Resubmit Caregiving

This document responds to some questions raised by reviewers during the review process. You will need to get the private metadata csv file from the BabbleCor authors (and our data) in order to reproduce these results.

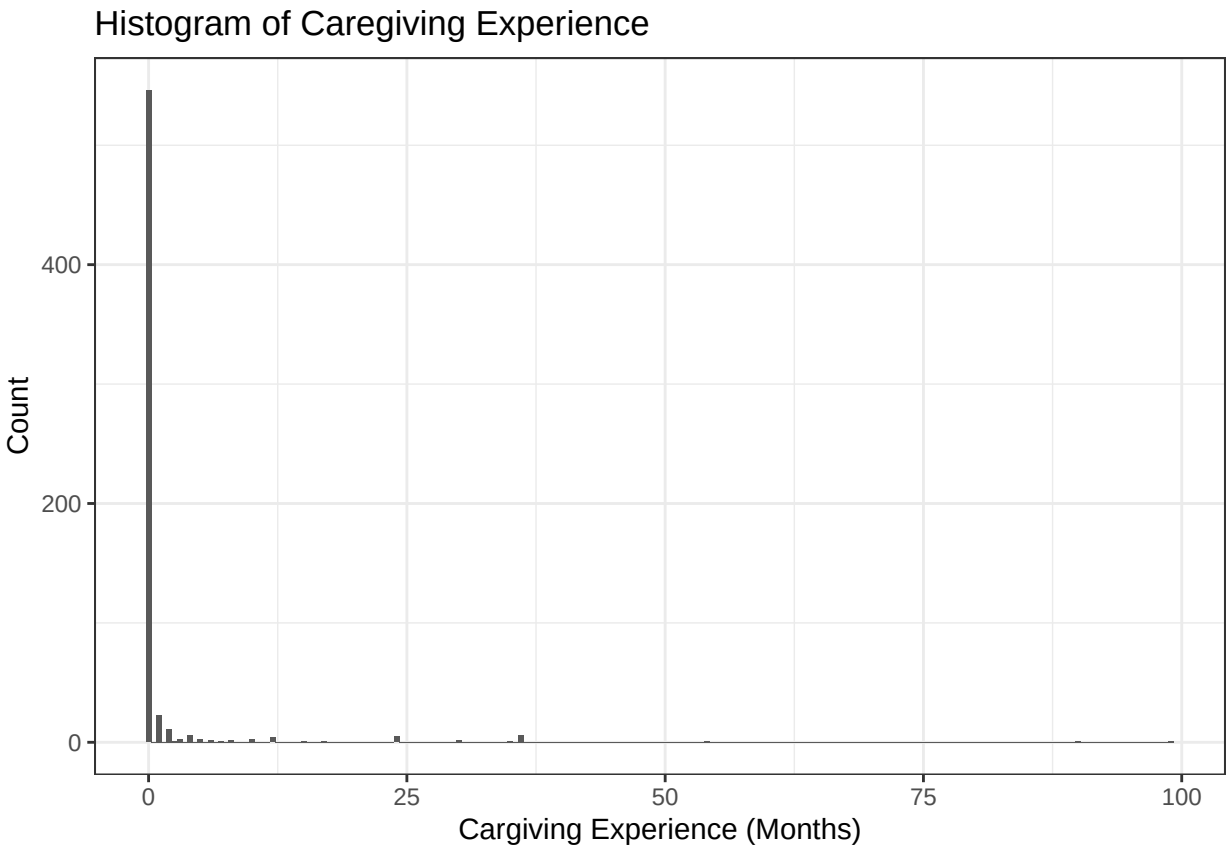
The reviewers expressed surprise at the lack of significant results in the analysis of caregiving experience so we examined the issue further.

Firstly we present the distribution of caregiving and childcare experience reported by the participants. We also present another histogram eliminating those with 0 months experience.

