The P600 effect when singular gendered antecedents are co-indexed with (a) *himself* or *herself* (b) *themselves*

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This script, on the advice of reviewer 1, conducts an ANOVA examining the P600 PROST data with Referentiality and Gender as within variables. Gender Identity status will be examined as a post-hoc variable. Analysis 1 examines the data for antecedents that are co-indexed with *himself* or *herself*, while Analysis 2 examines the P600 effect when antecedents are co-indexed with *themselves*

Define functions, set parameters and load

Define standard error of mean function

```
sem <- function(x) sd(x)/sqrt(length(x))
```

Before we begin, let's set some general parameters for `ggplot2`. We will set a general theme using the `theme_set()` function. We will use the 'classic' theme which gives us clean white background rather than the default grey with white grid lines. We will position the legend at the top of the graph rather than at the right side which is the default.

Then we re-order factor levels for *Referentiality*

```
## [1] "Referential"    "NonReferential"
```

Analysis

```
ezANOVA(data = prost_2024_combined
              , dv = diff_score
              , wid = SubjID
              , within = .(Referentiality, Gender_Status, Anaphor_Type)
              , type = 3
              , return_aov = F
              )
```

```
## $ANOVA
##                                      Effect DFn DFd          F            p
## 2                            Referentiality   1  37  6.2117431 1.729558e-02
## 3                             Gender_Status   1  37  2.0944635 1.562538e-01
## 4                              Anaphor_Type   1  37  0.3171030 5.767506e-01
## 5              Referentiality:Gender_Status   1  37  0.1358162 7.145766e-01
## 6               Referentiality:Anaphor_Type   1  37 28.9761499 4.299269e-06
## 7                Gender_Status:Anaphor_Type   1  37  0.4098340 5.259986e-01
## 8 Referentiality:Gender_Status:Anaphor_Type   1  37 11.7011127 1.537022e-03
##   p<.05          ges
## 2     * 0.0189387917
## 3       0.0084412020
```

```
## 4       0.0009848718
## 5       0.0006023389
## 6     * 0.0802353837
## 7       0.0010880289
## 8     * 0.0357868295
```

Condition Means for Analysis 1

Significant Effects: **Referentiality; Referentiality x Anaphor Type; Referentiality X Gender Status X Anaphor Type**

Referentiality	Mean	SE	SD	Max	Min
Referential	0.08	0.13	1.59	4.45	-4.41
NonReferential	0.51	0.14	1.76	6.52	-4.29

Referentiality	Anaphor_Type	Mean	SE	SD	Max	Min
Referential	plural	0.49	0.19	1.66	4.45	-4.03
Referential	singular	-0.34	0.16	1.42	4.15	-4.41
NonReferential	plural	0.00	0.18	1.60	3.52	-4.29
NonReferential	singular	1.03	0.20	1.78	6.52	-3.33

Referentiality	Gender_Status	Anaphor_Type	Mean	SE	SD	Max	Min
Referential	Gendered	plural	0.93	0.25	1.52	4.45	-2.35
Referential	Gendered	singular	-0.40	0.26	1.63	4.15	-4.41
Referential	NonGendered	plural	0.06	0.28	1.70	3.52	-4.03
Referential	NonGendered	singular	-0.27	0.19	1.18	2.54	-2.50
NonReferential	Gendered	plural	-0.25	0.23	1.40	3.52	-2.77
NonReferential	Gendered	singular	1.49	0.30	1.84	6.52	-1.66
NonReferential	NonGendered	plural	0.25	0.29	1.76	3.18	-4.29
NonReferential	NonGendered	singular	0.57	0.26	1.62	4.02	-3.33

Post-hoc tests

Runs post-hoc tests for the 3-way ***"Gender Status x Referentiality"*** Interaction

"Some woman... himself" vs. "Mary... himself"

Table 4: Paired t-test: `diff_score` by `Referentiality`

Test statistic	df	P value	Alternative hypothesis	mean difference
4.833	37	2.36e-05 * * *	two.sided	1.893

"Someone... himself" vs. "The participant... himself"

Table 5: Paired t-test: `diff_score` by `Referentiality`

Test statistic	df	P value	Alternative hypothesis	mean difference
2.614	37	0.01286 *	two.sided	0.8365

"The participant... himself" vs. "Mary... himself"

Table 6: Paired t-test: `diff_score` by `Gender_Status`

Test statistic	df	P value	Alternative hypothesis	mean difference
-0.3661	37	0.7164	two.sided	-0.1346

"Someone... himself" vs. "Some woman... himself"

Table 7: Paired t-test: `diff_score` by `Gender_Status` "Some woman... themselves" vs. "Mary... themselves"

