## 2 8 9 2 0 0 0 0 1 0 0  
## 3 8 10 7 0 0 0 0 0 0 0  
## 4 8 13 7 0 0 0 0 0 0 0  
## 5 8 14 7 0 0 0 0 0 0 0  
## 6 8 17 2 0 0 0 0 0 0 0  
## 7 8 17 7 0 0 0 0 1 1 0  
## # ... with 11 more variables: Amusement <dbl>, Alertness <dbl>,  
## # Anxiety <dbl>, Disdain <dbl>, Offense <dbl>, Guilt <dbl>,  
## # Disgust <dbl>, Fear <dbl>, Embarrassment <dbl>, Sadness <dbl>,  
## # Anger <dbl>

dplyr::filter(emotion\_raw, id == 15)

## # A tibble: 8 x 21  
## id Hours Day Pride Love Hope Gratitude Joy Satisfaction Awe  
## <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 15 11 1 0 0 0 0 0 0 0  
## 2 15 11 6 0 0 0 1 0 0 0  
## 3 15 14 6 0 0 0 0 0 0 0  
## 4 15 15 2 0 0 0 0 0 0 0  
## 5 15 15 2 0 0 0 0 0 0 0  
## 6 15 18 1 0 0 0 0 0 0 0  
## 7 15 20 1 0 0 0 0 0 0 0  
## 8 15 21 1 0 0 0 0 0 0 0  
## # ... with 11 more variables: Amusement <dbl>, Alertness <dbl>,  
## # Anxiety <dbl>, Disdain <dbl>, Offense <dbl>, Guilt <dbl>,  
## # Disgust <dbl>, Fear <dbl>, Embarrassment <dbl>, Sadness <dbl>,  
## # Anger <dbl>

#Looks like subject 8 only has 21 entries.

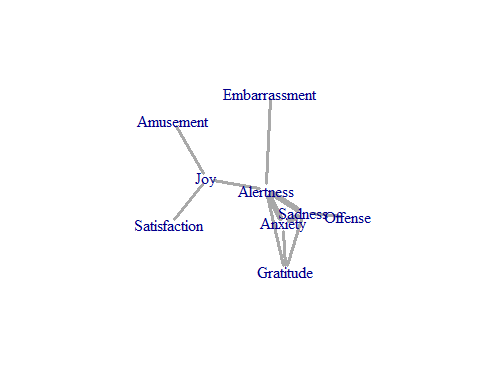
emote1 <- c( "Joy", "Joy", "Joy", "Alertness", "Alertness","Alertness","Sadness","Sadness",  
 "Gratitude","Gratitude","Gratitude")  
  
emote2 <- c("Amusement","Alertness","Satisfaction","Embarrassment","Anxiety", "Sadness","Anxiety","Offense",  
 "Alertness", "Anxiety", "Sadness")  
  
weight <- c( 1, 1, 1, 1, 2, 2, 2, 1,  
 1, 1, 1)  
  
el <- data.frame("emotion1" = emote1, "emotion2" = emote2, "weight" = weight)  
el

## emotion1 emotion2 weight  
## 1 Joy Amusement 1  
## 2 Joy Alertness 1  
## 3 Joy Satisfaction 1  
## 4 Alertness Embarrassment 1  
## 5 Alertness Anxiety 2  
## 6 Alertness Sadness 2  
## 7 Sadness Anxiety 2  
## 8 Sadness Offense 1  
## 9 Gratitude Alertness 1  
## 10 Gratitude Anxiety 1  
## 11 Gratitude Sadness 1

graph\_from\_data\_frame(el, directed = FALSE) -> emote\_igraph  
emote\_igraph

## IGRAPH 10f4299 UNW- 9 11 --   
## + attr: name (v/c), weight (e/n)  
## + edges from 10f4299 (vertex names):  
## [1] Joy --Amusement Joy --Alertness   
## [3] Joy --Satisfaction Alertness--Embarrassment  
## [5] Alertness--Anxiety Alertness--Sadness   
## [7] Sadness --Anxiety Sadness --Offense   
## [9] Alertness--Gratitude Gratitude--Anxiety   
## [11] Sadness --Gratitude

set.seed(42)  
E(emote\_igraph)$width <- E(emote\_igraph)$weight\*3  
plot(emote\_igraph, vertex.shape = "none")



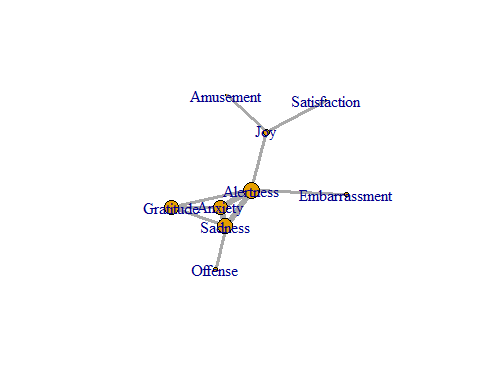
Granting that I am building this from limited data, we can still see what patterns have emerged, and consider whether or not they seem reasonable.

We can see that Joy, Amusement, and Satisfaction or out on their own branch. None of them are connected to any “negative” emotions.

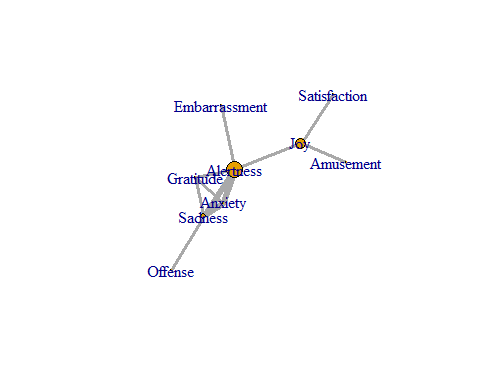
In contrast, Alertness, Anxiety, and Sadness are at the center of the graph, with more weighted edges connecting them. This makes some sense, as when I feel sad or anxious, I often will end up feeling both.

The most interesting thing to me though, is how Gratitude ties to anxiety and sadness, but not joy. The more that I think about it, the moments when I have been most greatful have been when someone has helped relieve my sadness or anxiety. Joy often comes later, but doesn;t tend to mix with sadness or anxiety the way gratitude does.

set.seed(40)  
emote\_igraph$eigen <- centr\_eigen(emote\_igraph)  
emote\_igraph$betw <- centr\_betw(emote\_igraph)  
  
plot(emote\_igraph, edge.size = 0.5,  
 vertex.size = emote\_igraph$eigen$vector\*20)



plot(emote\_igraph, edge.size = 0.5,  
 vertex.size = emote\_igraph$betw$res)



I would choose Alertness as the most central emotion, as it scores highly on both eigen vector and betweeness centrality.

Betweeness also highlights the gatekeeper, Joy.

Eigen highlights Sadness, Anxiety, and Gratitude.

In a network this small, identifying central nodes is fairly simple, but it is still interesting to see what stands out in contrast.

Gratitude, for example is very influential due to its connection to our central block of Alertness, Anxiety, and Sadness. Eigen points this out, while betweeness ignores Gratitude due to Gratitude not being the only shortest path between any two edges.

This contrast when comparing eigen and betweeness is why those two centrality methods have become my favorites to run together. Betweeness is all about access to the network as whole, those critical intersections that control the flow of information. Eigen is instead all about direct interactions, the nodes that have many infuential connections and can affect the greatest number of nodes in the fewest number of steps.