How I Data Mined My Text Message History

By: Joe Cannatti
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Know thyself...

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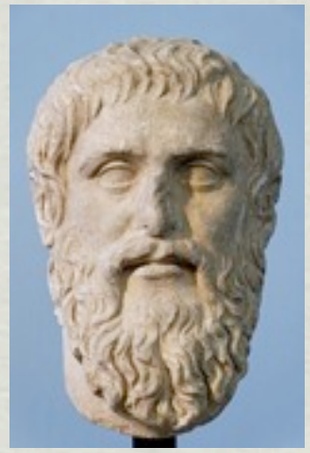

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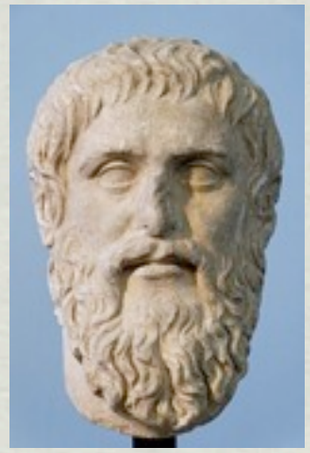

- γνῳθι σεαυτόν

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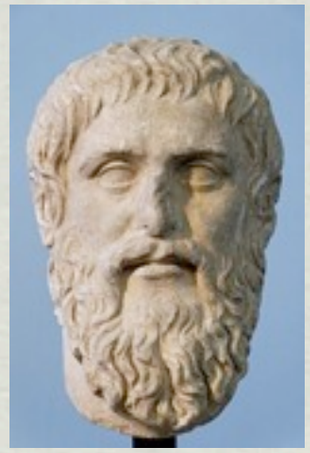

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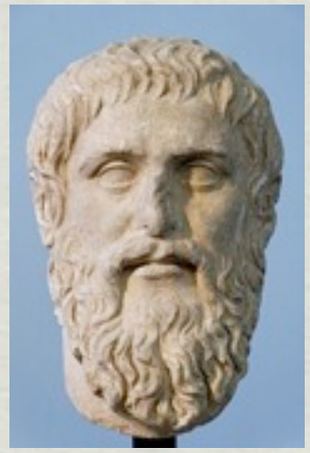

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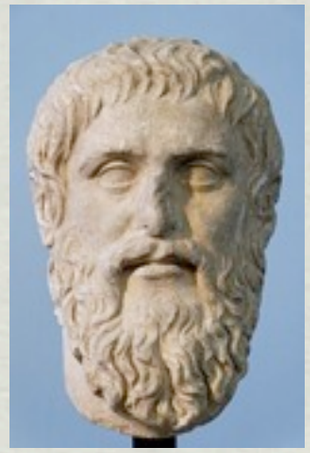

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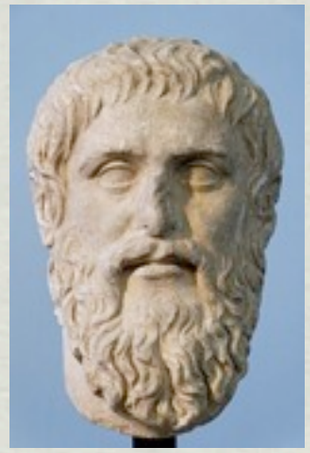
- Our memories are poor

Know thyself...



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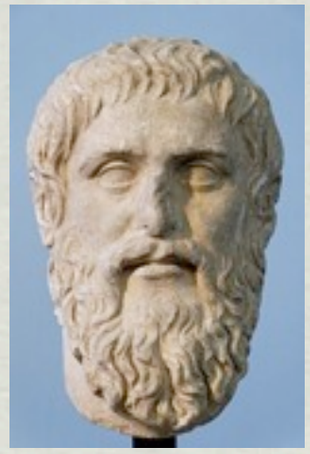
- Our memories are poor
- We are not good at summing up our experiences

Know thyself...



- γνῳθι σεαυτόν
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- Our memories are poor
- We are not good at summing up our experiences
- Enter.....DATA

Text Messages

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- Increased use

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- Increased use
- Is it a good subset of your overall communication?

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- What can we learn from it?

Text Messages

- Increased use
- Is it a good subset of your overall communication?
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- SCIENCE!!!

