Resubmit_Analysis

This document responds to 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.

This document reads in the results of an acoustic analysis and examines whether there are statistical differences on any of the f0, f1, f2, intensity, or duration measurements between the groups of babies as divided by the factors analyzed in the study.

We first analyze the data with list-wise deletion for missing cases (when one of the acoustic features could not be calculated), and then test two methods of multiple imputation (random sample from observed values and predictive mean matching).

As can be seen below, there are no statistically significant differences on any of the measurements (for either the Age/Language stimuli or the Sex stimuli) in any of the different methods of analysis. It seems unlikely that differences in participants judgements were based on these acoustic features.

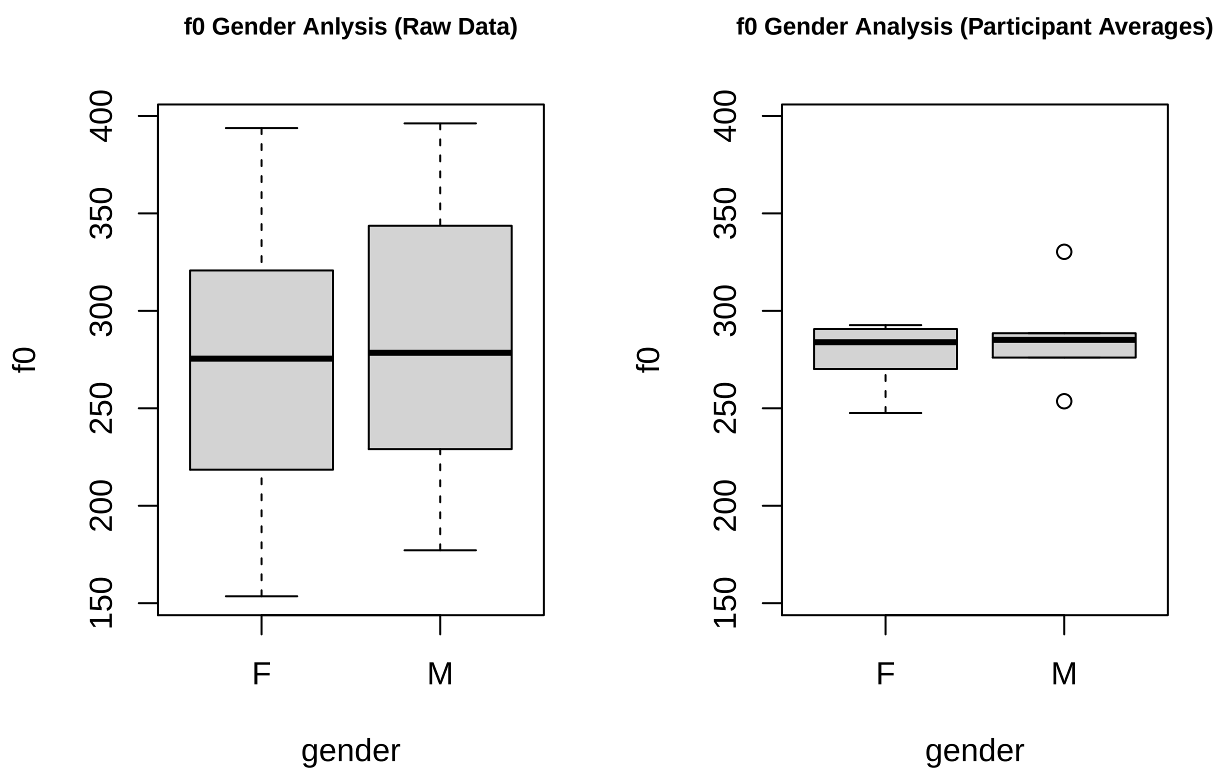
Note: the duration of audio clips does not reflect the duration of the original infant vocalizations. The BabbleCor clips were edited to be approximately ~400ms (under ~500ms).

List-wise Deletion

Analysis of the Sex Stimuli

f0 midpoint analysis

```
par(mfrow = c(1,2))
boxplot(f0~gender,data = sex_sub_audio,
        main="f0 Gender Anlysis (Raw Data)",
        ylim = c(min(sex_sub_audio$f0,na.rm = T),
                 max(sex_sub_audio$f0,na.rm = T)),
        cex.main=0.75)
boxplot(f0~gender,data = aggregate(f0~gender*stim_ID,data = sex_sub_audio,mean),
        ylim = c(min(sex_sub_audio$f0,na.rm = T),
                 max(sex_sub_audio$f0,na.rm = T)),
        main = "f0 Gender Analysis (Participant Averages)",
        cex.main=0.75)
```



