

## Predicting language proficiency in bilingual children

**Online supplement****Calculating the BPI**

The Bilingualism Profile Index is a measure that combines the cumulative measures of home language exposure and use, through Principal Component Analysis (an objective method of dimension reduction). The R code to derive the BPI is given below.

```
## creating a dataframe comprising just the measures of  
  cumulative  
  
## exposure and cumulative use  
experience <- dat[ , c("Cumulative.Exposure.HL", "Cumulative.Use.HL")]  
  
## obtaining PCA scores  
experience.pr2 = princomp(experience)  
experienceScores <- experience.pr2$scores  
  
colnames(experienceScores) = c("BPI", "PrComp2")  
  
## extracting the PCA loadings  
experience.pr2$loadings
```

**Error analysis in the sentence repetition test**

|              | Coefficient | Std.Error | t     |
|--------------|-------------|-----------|-------|
| Intercept    | 0.93        | 0.03      | 30.56 |
| SRep Level 2 | -0.05       | 0.03      | -1.71 |
| SRep Level 3 | -0.12       | 0.03      | -3.71 |
| BPI (scaled) | -0.05       | 0.01      | -3.46 |
| SES (scaled) | 0.04        | 0.01      | 3.03  |
| STM (scaled) | 0.04        | 0.01      | 3.38  |
| Gender:M     | -0.03       | 0.02      | -1.37 |

Table 1

*Fixed effects of the optimal Linear Mixed Model of bilingual children's functional errors in the Sentence Repetition test. Random effects: Participant, Item*

|              | Coefficient | Std.Error | t     |
|--------------|-------------|-----------|-------|
| Intercept    | 0.96        | 0.03      | 31.60 |
| SRep Level 2 | -0.05       | 0.04      | -1.46 |
| SRep Level 3 | -0.12       | 0.04      | -3.18 |
| BPI (scaled) | -0.02       | 0.01      | -1.86 |
| SES (scaled) | 0.01        | 0.01      | 1.62  |
| STM (scaled) | 0.03        | 0.01      | 2.71  |
| Gender:M     | -0.01       | 0.02      | -0.73 |

Table 2

*Fixed effects of the optimal Linear Mixed Model of bilingual children's inflectional errors in the Sentence Repetition test. Random effects: Participant, Item*

|              | Coefficient | Std.Error | t     |
|--------------|-------------|-----------|-------|
| Intercept    | 0.97        | 0.03      | 35.42 |
| SRep Level 2 | -0.05       | 0.03      | -1.45 |
| SRep Level 3 | -0.13       | 0.04      | -3.58 |
| BPI (scaled) | -0.02       | 0.01      | -2.05 |
| SES (scaled) | 0.02        | 0.01      | 2.79  |
| STM (scaled) | 0.03        | 0.01      | 3.57  |
| Gender:M     | -0.01       | 0.02      | -0.81 |

Table 3

*Fixed effects of the optimal Linear Mixed Model of bilingual children's lexical errors in the Sentence Repetition test. Random effects: Participant, Item*