Tools Used

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- R

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- R
- RStudio

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- Navicat for Sqlite

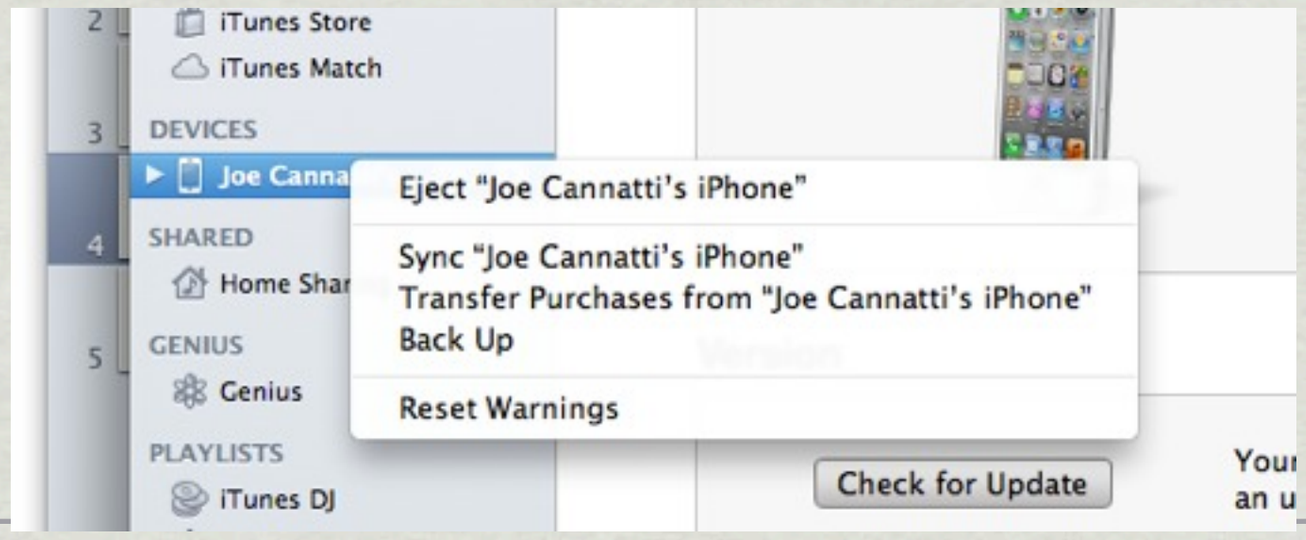
Tools Used

- R
- RStudio
- Navicat for Sqlite
- Bash

So, what are we going to do?

iTunes backup

- Backup your phone to your machine (unencrypted)



Where dem bitz at?

- ~/Library/Application Support/MobileSync/Backup/
- 3d0d7e5fb2ce288813306e4d4636395e047a3d2

Hmmm...what else is in there?

- Bash to the rescue
- find . -name *3d0d7e5fb2ce288813306e4d4636395e047a3d2*
- for i in $(find . -type f); do sqlite3 $i ".databases" &> /dev/null; if [[$? == "0"]]; then echo $i; fi; done
- 190 sqlite DBs

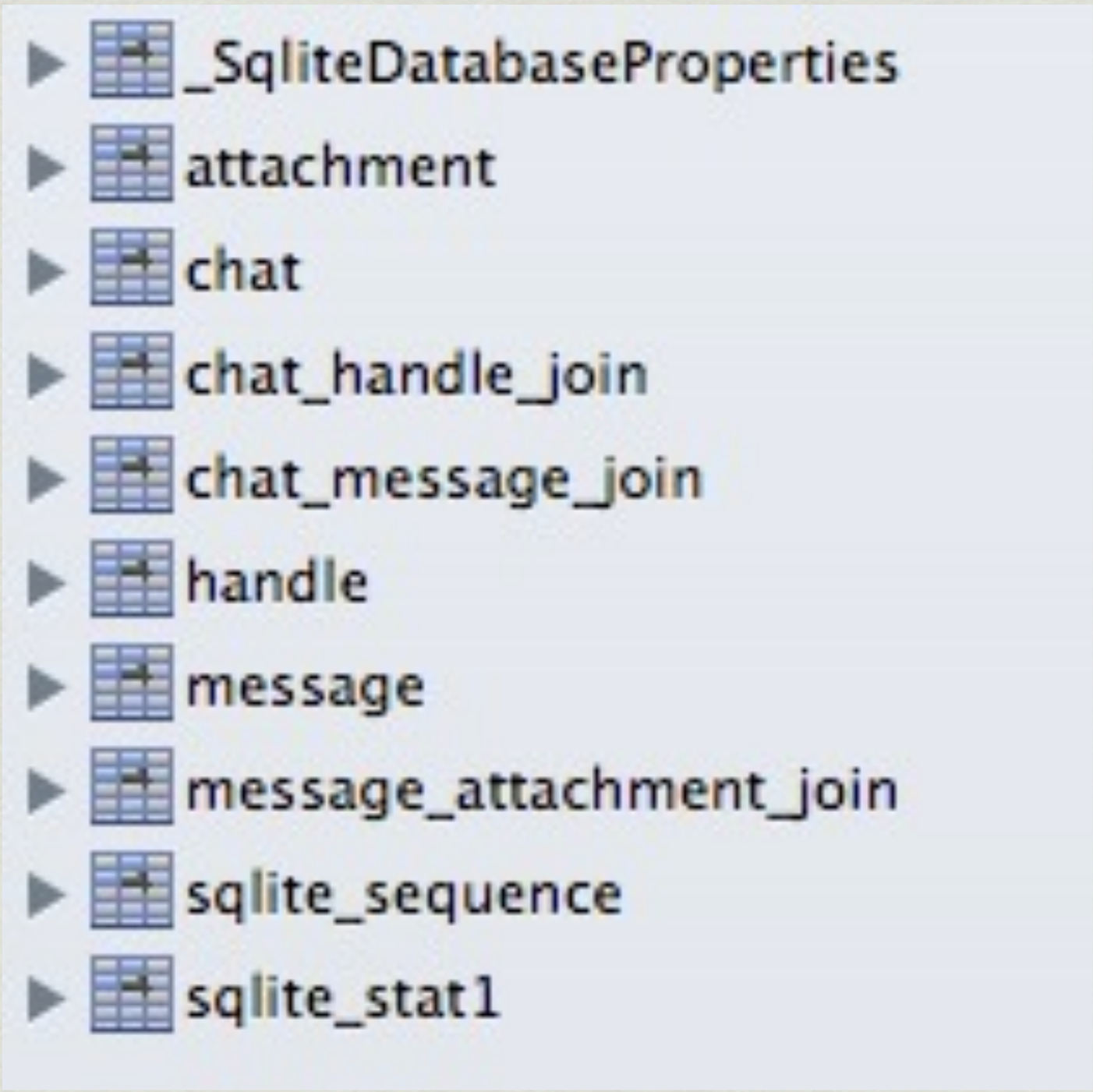
Bash Fu

```
for i in $(find . -type f); do
  sqlite3 $i ".databases" &> /dev/null;
  if [[ $? == "0" ]]; then
    echo $i;
  fi;
done
```