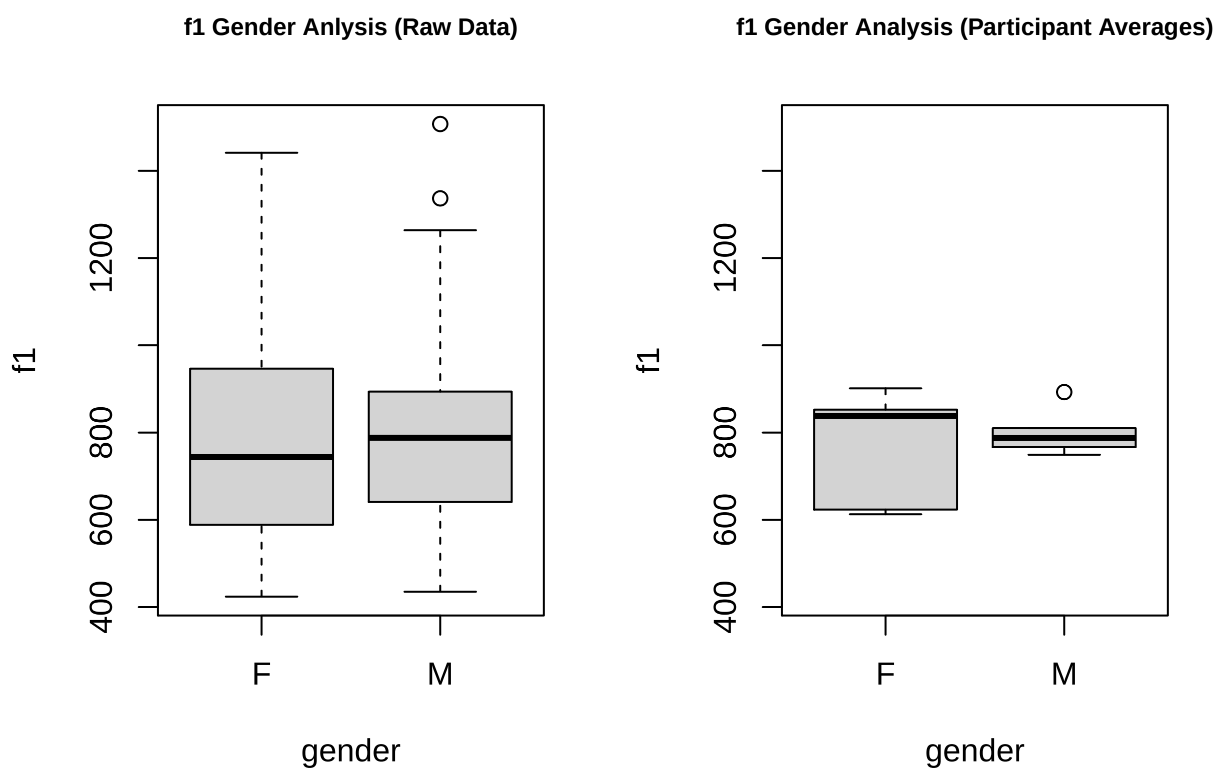

```
pander(summary(aov(f0~gender+Error(stim_ID), data = sex_sub_audio))[[1]])
```

Table 1: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
gender	1	2448	2448	0.4676	0.5134
Residuals	8	41875	5234	NA	NA

f1 midpoint analysis

```
par(mfrow = c(1,2))
boxplot(f1~gender,data = sex_sub_audio,main="f1 Gender Anlysis (Raw Data)",
        ylim = c(min(sex_sub_audio$f1,na.rm = T),
                 max(sex_sub_audio$f1,na.rm = T)),
        cex.main=0.75)
boxplot(f1~gender,data = aggregate(f1~gender*stim_ID,data = sex_sub_audio,mean),
        ylim = c(min(sex_sub_audio$f1,na.rm = T),
                 max(sex_sub_audio$f1,na.rm = T)),
        main = "f1 Gender Analysis (Participant Averages)",
        cex.main=0.75)
```



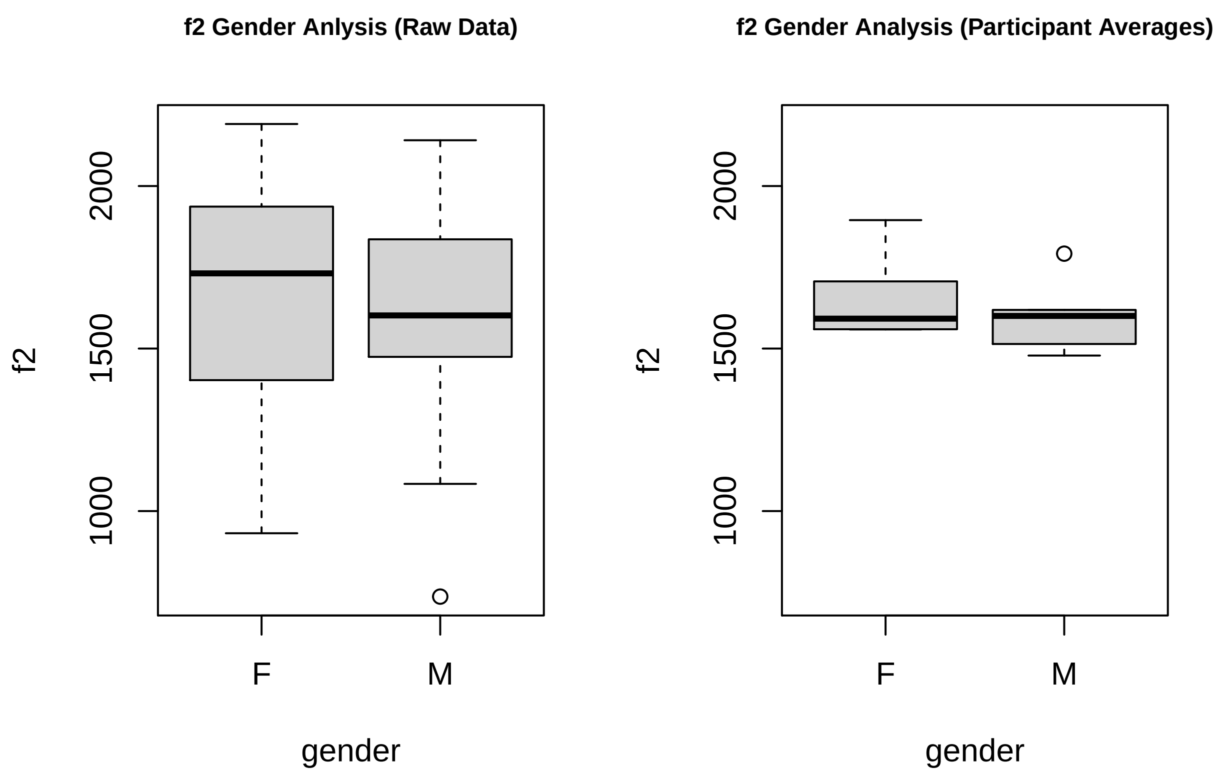

```
pander(summary(aov(f1~gender+Error(stim_ID), data = sex_sub_audio))[[1]])
```