Test statistic	df	P value	Alternative hypothesis	mean difference
2.688	37	0.01071 *	two.sided	0.9219

Table 8: Paired t-test: `diff_score` by `Referentiality`

Test statistic	df	P value	Alternative hypothesis	mean difference
-3.366	37	0.001787 * *	two.sided	-1.174

"Someone... themselves" vs. "The participant... themselves"

Table 9: Paired t-test: `diff_score` by `Referentiality`

Test statistic	df	P value	Alternative hypothesis	mean difference
0.4705	37	0.6407	two.sided	0.191

"The participant... themselves" vs. "Mary... themselves"

Table 10: Paired t-test: `diff_score` by `Gender_Status`

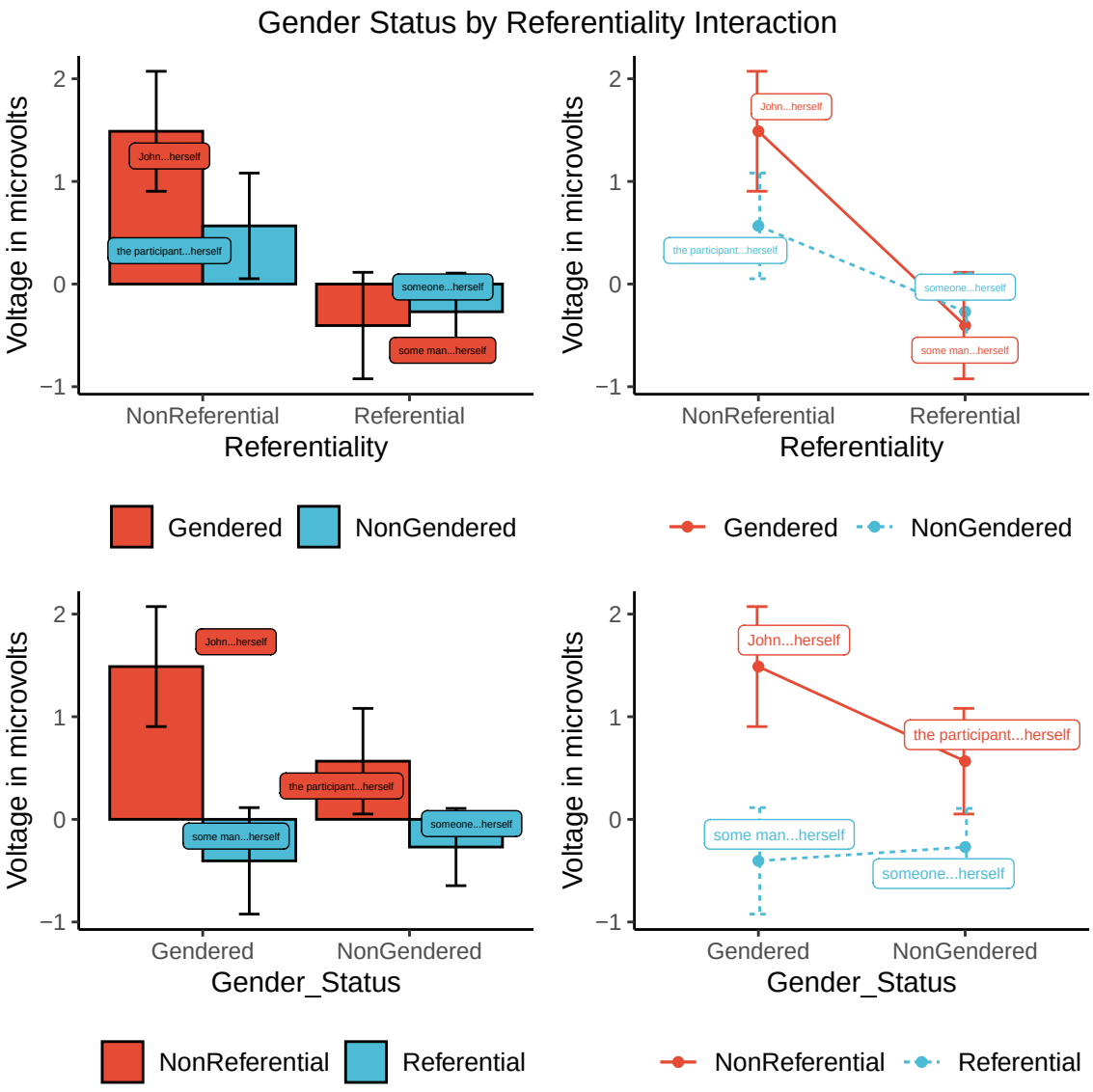
Test statistic	df	P value	Alternative hypothesis	mean difference
2.157	37	0.03754 *	two.sided	0.8688