Getting ready to open the project

- Download the RSQLite .tar.gz
- R CMD INSTALL RSQLite-<version>.tar.gz
- install.packages(‘DBI’)

Tables


_SqliteDatabaseProperties
attachment
chat
chat_handle_join
chat_message_join
handle
message
message_attachment_join
sqlite_sequence
sqlite_stat1

Our main view

```
SELECT
    *
FROM
    message m
JOIN chat_message_join j ON j.message_id = m.ROWID
JOIN chat c ON j.chat_id = c.ROWID;
```

Adding Contact data

```
add_to_db <- function(vect,con){
  funct <- function(data){
    rs <- dbSendQuery(con, paste("insert into demographics (num
  }
  sapply(vect, FUN=funct)
}
data <- sort(unique(message_data$chat_identifier))
numbers <- data[substring(data, 1, 1) == "+"]
add_to_db(numbers, con)
```

A note about R

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Problems with the Language

Problems with the Language

```
> apply(times,1,function(data){print(data$times)})
Error in data$times : $ operator is invalid for atomic vectors
> apply(times,1,function(data){print(data[3])})
```

Problems with the Language

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> apply(times,1,function(data){print(data$times)})
Error in data$times : $ operator is invalid for atomic vectors
> apply(times,1,function(data){print(data[3])})
```

ANY APL OR J PROGRAMMERS HERE?

My besties