Table 2: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
gender	1	31574	31574	0.2893	0.6053
Residuals	8	873129	109141	NA	NA

f2 midpoint analysis

```
par(mfrow = c(1,2))
boxplot(f2~gender,data = sex_sub_audio,main="f2 Gender Anlysis (Raw Data)",
        ylim = c(min(sex_sub_audio$f2,na.rm = T),
                 max(sex_sub_audio$f2,na.rm = T)),
        cex.main=0.75)
boxplot(f2~gender,data = aggregate(f2~gender*stim_ID,data = sex_sub_audio,mean),
        ylim = c(min(sex_sub_audio$f2,na.rm = T),
                 max(sex_sub_audio$f2,na.rm = T)),
        main = "f2 Gender Analysis (Participant Averages)",
        cex.main=0.75)
```



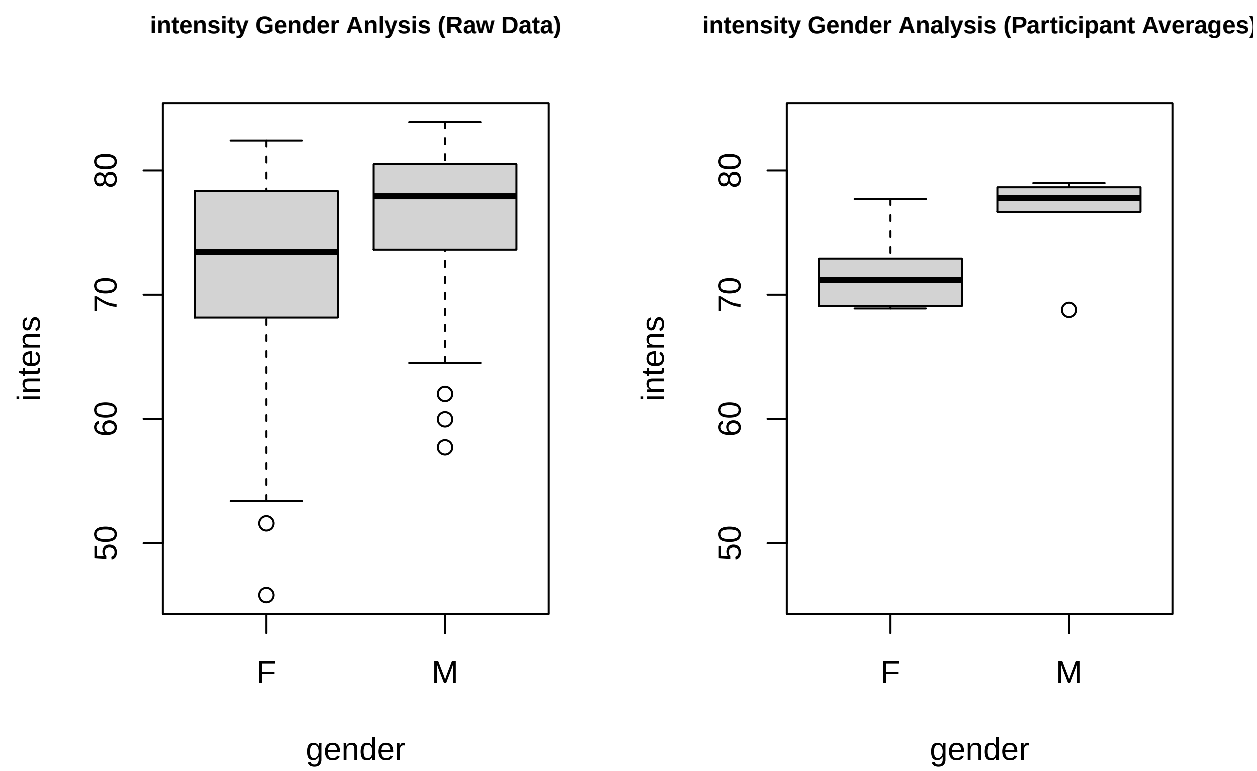

```
pander(summary(aov(f2~gender+Error(stim_ID), data = sex_sub_audio))[[1]])
```

Table 3: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
gender	1	63880	63880	0.4572	0.518
Residuals	8	1117679	139710	NA	NA

intensity analysis

```
par(mfrow = c(1,2))
boxplot(intens~gender,data = sex_sub_audio,
        main="intensity Gender Anlysis (Raw Data)",
        ylim = c(min(sex_sub_audio$intens,na.rm = T),
                 max(sex_sub_audio$intens,na.rm = T)),
        cex.main=0.75)
boxplot(intens~gender,data = aggregate(intens~gender*stim_ID,data = sex_sub_audio,mean),
        ylim = c(min(sex_sub_audio$intens,na.rm = T),
                 max(sex_sub_audio$intens,na.rm = T)),
        main = "intensity Gender Analysis (Participant Averages)",
        cex.main=0.75)
```