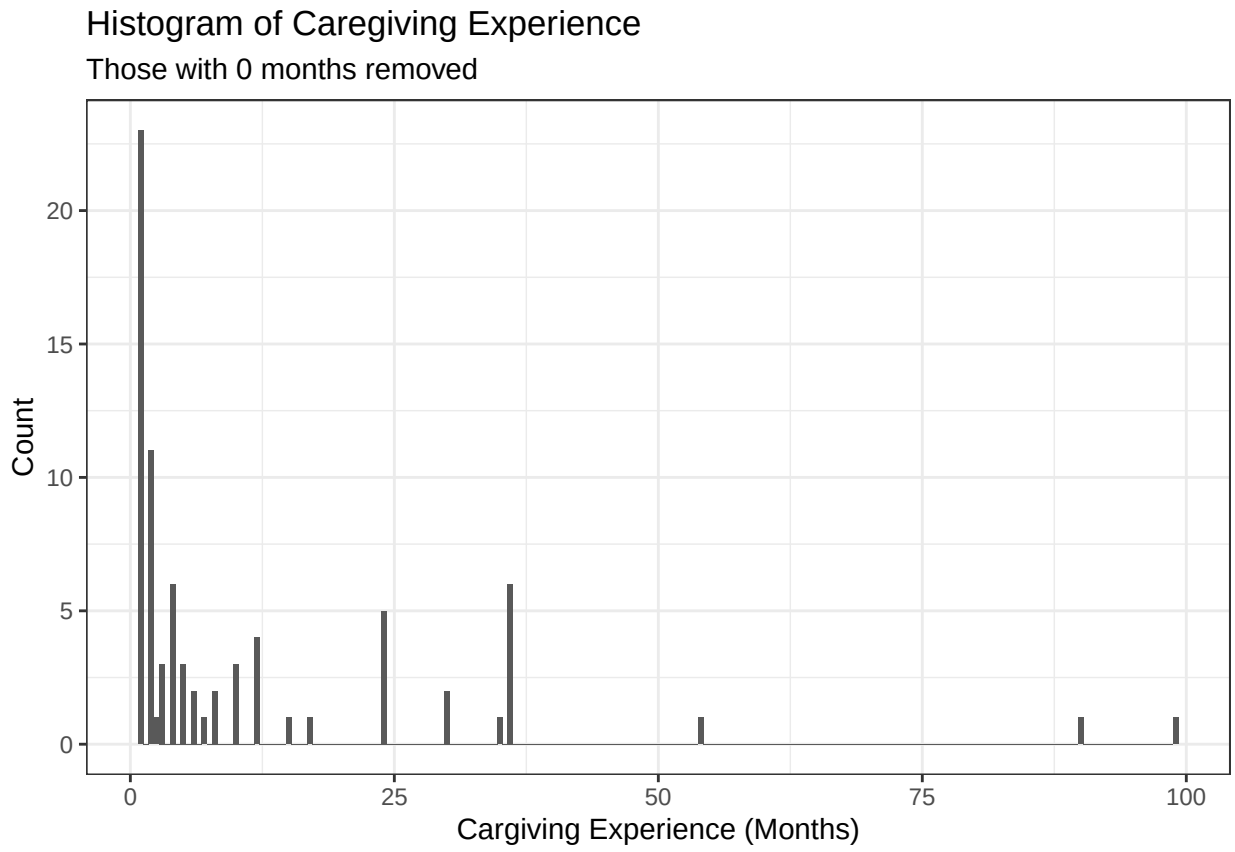
```
sum_data <- read.csv(here::here("data","summarized_data.csv"))

ggplot(sum_data, aes(caregiver))+
  geom_histogram(binwidth = .5)+
  xlab("Cargiving Experience (Months)")+
  ylab("Count")+
  labs(title = "Histogram of Caregiving Experience")+
  theme_bw()
```

```
## Warning: Removed 2 rows containing non-finite values (stat_bin).
```