```
 9
10  SELECT
11      count(*), name
12  FROM
13      message m
14  JOIN chat_message_join j ON j.message_id = m.ROWID
15  JOIN chat c ON j.chat_id = c.ROWID
16  JOIN demographics d ON c.chat_identifier =  ('+' || d.number)
17  group by name
18  order by count(*) desc;
```

Result

count(*)	name
1338	Lissa M
795	Corissa Bragg
699	Angie Denicholas
659	Kyllea
553	Erica H
464	Ash Roc
396	Bill Seeholzer
240	[Null]
182	Jon Knapp
177	Dad
166	Shawn Jackson
163	Shultz
156	Mark Mraz
135	Adriana
118	Kevin Solorio
85	Bob Lib
82	Jessica Tag

← **MY BABY MOMA**

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MY BABY MOMA

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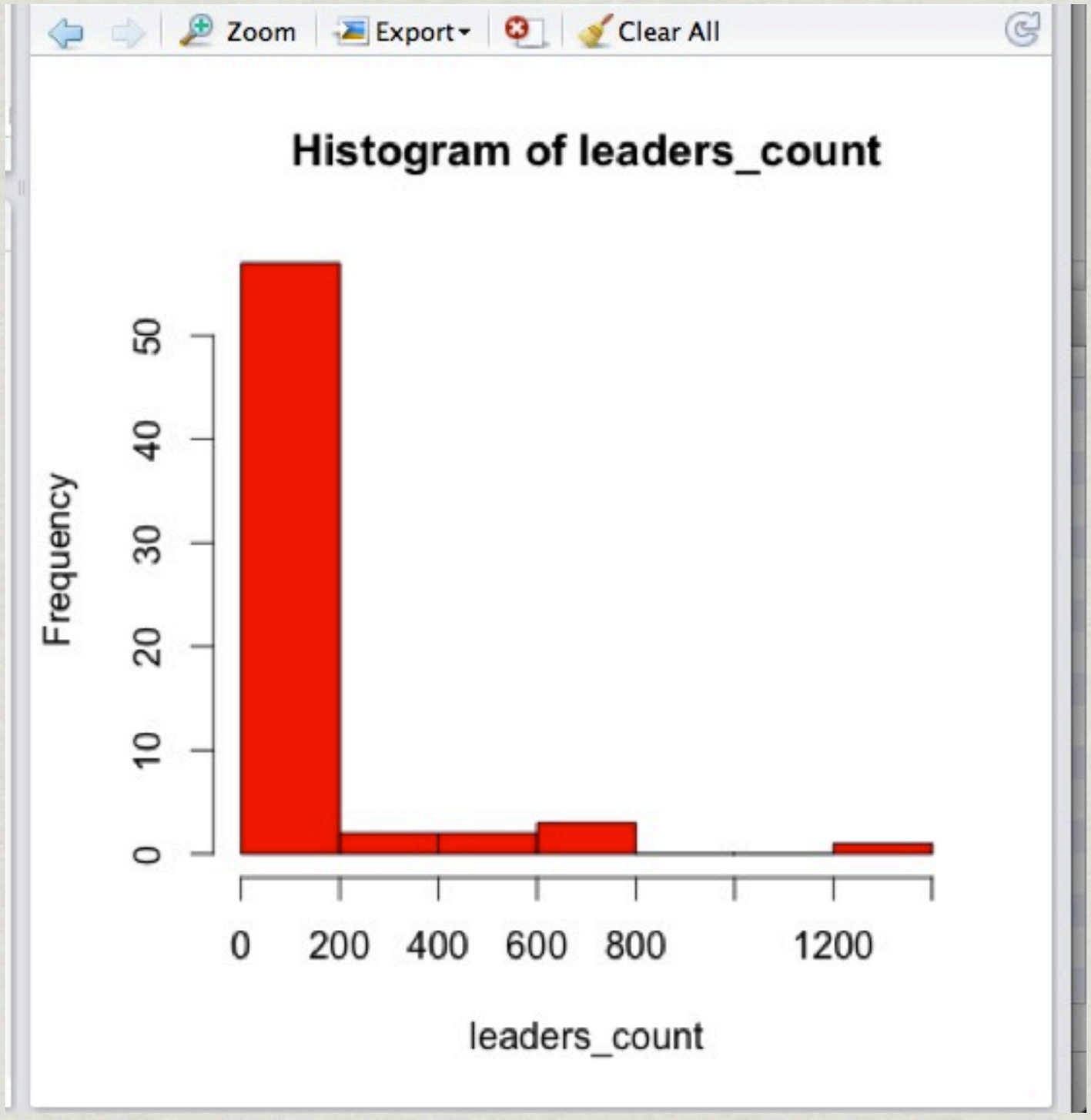
MARK G'S GIRL

MY BABY MOMA


Zoom
Export
Clear All
Histogram of leaders_count
Frequency
0
10
20
30
40
50
0
200
400
600
800
1200
leaders_count

```
hist(leaders_count, col=c('red'))
hist(leaders_count, breaks=10, col=c('red'))
hist(leaders_count, breaks="FD", col=c('red'))
```

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hist(leaders_count, col=c('red'))
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HISTORGRAMS CAN BE PRETTY WACK

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hist(leaders_count, col=c('red'))
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hist(leaders_count, breaks="FD", col=c('red'))
```

HISTORGRAMS CAN BE PRETTY WACK

THE FREEDMAN-DIACOIS RULE

```r
hist(leaders_count, col=c('red'))
hist(leaders_count, breaks=10, col=c('red'))
hist(leaders_count, breaks="FD", col=c('red'))
```