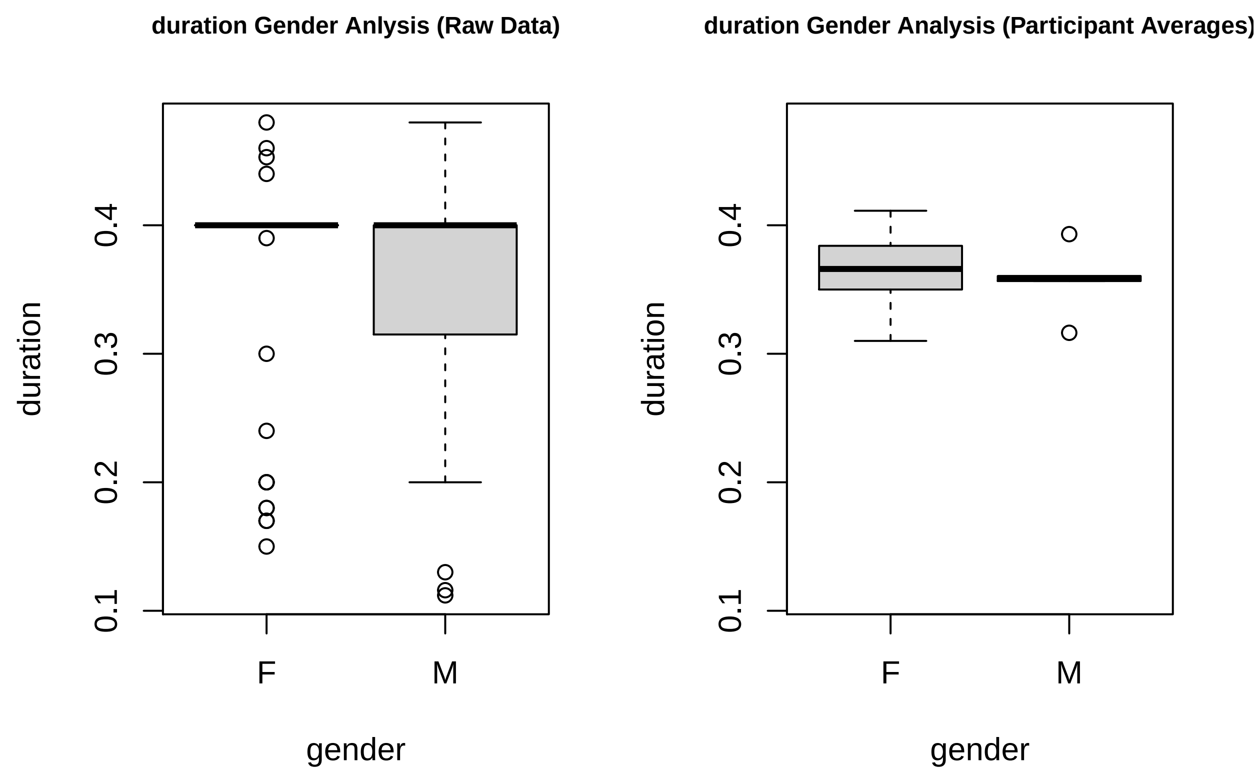

```
pander(summary(aov(intens~gender+Error(stim_ID), data = sex_sub_audio))[[1]])
```

Table 4: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
gender	1	445.2	445.2	2.88	0.1282
Residuals	8	1237	154.6	NA	NA

duration midpoint analysis

```
par(mfrow = c(1,2))
boxplot(duration~gender,data = sex_sub_audio,
        main="duration Gender Anlysis (Raw Data)",
        ylim = c(min(sex_sub_audio$duration,na.rm = T),
                 max(sex_sub_audio$duration,na.rm = T)),
        cex.main=0.75)
boxplot(duration~gender,data = aggregate(duration~gender*stim_ID,data = sex_sub_audio,mean),
        ylim = c(min(sex_sub_audio$duration,na.rm = T),
                 max(sex_sub_audio$duration,na.rm = T)),
        main = "duration Gender Analysis (Participant Averages)",
        cex.main=0.75)
```




```
pander(summary(aov(duration~gender+Error(stim_ID), data = sex_sub_audio))[[1]])
```

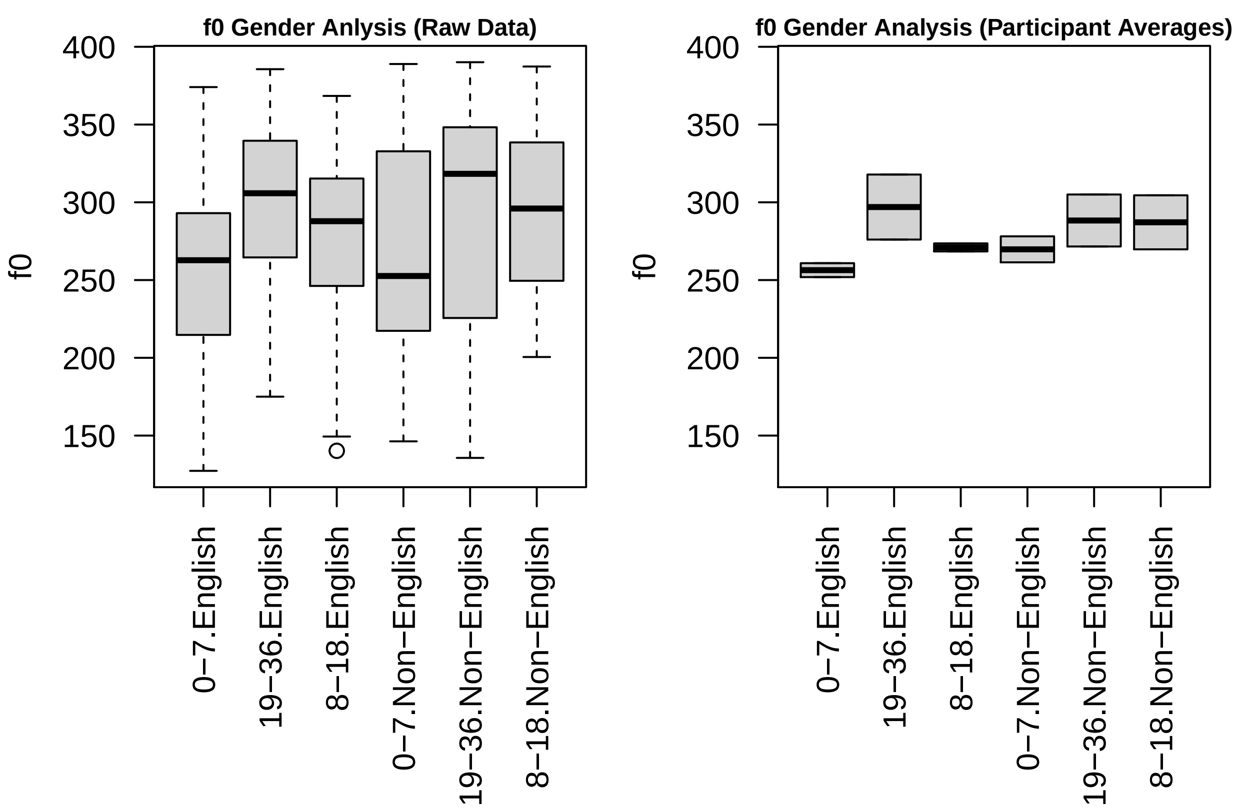
Table 5: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
gender	1	0.001281	0.001281	0.1174	0.7407
Residuals	8	0.08729	0.01091	NA	NA