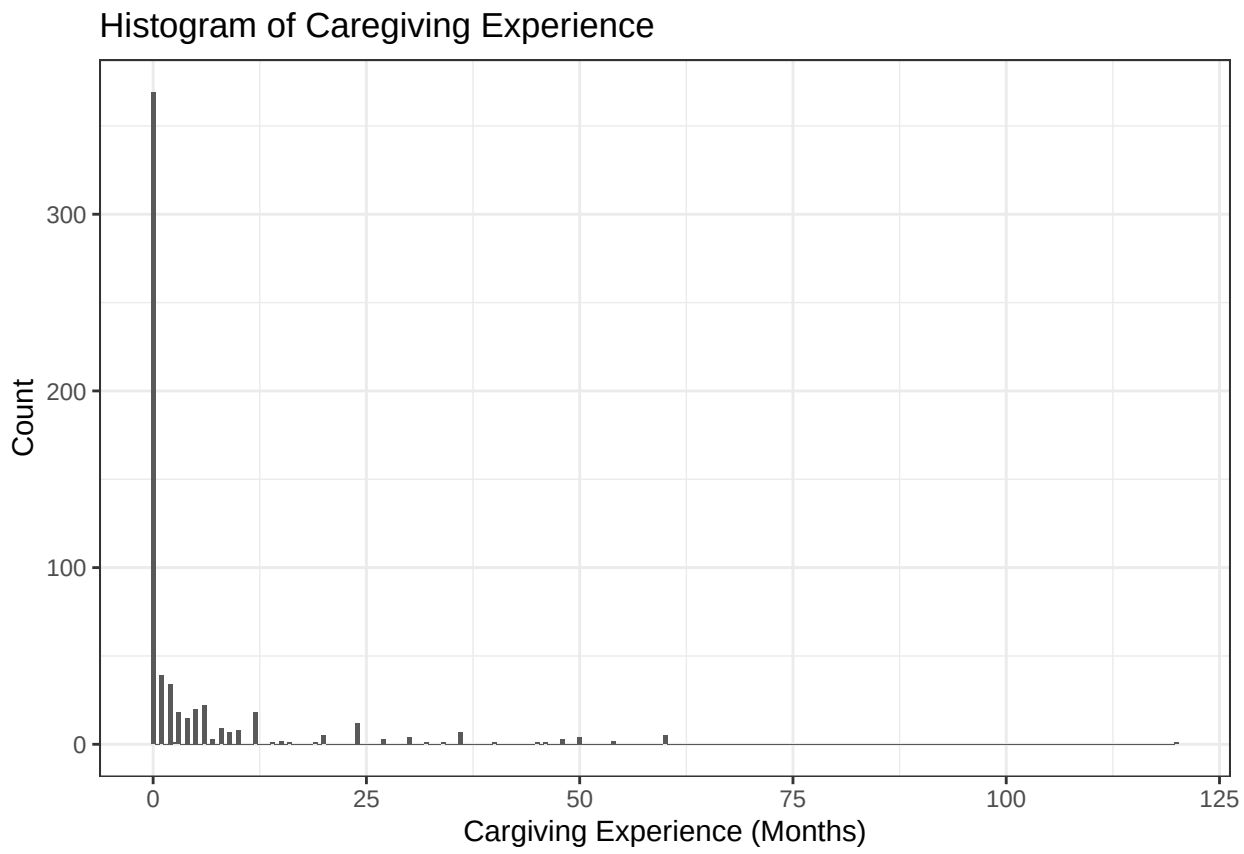



```
ggplot(subset(sum_data,sum_data$caregiver>0), aes(caregiver))+
  geom_histogram(binwidth = .5)+
  xlab("Cargiving Experience (Months)")+
  ylab("Count")+
  labs(title = "Histogram of Caregiving Experience",subtitle = "Those with 0 months removed")+
  theme_bw()
```