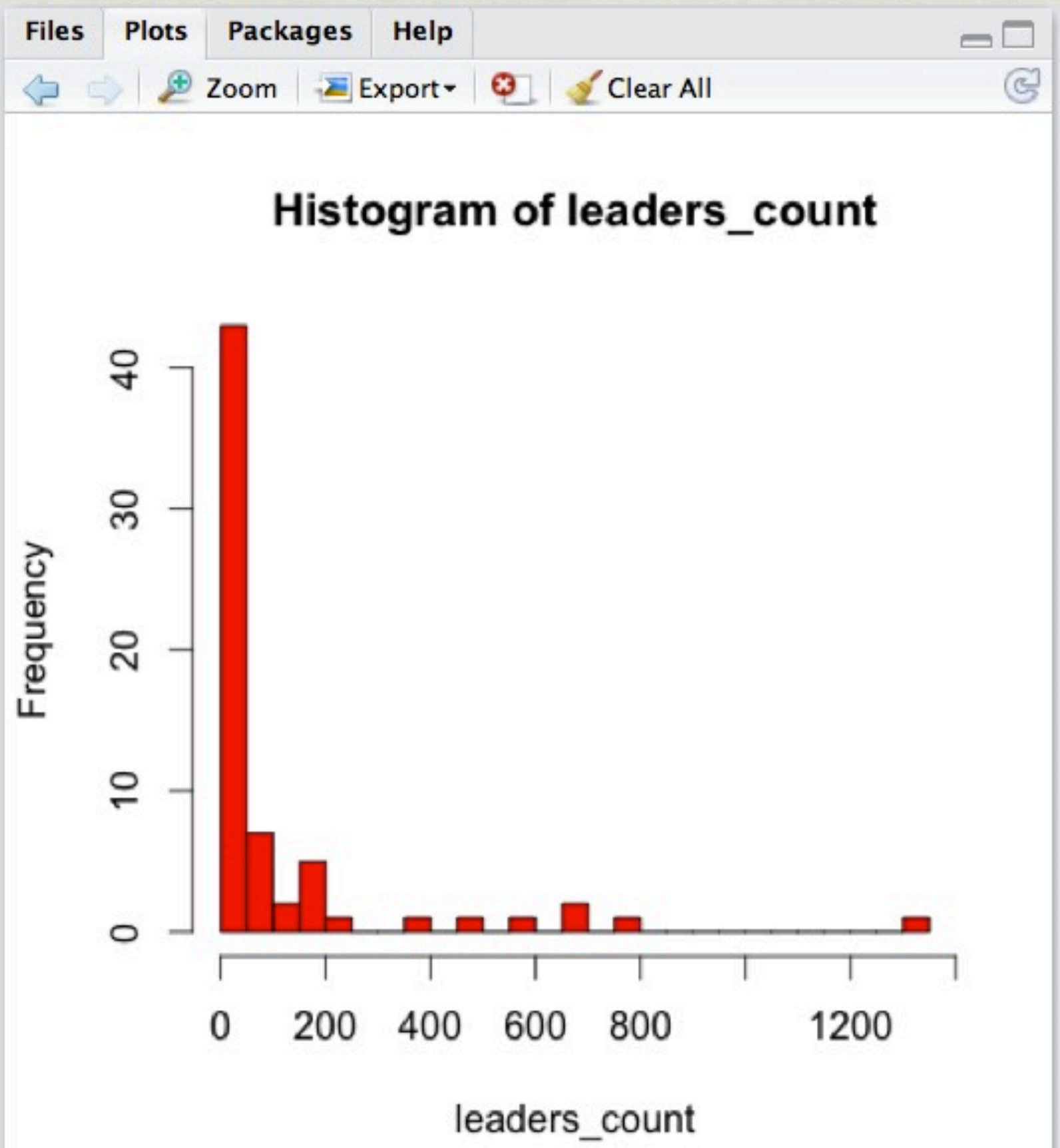
HISTORGRAMS CAN BE PRETTY WACK

THE FREEDMAN-DIACOIS RULE

$$h = 2 * \mathrm{IQR} * n^{-1/3}$$

Files | Plots | Packages | Help

Zoom | Export | Clear All



Demo Frequency

Our main Data.Frame

```
load_message_data <- function(con){
  rs <- dbSendQuery(con, "select * from message m
                          join chat_message_join j
                          on j.message_id = m.ROWID
                          join chat c
                          on j.chat_id = c.ROWID;")
  data <- fetch(rs, n=Inf)
  return(data)
}
```