Analysis of the Age/Language Stimuli

f0 midpoint analysis

```
par(mfrow = c(1,2),mar=c(10,4,1,1))
boxplot(f0~age_group*language,data = age_lang_sub_audio,
        main="f0 Gender Anlysis (Raw Data)",
        ylim = c(min(age_lang_sub_audio$f0,na.rm = T),
                 max(age_lang_sub_audio$f0,na.rm = T)),
        cex.main=0.75,
        las=2,
        xlab = "")
boxplot(f0~age_group*language,
        data = aggregate(f0~age_group*language*stim_ID,data = age_lang_sub_audio,mean),
        ylim = c(min(age_lang_sub_audio$f0,na.rm = T),
                 max(age_lang_sub_audio$f0,na.rm = T)),
        main = "f0 Gender Analysis (Participant Averages)",
        cex.main=0.75,
        las=2,
        xlab = "")
```



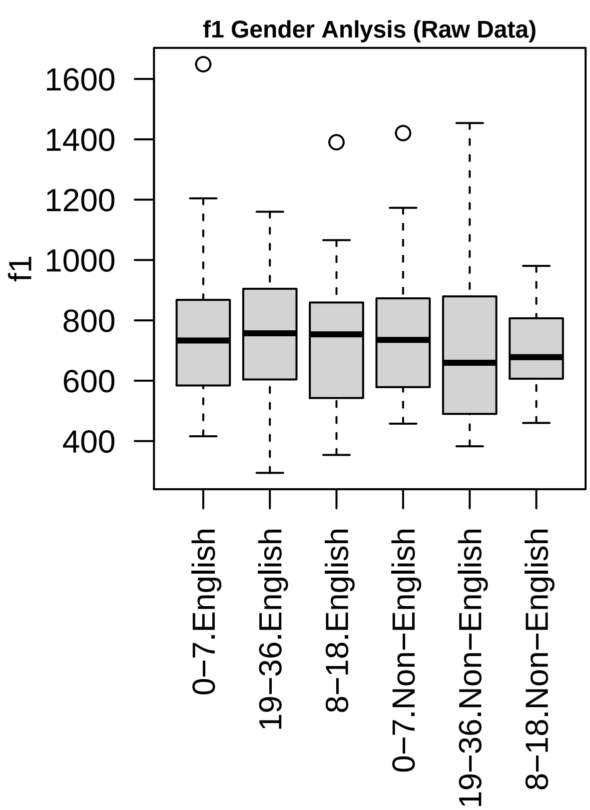

```
pander(summary(aov(f0~age_group*language+Error(stim_ID), data = age_lang_sub_audio))[[1]])
```

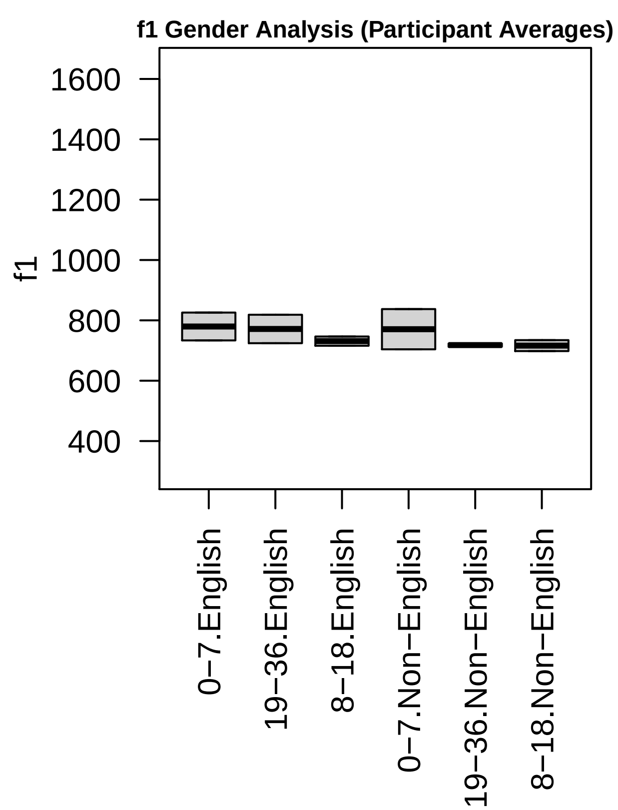
Table 6: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
age_group	2	17554	8777	2.719	0.1443
language	1	1356	1356	0.4202	0.5408
age_group:language	2	2969	1485	0.4599	0.6519
Residuals	6	19367	3228	NA	NA

f1 midpoint analysis

```
par(mfrow = c(1,2),mar=c(10,4,1,1))
boxplot(f1~age_group*language,data = age_lang_sub_audio,
        main="f1 Gender Anlysis (Raw Data)",
        ylim = c(min(age_lang_sub_audio$f1,na.rm = T),
                 max(age_lang_sub_audio$f1,na.rm = T)),
        cex.main=0.75,
        las=2,
        xlab = "")
boxplot(f1~age_group*language,
        data = aggregate(f1~age_group*language*stim_ID,data = age_lang_sub_audio,mean),
        ylim = c(min(age_lang_sub_audio$f1,na.rm = T),
                 max(age_lang_sub_audio$f1,na.rm = T)),
        main = "f1 Gender Analysis (Participant Averages)",
        cex.main=0.75,
        las=2,
        xlab = "")
```