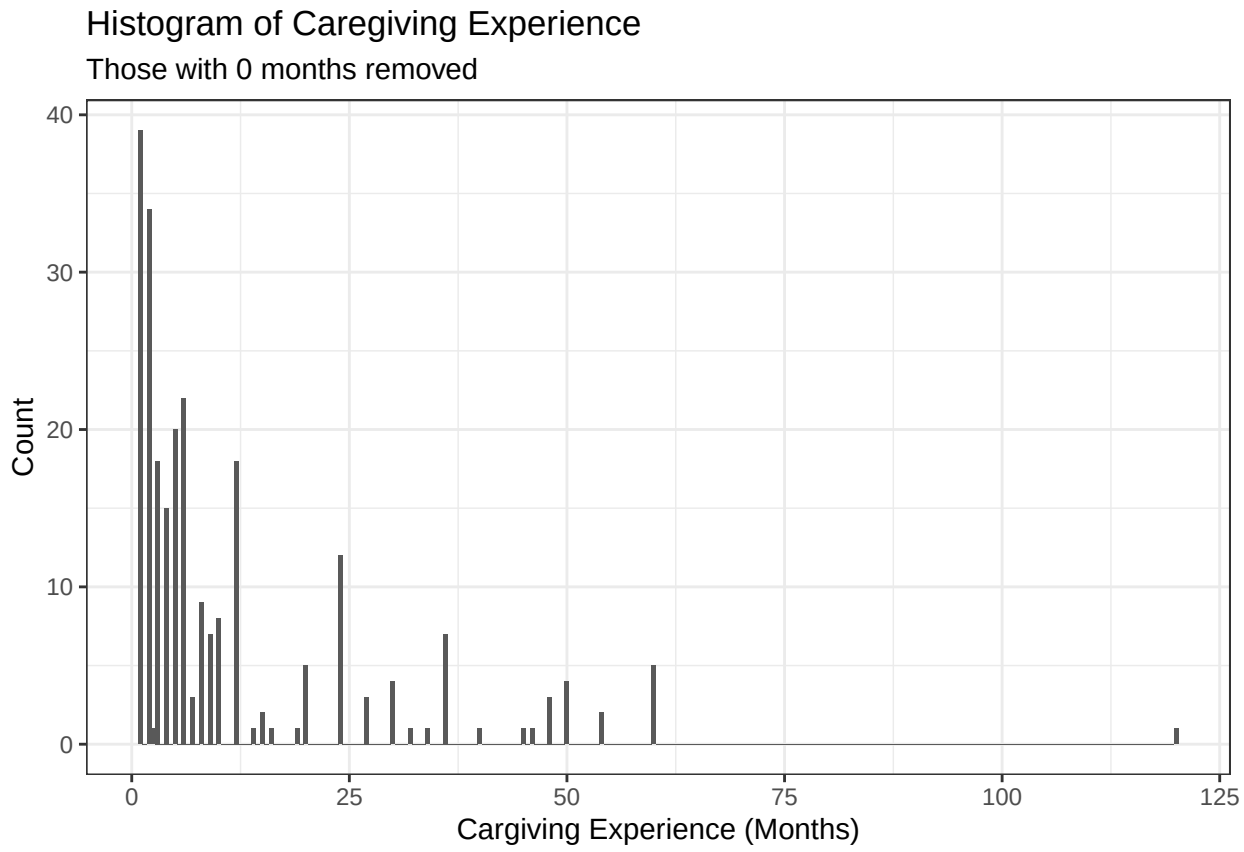



```
ggplot(sum_data, aes(childcare))+
  geom_histogram(binwidth = .5)+
  xlab("Cargiving Experience (Months)")+
  ylab("Count")+
  labs(title = "Histogram of Caregiving Experience")+
  theme_bw()
```

```
## Warning: Removed 7 rows containing non-finite values (stat_bin).
```




```
ggplot(subset(sum_data,sum_data$childcare>0), aes(childcare))+
  geom_histogram(binwidth = .5)+
  xlab("Cargiving Experience (Months)")+
  ylab("Count")+
  labs(title = "Histogram of Caregiving Experience",subtitle = "Those with 0 months removed")+
  theme_bw()
```



The above histograms confirm the reviewers suspicions that participants generally had little to no childcare or caregiving experience. So on the suggestion of the reviewers we performed a categorical split.

We analyzed the results from a binomial regression (to be analogous to the methods reported in the manuscript) to test whether there was a difference between those with some childcare or caregiving experience and those with none on any of the three main questions (whether participants could identify the Sex, Language, or Age of the infants). To be complete we ran every possible categorical split and found that none of them found significant results (alpha = 0.01) however there were some possible differences between those with some experience and none on the Age question ($p < 0.05$) if we were to accept the common alpha rate.

```
# exclude the participants that we need to
sum_data <- read.csv(here::here("data","summarized_data.csv"))
attention_exc<-unique(subset(sum_data,sum_data$n_attention_checks<=5)$subject_ID)
audio_exc<-unique(subset(sum_data,sum_data$n_audio_checks<=5)$subject_ID)
neglig_exc<-unique(subset(sum_data,sum_data$var_sex<=5 & sum_data$var_lang<=5 & sum_data$var_age<=5)$su

# refactor the group so the order is correct in the graphs
d$stim_ageGroup<-factor(d$stim_ageGroup,levels = c("0-7","8-18","19-36"))

# exclude those who failed our attention check and audio check criteria
d <- d[d$subject_ID%in%attention_exc, ]
d <- d[d$subject_ID%in%audio_exc, ]
# exclude those who clicked the same button for an entire experimental phase
d <- d[d$subject_ID%in%neglig_exc, ]
# exclude those who responded other in gender and country
d <- d[d$gender %in% c("Female", "Male"), ]
```

```r
d <- d[d$country %in% c("Canada", "USA"), ]
# exclude those who speak a language other than english
d <- d[d$eng_first == "Yes", ]
d <- d[d$know_corp_lang == "list()", ]

library(lme4)
```