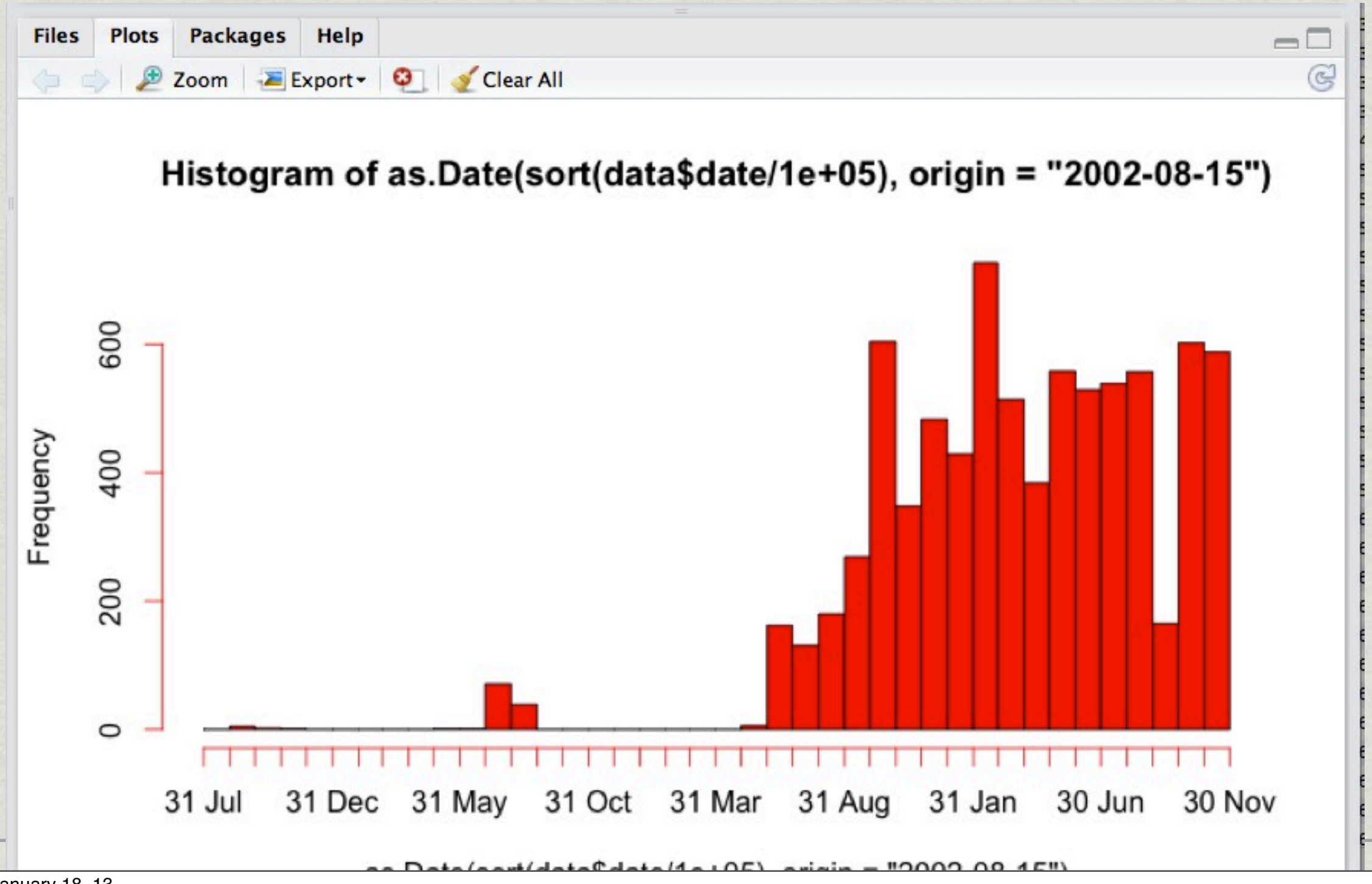
colnames(message_data)

```
> colnames(message_data)
 [1] "ROWID"              "guid"                 "text"
 [4] "replace"            "service_center"       "handle_id"
 [7] "subject"            "country"              "attributedBody"
[10] "version"            "type"                 "service"
[13] "account"            "account_guid"         "error"
[16] "date"               "date_read"            "date_delivered"
[19] "is_delivered"       "is_finished"          "is_emote"
[22] "is_from_me"         "is_empty"             "is_delayed"
[25] "is_auto_reply"      "is_prepared"          "is_read"
[28] "is_system_message"  "is_sent"              "has_dd_results"
[31] "is_service_message" "is_forward"           "was_downgraded"
[34] "is_archive"         "cache_has_attachments" "cache_roomnames"
[37] "was_data_detected"  "was_deduplicated"     "chat_id"
[40] "message_id"         "ROWID"                "guid"
[43] "style"              "state"                "account_id"
[46] "properties"         "chat_identifier"      "service_name"
[49] "room_name"          "account_login"        "is_archived"
[52] "last_addressed_handle"
```

Codez

```
35 text_frequency_by_month <- function(data){
36   hist(as.Date(sort(data$date/100000), origin="2002-08-15"),
37        breaks='months',
38        freq = TRUE,
39        format = "%d %b",
40        col=c('red'))
41 }
42
```

Text Frequency By Month



Demo send/receive

```
load_balance_data <- function(con){
  rs <- dbSendQuery(con, "  select chat_identifier, count(*), sum(is_from_me) from_me,
  count(*) - sum(is_from_me) as to_me, name, gender from message m
  join chat_message_join j
  on j.message_id = m.ROWID
  join chat c
  on j.chat_id = c.ROWID
  JOIN demographics d
  ON c.chat_identifier =  ('+' || d.number)
  group by chat_identifier;")
  data <- fetch(rs, n=Inf)
  return(data)
}
```

Saving to a file

```
png('39.png')
pie_chart_for_text_balance_ratio(balance_data[39,])
dev.off()
```

