**SUPPLEMENTARY MATERIALS: PROCEDURE TO OBTAIN THE FINAL RANDOM SLOPE MODELS**

*Experiment 1:*

We got the model with only fixed and random effects:

model.syllable =lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (1|Item), data=data.syllable)

We added random slopes, as there are some manipulated variables that could influence subjects or items. We tested different random slope models, firstly added to the Subject random effect:

model.syllable.a = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Block+1|Subject) + (1|Item), data = data.syllable)

model.syllable.b = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Syllabic.Frequency + 1|Subject) + (1|Item), data = data.syllable)

model.syllable.c = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Syllabic.Estructure + 1|Subject) + (1|Item), data = data.syllable)

model.syllable.d = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Length + 1|Subject) + (1|Item), data = data.syllable)

model.syllable.e = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Block + Syllabic.Frequency + 1|Subject) + (1|Item), data= data.syllable)

model.syllable.f = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Block + Syllabic.Estructure + 1|Subject) + (1|Item), data = data.syllable)

model.syllable.g = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Block + Length + 1|Subject) + (1|Item), data = data.syllable)

model.syllable.h = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Syllabic.Frequency + Syllabic.Estructure + 1|Subject) + (1|Item), data = data.syllable)

model.syllable.i = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Syllabic.Frequency + Length + 1|Subject) + (1|Item), data = data.syllable)

model.syllable.j = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Syllabic.Estructure + Length + 1|Subject) + (1|Item), data = data.syllable)

And tested for the best model:

AIC (model.syllable.a, model.syllable.b, model.syllable.c, model.syllable.d, model.syllable.e, model.syllable.f, model.syllable.g, model.syllable.h, model.syllable.i, model.syllable.j)

|  |  |  |
| --- | --- | --- |
|  | df | AIC |
| model.syllable.a | 71 | 40674.18 |
| model.syllable.b | 53 | 40701.80 |
| model.syllable.c | 53 | 40704.19 |
| model.syllable.d | 53 | 40685.11 |
| model.syllable.e | 78 | 40680.84 |
| model.syllable.f | 78 | 40681.60 |
| **model.syllable.g** | **78** | **40658.89** |
| model.syllable.h | 56 | 40707.36 |
| model.syllable.i | 56 | 40685.71 |
| model.syllable.j | 56 | 40690.55 |

Secondly, we added random slopes to the Item random effect:

model.syllable.k = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Block + 1|Item), data = data.syllable)

model.syllable.l = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Syllabic.Frequency + 1|Item), data = data.syllable)

model.syllable.m = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Syllabic.Estructure + 1|Item), data = data.syllable)

model.syllable.n = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Length + 1|Item), data = data.syllable)

model.syllable.o = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Block + Syllabic.Frequency + 1|Item), data = data.syllable)

model.syllable.p = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Block + Syllabic.Estructure + 1|Item), data = data.syllable)

model.syllable.q = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Block + Length + 1|Item), data = data.syllable)

model.syllable.r = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Syllabic.Frequency + Syllabic.Estructure + 1|Item), data = data.syllable)

model.syllable.s = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Syllabic.Frequency + Length + 1|Item), data = data.syllable)

model.syllable.t = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Syllabic.Estructure + Length + 1|Item), data = data.syllable)

And selected the best model:

AIC (model.syllable.k, model.syllable.l, model.syllable.m, model.syllable.n, model.syllable.o, model.syllable.p, model.syllable.q, model.syllable.r, model.syllable.s, model.syllable.t)

|  |  |  |
| --- | --- | --- |
|  | df | AIC |
| model.syllable.k | 71 | 40723.42 |
| model.syllable.l | 53 | 40704.36 |
| **model.syllable.m** | **53** | **40697.81** |
| model.syllable.n | 53 | 40704.04 |
| model.syllable.o | 78 | 40734.08 |
| model.syllable.p | 78 | 40730.78 |
| model.syllable.q | 78 | 40733.64 |
| model.syllable.r | 56 | 40703.78 |
| model.syllable.s | 56 | 40707.74 |
| model.syllable.t | 56 | 40703.75 |

Finally, we compared the initial model with the best models adding random slopes and created a new one mixing them:

model.syllable = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (1|Item), data = data.syllable)

model.syllable.g = lmer (RTs ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Block + Length + 1|Subject) + (1|Item), data = data.syllable)

model.syllable.m = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Syllabic.Estructure + 1|Item), data = data.syllable)

model.syllable.u = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (Block + Length + 1|Subject) + (Syllabic.Estructure + 1|Item), data = data.syllable)