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

```
##
## Attaching package: 'Matrix'
```

```
## The following objects are masked from 'package:tidyr':
##
##     expand, pack, unpack
```

```r
# tested every level of the categorical split and found no significance (alpha = 0.01). Lowest p = 0.03
save<-rep(0,3*100)
for(i in 1:3){
  X<-i
  # define any experience as more than X
  d$anyExp<-(d$childcare>X | d$caregiver>X)
  # sex any experience categorical model instead of continuous variable
  model_AnyExp<- glmer(correct~1+anyExp+(1|subject_ID),
                       data = subset(d,
                                     d$gender%in%c("Male","Female") & d$phase=="Sex"),
                       family = binomial(link=logit))
  sum<-summary(model_AnyExp)
  #sum
  save[((i-1)*3)+1]<-sum$coefficients[2,4]
  # language any experience categorical model instead of continuous variable
  model_AnyExp<- glmer(correct~1+anyExp+(1|subject_ID),
                       data = subset(d,
                                     d$gender%in%c("Male","Female") & d$phase=="Language"),
                       family = binomial(link=logit))
  sum<-summary(model_AnyExp)
  save[((i-1)*3)+2]<-sum$coefficients[2,4]
  #sum
  # age any experience categorical model instead of continuous variable
  model_AnyExp<- glmer(correct~1+anyExp+(1|subject_ID),
                       data = subset(d,
                                     d$gender%in%c("Male","Female") & d$phase=="Age"),
                       family = binomial(link=logit))
  sum<-summary(model_AnyExp)
  save[((i-1)*3)+3]<-sum$coefficients[2,4]
  #print(sum)
}
```

```
## boundary (singular) fit: see ?isSingular
```

```
## boundary (singular) fit: see ?isSingular
## boundary (singular) fit: see ?isSingular
```

```
## boundary (singular) fit: see ?isSingular
## boundary (singular) fit: see ?isSingular
## boundary (singular) fit: see ?isSingular
```

```r
res<-matrix(save,ncol = 3,byrow = T)
colnames(res)<-c("Sex","Language","Age")
library(knitr)
```

```
## Warning: package 'knitr' was built under R version 4.0.5
```

```r
kable(res, caption = "P-values of the 'any experience' variable for each level of categorical split")
```

Table 1: P-values of the 'any experience' variable for each level of categorical split

Sex	Language	Age
0.8007009	0.1850204	0.0670175
0.9250128	0.3296211	0.0275031
0.8146576	0.3154694	0.0360715
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000

Sex	Language	Age
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000

Sex	Language	Age
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000
0.0000000	0.0000000	0.0000000

After running the logistic regression we decided to run a simpler analysis by comparing participants average accuracy between groups with some and "no" experience in the same way as before with using a Welch's t-test. Results indicate that there is some difference between those with some childcare or caregiving experience and those with none in identifying the age of infants.

```
save<-matrix(0,nrow = 99,ncol = 4)
for(i in 0:98){
  X<-i
  sum_data$anyExp<-(sum_data$childcare>X | sum_data$caregiver>X)
  t<-t.test(p_cor_sex~anyExp,data = sum_data)
  save[i+1,2]<-t$p.value
  t<-t.test(p_cor_lang~anyExp,data = sum_data)
  save[i+1,3]<-t$p.value
  t<-t.test(p_cor_age~anyExp,data = sum_data)
  save[i+1,4]<-t$p.value
}
save[,1]<-0:98
colnames(save)<-c("Split at","Sex","Language","Age")
kable(save, caption = "P-values of the t-test comparing accuracy for each level of categorical split")
```

Table 2: P-values of the t-test comparing accuracy for each level of categorical split

Split at	Sex	Language	Age
0	0.9309985	0.1546893	0.1334642
1	0.9470181	0.1529483	0.0149907
2	0.7394774	0.2668417	0.0096177
3	0.8142115	0.1727400	0.0175585
4	0.7477454	0.1865080	0.1633329
5	0.7520960	0.1004364	0.1672084
6	0.9074525	0.1694340	0.0523652
7	0.8879201	0.2101362	0.0351753
8	0.4279134	0.2206671	0.0149084
9	0.3532821	0.3155907	0.0232774
10	0.2526453	0.3848458	0.0041886
11	0.2526453	0.3848458	0.0041886
12	0.3364908	0.2378019	0.0016360