Let Talk About Sex

Let Talk About Sex

GET YOUR MIND OUT OF THE GUTTER!!!

```sql
select
(select count(*) from demographics where gender = 1) as num_men,
(select count(*) from demographics where gender = 0) as num_women;
```

num_men	num_women
40	26

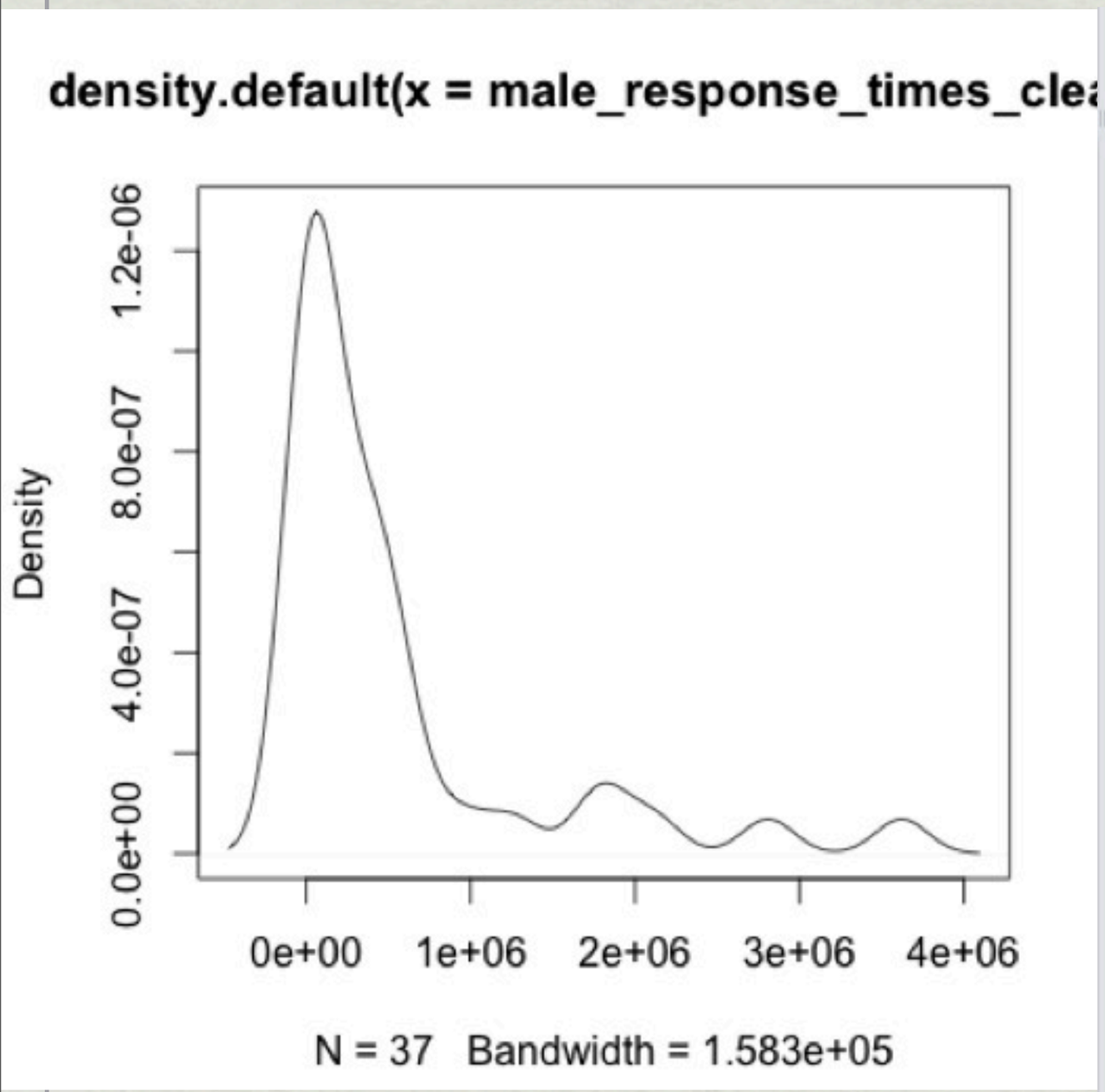
```
27  SELECT
28      count(*), name, group_concat(date)
29  FROM
30      message m
31  JOIN chat_message_join j ON j.message_id = m.ROWID
32  JOIN chat c ON j.chat_id = c.ROWID
33  JOIN demographics d ON c.chat_identifier =  ('+' || d.number)
34  group by name
35  order by count(*) desc;
36
```