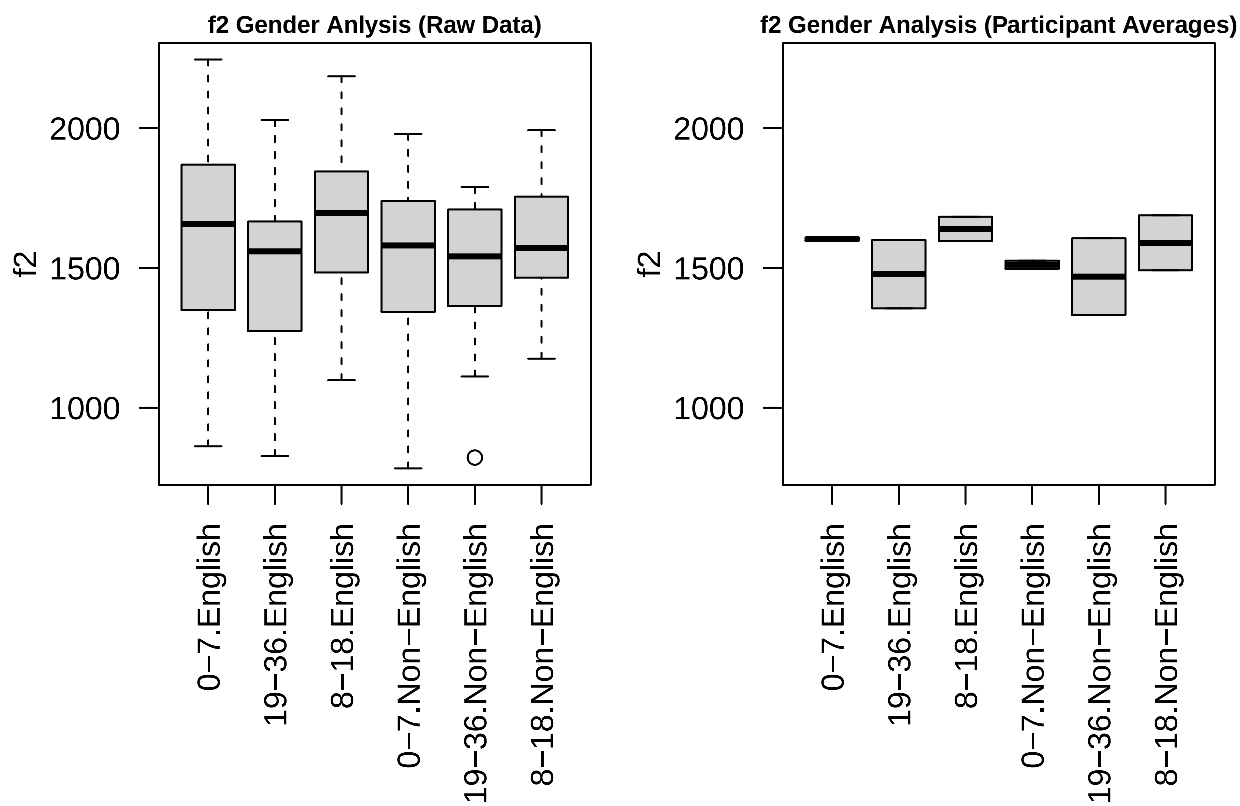

```
pander(summary(aov(f1~age_group*language+Error(stim_ID), data = age_lang_sub_audio))[[1]])
```

Table 7: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
age_group	2	53484	26742	0.8543	0.4715
language	1	19895	19895	0.6356	0.4557
age_group:language	2	11687	5844	0.1867	0.8343
Residuals	6	187815	31302	NA	NA

f2 midpoint analysis

```
par(mfrow = c(1,2),mar=c(10,4,1,1))
boxplot(f2~age_group*language,data = age_lang_sub_audio,
        main="f2 Gender Anlysis (Raw Data)",
        ylim = c(min(age_lang_sub_audio$f2,na.rm = T),
                 max(age_lang_sub_audio$f2,na.rm = T)),
        cex.main=0.75,
        las=2,
        xlab = "")
boxplot(f2~age_group*language,
        data = aggregate(f2~age_group*language*stim_ID,data = age_lang_sub_audio,mean),
        ylim = c(min(age_lang_sub_audio$f2,na.rm = T),
                 max(age_lang_sub_audio$f2,na.rm = T)),
        main = "f2 Gender Analysis (Participant Averages)",
        cex.main=0.75,
        las=2,
        xlab = "")
```



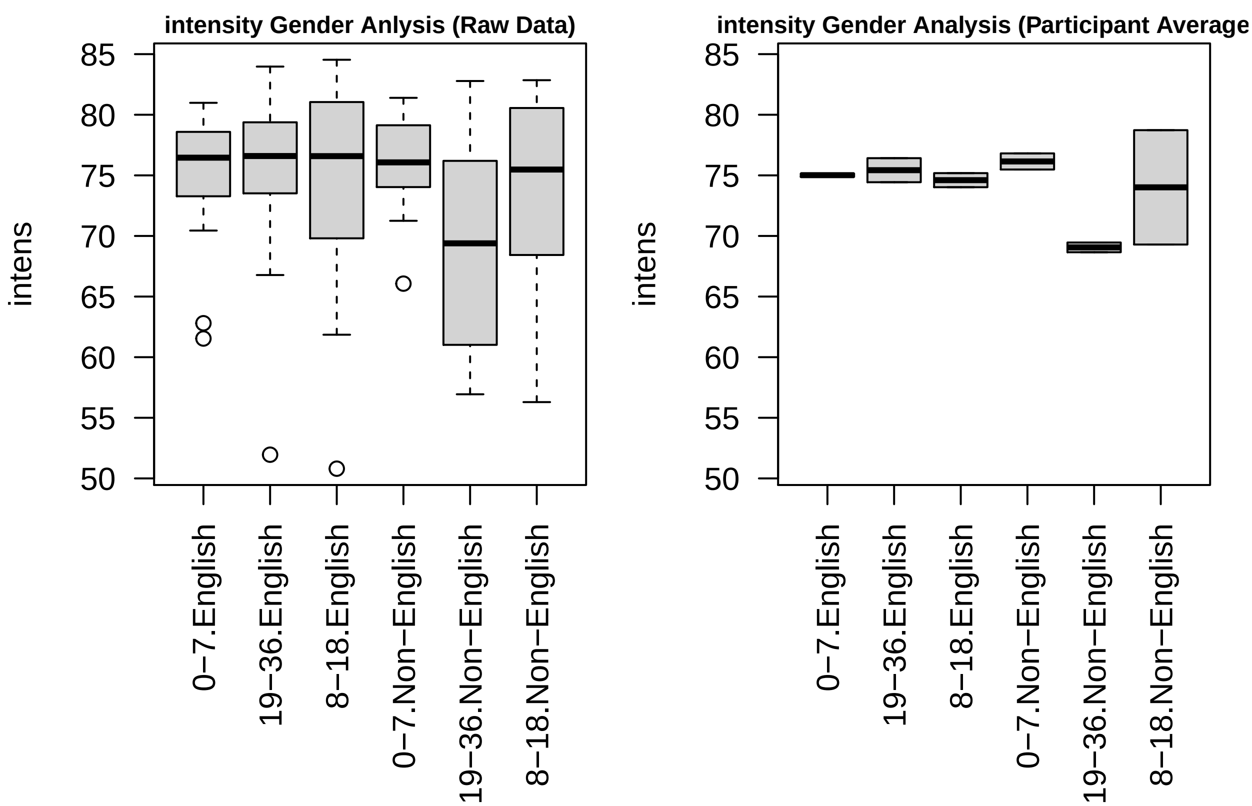

```
pander(summary(aov(f2~age_group*language+Error(stim_ID), data = age_lang_sub_audio))[[1]])
```