Split at	Sex	Language	Age
13	0.3364908	0.2378019	0.0016360
14	0.4400035	0.1754488	0.0024377
15	0.4511205	0.2286395	0.0042096
16	0.3500756	0.2203104	0.0037373
17	0.4625017	0.2391310	0.0043774
18	0.4625017	0.2391310	0.0043774
19	0.4625017	0.2391310	0.0043774
20	0.5869513	0.5928513	0.0152264
21	0.5869513	0.5928513	0.0152264
22	0.5869513	0.5928513	0.0152264
23	0.5869513	0.5928513	0.0152264
24	0.8243453	0.2884245	0.0790811
25	0.8243453	0.2884245	0.0790811
26	0.8243453	0.2884245	0.0790811
27	0.9339524	0.1924959	0.1387671
28	0.9339524	0.1924959	0.1387671
29	0.9339524	0.1924959	0.1387671
30	0.8988359	0.3494474	0.1847954
31	0.8988359	0.3494474	0.1847954
32	0.9749452	0.4325171	0.0861446
33	0.9749452	0.4325171	0.0861446
34	0.7362809	0.5275952	0.1015122
35	0.6093346	0.1875733	0.1190780
36	0.7640171	0.3917026	0.1843987
37	0.7640171	0.3917026	0.1843987
38	0.7640171	0.3917026	0.1843987
39	0.7640171	0.3917026	0.1843987
40	0.8613307	0.1634518	0.2803452
41	0.8613307	0.1634518	0.2803452
42	0.8613307	0.1634518	0.2803452
43	0.8613307	0.1634518	0.2803452
44	0.8613307	0.1634518	0.2803452
45	0.7037604	0.1079421	0.4134030
46	0.6775714	0.0372634	0.4803454
47	0.6775714	0.0372634	0.4803454
48	0.7031885	0.2239476	0.3315749
49	0.7031885	0.2239476	0.3315749
50	0.4941436	0.1879942	0.1382848
51	0.4941436	0.1879942	0.1382848
52	0.4941436	0.1879942	0.1382848
53	0.4941436	0.1879942	0.1382848
54	0.4108437	0.2243558	0.2094049
55	0.4108437	0.2243558	0.2094049
56	0.4108437	0.2243558	0.2094049
57	0.4108437	0.2243558	0.2094049
58	0.4108437	0.2243558	0.2094049
59	0.4108437	0.2243558	0.2094049
60	0.5763110	0.6151332	0.3207643
61	0.5763110	0.6151332	0.3207643
62	0.5763110	0.6151332	0.3207643
63	0.5763110	0.6151332	0.3207643
64	0.5763110	0.6151332	0.3207643

Split at	Sex	Language	Age
65	0.5763110	0.6151332	0.3207643
66	0.5763110	0.6151332	0.3207643
67	0.5763110	0.6151332	0.3207643
68	0.5763110	0.6151332	0.3207643
69	0.5763110	0.6151332	0.3207643
70	0.5763110	0.6151332	0.3207643
71	0.5763110	0.6151332	0.3207643
72	0.5763110	0.6151332	0.3207643
73	0.5763110	0.6151332	0.3207643
74	0.5763110	0.6151332	0.3207643
75	0.5763110	0.6151332	0.3207643
76	0.5763110	0.6151332	0.3207643
77	0.5763110	0.6151332	0.3207643
78	0.5763110	0.6151332	0.3207643
79	0.5763110	0.6151332	0.3207643
80	0.5763110	0.6151332	0.3207643
81	0.5763110	0.6151332	0.3207643
82	0.5763110	0.6151332	0.3207643
83	0.5763110	0.6151332	0.3207643
84	0.5763110	0.6151332	0.3207643
85	0.5763110	0.6151332	0.3207643
86	0.5763110	0.6151332	0.3207643
87	0.5763110	0.6151332	0.3207643
88	0.5763110	0.6151332	0.3207643
89	0.5763110	0.6151332	0.3207643
90	0.5763110	0.6151332	0.3207643
91	0.5763110	0.6151332	0.3207643
92	0.5763110	0.6151332	0.3207643
93	0.5763110	0.6151332	0.3207643
94	0.5763110	0.6151332	0.3207643
95	0.5763110	0.6151332	0.3207643
96	0.5763110	0.6151332	0.3207643
97	0.5763110	0.6151332	0.3207643
98	0.5763110	0.6151332	0.3207643