"Someone... themselves" vs. "Some woman... themselves"

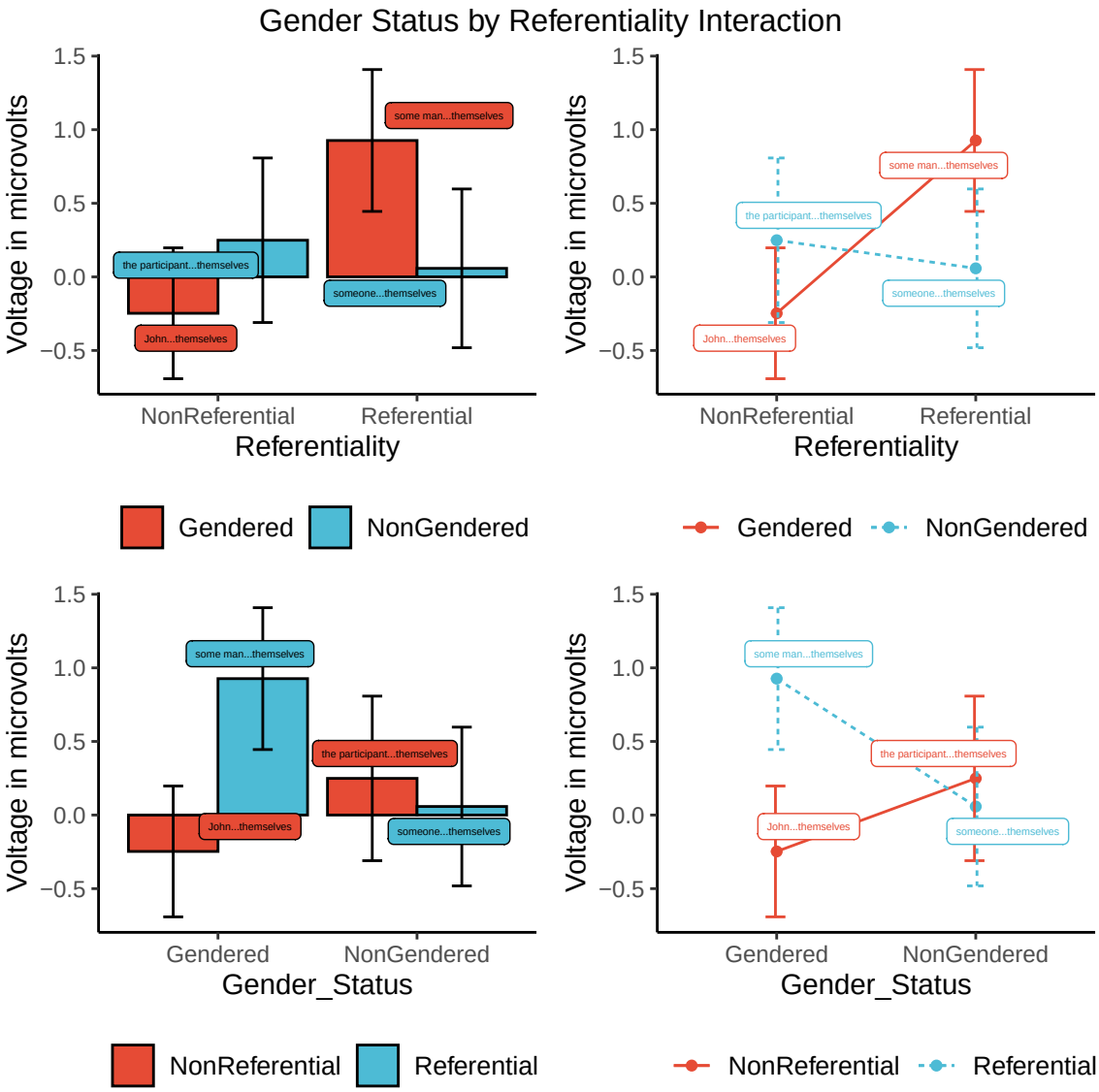
Table 11: Paired t-test: `diff_score` by `Gender_Status`

Test statistic	df	P value	Alternative hypothesis	mean difference
-1.277	37	0.2097	two.sided	-0.4963

Interaction Plots: Gender Status x Referentiality *himself*



Interaction Plots: Gender Status by Referentiality *themselves*


Gender Status by Referentiality Interaction
Voltage in microvolts
1.5
1.0
0.5
0.0
−0.5
the participant...themselves
some man...themselves
someone...themselves
John...themselves
NonReferential
Referential
Referentiality
Gendered
NonGendered
Gender_Status
NonReferential
Referential