Behavioural and electrophysiological markers of integration in novel word learning

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ANALYSIS

In all analyses, the contrasts of interest were defined with sum contrast coding: *condition* (Unrelated = 1, Related = -1), *set* (Recent = 1, Remote = -1), *ROI* (Posterior = 1, Frontal = -1; for the LPC spatiotemporal window). In Bayesian inference, hypothesis testing was done with Bayes factors, with the estimates based on bridge sampling. All models were fit with 3 sets of priors that differed in terms of their informativeness (diffuse, weakly informative, strongly informative). In the slides, we only report Bayes factors for the models fit with the weakly informative priors.

Behavioural data

Behavioural data was analysed with Bayesian linear mixed effects models with correlated varying intercepts and slopes for subjects and items. We used the following priors to compute the Bayes factors (all priors except for the prior on the correlation parameter followed log-normal distribution):

	Diffuse	*Weakly informative*	*Strongly informative*
Intercept	6.5, 0.5	6.5, 0.5	6.5, 0.5
Condition	0, 0.05	0.02, 0.008	0.02, 0.004
Set	0, 0.05	-0.02, 0.008	-0.02, 0.004
Condition x set	0, 0.05	-0.02, 0.008	-0.02, 0.004
SD	0, 0.1	0, 0.05	0, 0.05
Sigma	0, 0.5	0, 0.5	0, 0.5
Correlation	LKJ(2)	LKJ(2)	LKJ(2)

Electrophysiological data

EEG was recorded using a 64-channel BioSemi ActiveTwo electrode system (Amsterdam, Netherlands) at a sampling rate of 2048Hz. The Ag-AgCl-tipped electrodes were attached to an electrode cap using the 10/20 system. Two types of analysis were employed: the amplitude averaging approach and the mass univariate analysis. The former approach was used as it is most common in the literature, while the latter explored other time windows and ROIs for the contrasts of interest. The mass univariate analysis was conducted in Matlab, using the LIMO toolbox. We used the Threshold Free Cluster Enhancement technique to correct for multiple comparisons.

Averaged amplitudes were analysed with Bayesian distributional regression models with correlated varying intercepts and slopes for subjects and items for the location parameter μ (for the semantic priming models), correlated varying intercepts and slopes for subjects and varying intercepts for items (for the lexicality models), and varying intercepts for the scale parameter δ (for all models). We used the following priors to compute the Bayes factors (all priors, except for the prior for the correlation parameter and for the SD of δ were normally distributed):

	Diffuse	*Weakly informative*	*Strongly informative*
Intercept	0,10	0,5	0,5
Effect of interest	0,10	0,5	0,2.5
SD	0,20	0,5	0,5
Intercept of Sigma	0, log(50)	0, log(10)	0,log(10)
SD of Sigma	0,5	0,5	0,5
Correlation	LKJ(2)	LKJ(2)	LKJ(2)

Two spatiotemporal windows were defined for the analysis on averaged amplitudes: the N400 and the LPC. The former spanned 23 central-parietal electrodes (C5, C3, C1, Cz, C2, C4, C6, CP5, CP3, CP1, CPz, CP2, CP4, CP6, P7, P5, P3, P1, Pz, P2, P4, P6, P8) between 300 and 500ms after word onset, and the latter spanned 9 frontal (F7, F5, F3, F1, Fz, F2, F4, F6, F8) and 9 parietal (P7, P5, P3, P1, Pz, P2, P4, P6, P8) electrodes between 500 and 800ms post onset.

NOTE

The .pdf file containing the slides (including references) for our talk will be uploaded at https://mariakna.github.io/research/ after the conference. Email Maria at maria.korochkina@mq.edu.au if you have any questions.