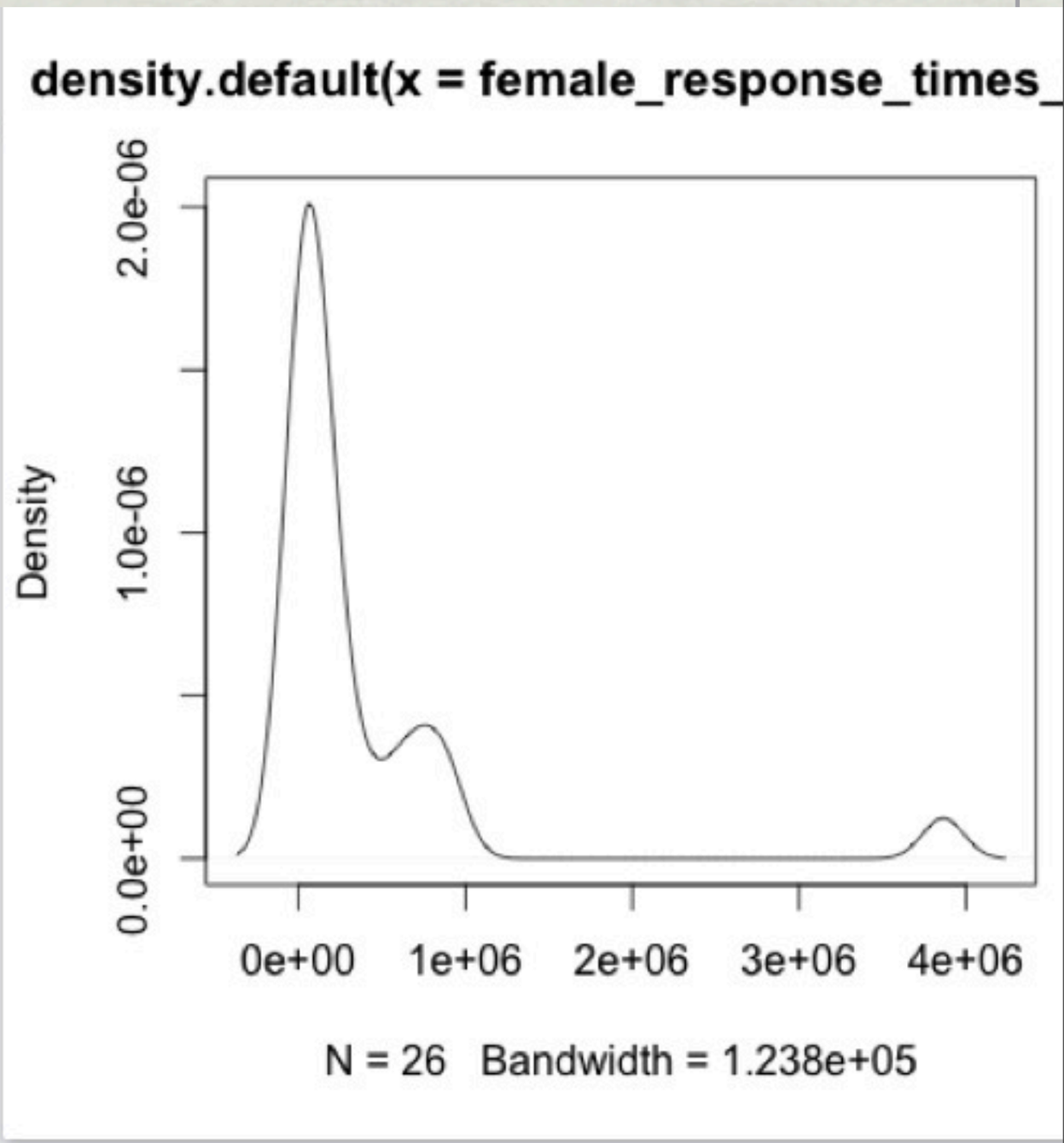
R?

```
127  median_response_times <- rep(0, length(res))
128  count = 0
129  for(r in res){
130    count = count + 1
131    comps <- unlist(strsplit(r, ","))
132    print(length(comps))
133    diffs <- rep(0, length(comps) - 1)
134    i = 0
135    for(c in comps){
136      i = i + 1
137      if(i > 1){
138        diffs[i] <- (as.integer(c) - as.integer(comps[i-1]))
139      }
140    }
141    median_response_times[count] <- mean(diffs)
142  }
```

R

```
times$median_response_time <- median_response_times
male_response_times <- times[times$gender == 1,]
male_response_times_clean <- male_response_times[!is.na(male_response_times$median_response_ti
female_response_times <- times[times$gender == 0,]
female_response_times_clean <- female_response_times[!is.na(female_response_times$median_respo
mean(female_response_times_clean)
mean(male_response_times_clean)
t.test(female_response_times_clean, male_response_times_clean)
male_d <- density(male_response_times_clean)
female_d <- density(female_response_times_clean)
plot(female_d)
plot(male_d)
```


density.default(x = male_response_times_clea
Density
0.0e+00
4.0e-07
8.0e-07
1.2e-06
0e+00
1e+06
2e+06
3e+06
4e+06
N = 37 Bandwidth = 1.583e+05


density.default(x = female_response_times_
Density
0.0e+00
1.0e-06
2.0e-06
0e+00
1e+06
2e+06
3e+06
4e+06
N = 26 Bandwidth = 1.238e+05