AIC (model.syllable., model.syllable.g, model.syllable.m, model.syllable.u)

|  |  |  |
| --- | --- | --- |
|  | df | AIC |
| model.syllable | 51 | 40700.56 |
| **model.syllable.g** | **78** | **40655.89** |
| model.syllable.m | 53 | 40697.81 |
| model.syllable.u | 80 | 40658.94 |

Our final random slope model was:

model.syllable.g = lmer (RTS ~ Block \* Syllabic.Frequency \* Syllabic.Estructure \* Length + (1|Subject) + (Block + Length + 1|Item), data = data.syllable)

***Experiment 2:***

We got the model with fixed and random effects:

Model = lmer (RTs ~ Context-dependency \* Block \* Length + (1|Subject) + (1|Item), data = data.cont-dep)

We added random slopes, as there are some manipulated variables that could influence subjects or items. We tested different random slope models, following the same procedure than in the Experiment 1:

model.cont-dep.a = lmer (RTs ~ Context-dependency \* Block \* Length + (Context-dependency + 1|Subject) + (1|Item), data = data.cont-dep)

model.cont-dep.b = lmer (RTs ~ Context-dependency \* Block \* Length + (Block + 1|Subject) + (1|Item), data = data.cont-dep)

model.cont-dep.c = lmer (RTs ~ Context-dependency \* Block \* Length + (Length + 1|Subject) + (1|Item), data = data.cont-dep)

model.cont-dep.d = lmer (RTs ~ Context-dependency \* Block \* Length + (Context-dependency + Block + 1|Subject) + (1|Item), data = data.cont-dep)

model.cont-dep.e = lmer (RTs ~ Context-dependency \* Block \* Length + (Context-dependency + Length + 1|Subject) + (1|Item), data = data.cont-dep)

model.cont-dep.f = lmer (RTs ~ Context-dependency \* Block \* Length + (Block + Length + 1|Subject) + (1|Item), data = data.cont-dep)

AIC (model.cont-dep.a, model.cont-dep.b, model.cont-dep.c, model.cont-dep.d, model.cont-dep.e, model.cont-dep.f)

|  |  |  |
| --- | --- | --- |
|  | df | AIC |
| model.cont-dep.a | 29 | 73204.20 |
| model.cont-dep.b | 47 | 73319.04 |
| model.cont-dep.c | 29 | 73252.73 |
| model.cont-dep.d | 54 | 73191.82 |
| **model.cont-dep.e** | **32** | **73139.46** |
| model.cont-dep.f | 54 | 73247.99 |

model.cont-dep.g = lmer (RTs ~ Context-dependency \* Block \* Length + (1|Subject) + (Context-dependency + 1|Item), data = data.cont-dep)

model.cont-dep.h = lmer (RTs ~ Context-dependency \* Block \* Length + (1|Subject) + (Block + 1|Item), data = data.cont-dep)

model.cont-dep.i = lmer (RTs ~ Context-dependency \* Block \* Length + (1|Subject) + (Length + 1|Item), data = data.cont-dep)

model.cont-dep.j = lmer (RTs ~ Context-dependency \* Block \* Length + (1|Subject) + (Context-dependency + Block + 1|Item), data = data.cont-dep)

model.cont-dep.k = lmer (RTs ~ Context-dependency \* Block \* Length + (1|Subject) + (Context-dependency + Length + 1|Item), data = data.cont-dep)

model.cont-dep.l = lmer (RTs ~ Context-dependency \* Block \* Length + (1|Subject) + (Block + Length + 1|Item), data = data.cont-dep)

AIC (model.cont-dep.g, model.cont-dep.h, model.cont-dep.i, model.cont-dep.k, model.cont-dep.l)

|  |  |  |
| --- | --- | --- |
|  | df | AIC |
| **model.cont-dep.g** | **29** | **73317.75** |
| model.cont-dep.h | 47 | 73330.26 |
| model.cont-dep.i | 29 | 73318.58 |
| model.cont-dep.j | 54 | 73341.35 |
| model.cont-dep.k | 32 | 73323.61 |
| model.cont-dep.l | 54 | 73343.77 |

model.cont-dep.m = lmer (RTs ~ Context-dependency \* Block \* Length + (Context-dependency + Length + 1|Subject) + (Context-dependency + 1|Item), data = data.cont-dep)

AIC (model.cont-dep, model.cont-dep.e, model.cont-dep.g, model.cont-dep.m)

|  |  |  |
| --- | --- | --- |
|  | df | AIC |
| model.cont-dep | 27 | 73314.67 |
| **model.cont-dep.e** | **32** | **73139.46** |
| model.cont-dep.g | 29 | 73317.75 |
| model.cont-dep.m | 34 | 73142.44 |

Our final random slope model was:

model.cont-dep.e = lmer (RTs ~ Context-dependency \* Block \* Length + (Context-dependency + Length + 1|Subject) + (1|Item), data = data.cont-dep)