Table 8: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
age_group	2	290678	145339	1.309	0.3375
language	1	49702	49702	0.4476	0.5283
age_group:language	2	21462	10731	0.09665	0.9093
Residuals	6	666199	111033	NA	NA

intensity analysis

```
par(mfrow = c(1,2),mar=c(10,4,1,1))
boxplot(intens~age_group*language,data = age_lang_sub_audio,
        main="intensity Gender Anlysis (Raw Data)",
        ylim = c(min(age_lang_sub_audio$intens,na.rm = T),
                 max(age_lang_sub_audio$intens,na.rm = T)),
        cex.main=0.75,
        las=2,
        xlab = "")
boxplot(intens~age_group*language,
        data = aggregate(intens~age_group*language*stim_ID,data = age_lang_sub_audio,mean),
        ylim = c(min(age_lang_sub_audio$intens,na.rm = T),
                 max(age_lang_sub_audio$intens,na.rm = T)),
        main = "intensity Gender Analysis (Participant Averages)",
        cex.main=0.75,
        las=2,
        xlab = "")
```



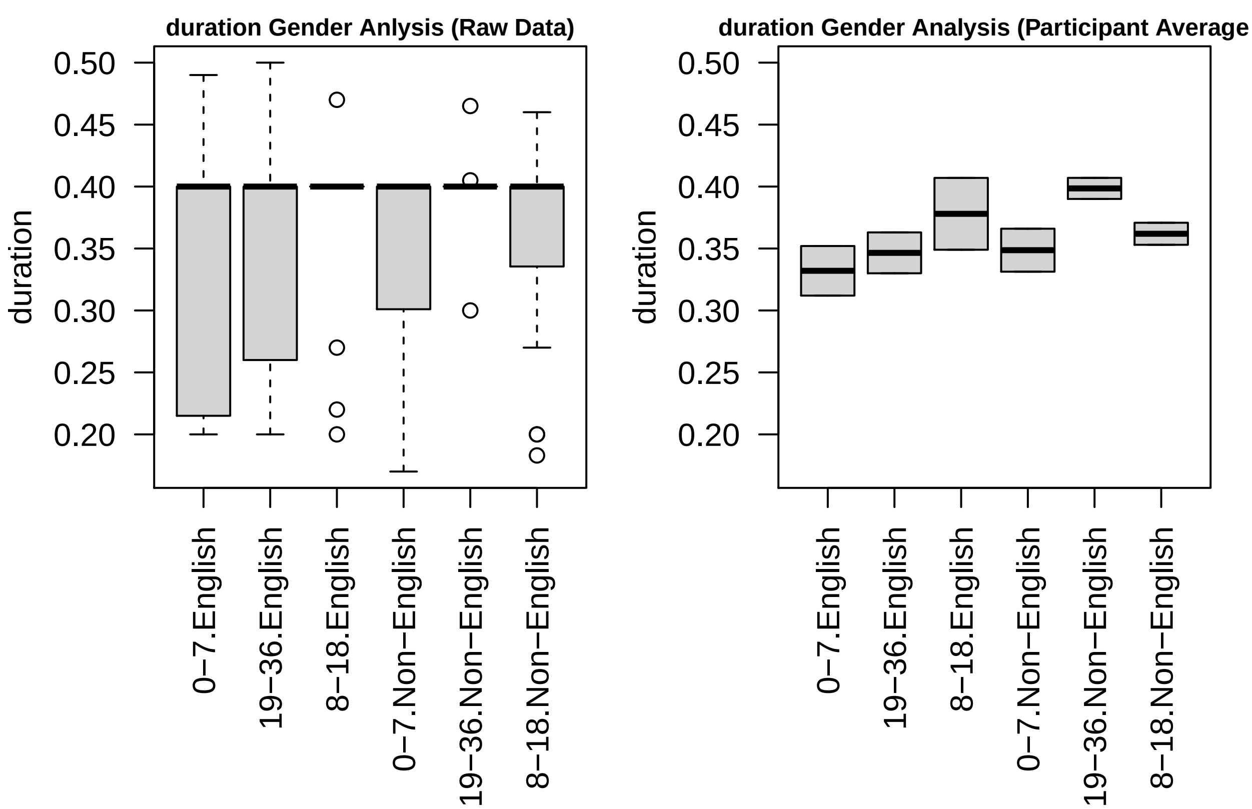

```
pander(summary(aov(intens~age_group*language+Error(stim_ID), data = age_lang_sub_audio))[[1]])
```

Table 9: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
age_group	2	227	113.5	1.407	0.3155
language	1	113.2	113.2	1.403	0.2811
age_group:language	2	308.6	154.3	1.913	0.2277
Residuals	6	484	80.67	NA	NA

duration midpoint analysis

```
par(mfrow = c(1,2),mar=c(10,4,1,1))
boxplot(duration~age_group*language,
        data = age_lang_sub_audio,
        main="duration Gender Anlysis (Raw Data)",
        ylim = c(min(age_lang_sub_audio$duration,na.rm = T),
                 max(age_lang_sub_audio$duration,na.rm = T)),
        cex.main=0.75,
        las=2,
        xlab = "")
boxplot(duration~age_group*language,
        data = aggregate(duration~age_group*language*stim_ID,data = age_lang_sub_audio,mean),
        ylim = c(min(age_lang_sub_audio$duration,na.rm = T),
                 max(age_lang_sub_audio$duration,na.rm = T)),
        main = "duration Gender Analysis (Participant Averages)",
        cex.main=0.75,
        las=2,
        xlab = "")
```




```
pander(summary(aov(duration~age_group*language+Error(stim_ID), data = age_lang_sub_audio))[[1]])
```

Table 10: Analysis of Variance Model

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
age_group	2	0.02559	0.0128	1.953	0.2222
language	1	0.009205	0.009205	1.405	0.2807
age_group:language	2	0.0232	0.0116	1.77	0.2487
Residuals	6	0.03932	0.006553	NA	NA

Multiple Imputation (Sample Observed Values)

Analysis of the Sex Stimuli

f0 midpoint analysis

```
fit1<-with(MI_List,lmer(f0~1+(1|stim_ID)))
```

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

```
fit2<-with(MI_List,lmer(f0~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##       F.value       df1       df2     P(>F)       RIV
##         0.227         1 19585.791     0.634     0.014
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

f1 midpoint analysis

```
fit1<-with(MI_List,lmer(f1~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f1~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.289       1     Inf   0.591   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

f2 midpoint analysis

```
fit1<-with(MI_List,lmer(f2~1+(1|stim_ID)))
```

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

```
fit2<-with(MI_List,lmer(f2~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.353       1 138.324   0.553   0.205
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

intensity analysis

```
fit1<-with(MI_List,lmer(intens~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(intens~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       2.880       1     Inf   0.090   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

duration midpoint analysis

```
fit1<-with(MI_List,lmer(duration~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(duration~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.117       1     Inf   0.732   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

Analysis of the Age/Langurage Stimuli

f0 midpoint analysis

```
fit1<-with(MI_List,lmer(f0~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f0~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(f0~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(f0~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.784       2 230.689   0.170   0.115
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##      F.value      df1      df2    P(>F)      RIV
##        0.526        1 1851.206    0.468    0.049
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
```

```
##       0.516       2 248.301   0.598   0.110
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

f1 midpoint analysis

```
fit1<-with(MI_List,lmer(f1~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f1~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(f1~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(f1~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.450       2     Inf   0.638   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.333       1     Inf   0.564   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.096       2     Inf   0.908   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

f2 midpoint analysis

```
fit1<-with(MI_List,lmer(f2~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f2~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(f2~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(f2~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.444       2  48.306   0.644   0.322
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.411       1 471.893   0.522   0.101
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.009       2 711.823   0.991   0.061
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

intensity analysis

```
fit1<-with(MI_List,lmer(intens~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(intens~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(intens~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(intens~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.128       2     Inf   0.324   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.142       1     Inf   0.285   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.913       2     Inf   0.148   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

duration midpoint analysis

```r
fit1<-with(MI_List,lmer(duration~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(duration~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(duration~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(duration~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.606       2     Inf   0.201   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```r
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.178       1     Inf   0.278   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```r
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.770       2     Inf   0.170   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

Multiple Imputation (Predictive Mean Matching)

Analysis of the Sex Stimuli

f0 midpoint analysis

```r
fit1<-with(MI_List,lmer(f0~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f0~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.064       1  99.877   0.801   0.250
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

f1 midpoint analysis

```
fit1<-with(MI_List,lmer(f1~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f1~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.289       1     Inf   0.591   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

f2 midpoint analysis

```
fit1<-with(MI_List,lmer(f2~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f2~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.555       1  14.175   0.468   1.133
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

intensity analysis

```
fit1<-with(MI_List,lmer(intens~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(intens~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       2.880       1     Inf   0.090   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

duration midpoint analysis

```
fit1<-with(MI_List,lmer(duration~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(duration~1+gender+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.117       1     Inf   0.732   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

Analysis of the Age/Langurage Stimuli

f0 midpoint analysis

```
fit1<-with(MI_List,lmer(f0~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f0~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(f0~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(f0~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.600       2 915.638   0.203   0.053
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.136       1 102.741   0.714   0.246
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
```

```
##       0.242       2 283.495   0.785   0.102
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

f1 midpoint analysis

```
fit1<-with(MI_List,lmer(f1~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f1~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(f1~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(f1~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.450       2     Inf   0.638   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.333       1     Inf   0.564   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.096       2     Inf   0.908   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

f2 midpoint analysis

```
fit1<-with(MI_List,lmer(f2~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(f2~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(f2~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(f2~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.143       2  15.512   0.868   1.077
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.577       1  11.579   0.463   1.426
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       0.050       2  63.785   0.951   0.262
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

intensity analysis

```
fit1<-with(MI_List,lmer(intens~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(intens~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(intens~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(intens~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.128       2     Inf   0.324   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.142       1     Inf   0.285   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.913       2     Inf   0.148   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

duration midpoint analysis

```
fit1<-with(MI_List,lmer(duration~1+(1|stim_ID)))
fit2<-with(MI_List,lmer(duration~1+age_group+(1|stim_ID)))
fit3<-with(MI_List,lmer(duration~1+age_group+language+(1|stim_ID)))
fit4<-with(MI_List,lmer(duration~1+age_group*language+(1|stim_ID)))
testModels(fit2,fit1)
```

```
##
## Call:
##
## testModels(model = fit2, null.model = fit1)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.606       2     Inf   0.201   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit3,fit2)
```

```
##
## Call:
##
## testModels(model = fit3, null.model = fit2)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.178       1     Inf   0.278   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```

```
testModels(fit4,fit3)
```

```
##
## Call:
##
## testModels(model = fit4, null.model = fit3)
##
## Model comparison calculated from 5 imputed data sets.
## Combination method: D1
##
##     F.value     df1     df2   P(>F)     RIV
##       1.770       2     Inf   0.170   0.000
##
## Unadjusted hypothesis test as appropriate in larger samples.
## Models fitted with REML were used as is.
```