

Supplemental Material S4. Preliminary explanatory IRT model and results using common item covariates.

In the process of arriving at the final explanatory IRT model of the present study, we first fit an initial LLTM (i.e., explanatory IRT model with only item covariates) with traditional item covariates known to be predictive of a common test of confrontation naming for noun production (see Fergadiotis et al., 2019 for further detail). This was done to confirm that these item covariates were sufficiently controlled for in the VNT test design, as intended by the test developers (Cho-Reyes & Thompson, 2012). This LLTM model included the following variables: lexical frequency, as measured by the log 10 contextual diversity index (Brysbaert & New, 2009); age of acquisition (Kuperman et al., 2012); and phoneme length. All item covariates were extracted from the South Carolina Psycholinguistic Metabase (Gao et al., 2022) and are included as part of Supplementary Materials S1.

Here, we interpreted age of acquisition as reflecting lexical-semantic processing, given observed effects in a wide range of lexical tasks (e.g., Johnston & Barry, 2005, although see Fergadiotis et al., 2019 for an overview of other processes that may be involved); phoneme length as reflecting phonological processing (e.g., Gollan & Brown, 2006; James & Burke, 2000; Meyer & Bock, 1992); and lexical frequency as reflecting both lexical-semantic and phonological processing (Kittredge et al., 2008).

As can be seen in Table S4-1, model fit indices revealed that a model with lexical frequency, age of acquisition, and phoneme length was not significantly different than one without the item covariates ($p = .547$), and these variables explained only a marginal amount of the variance in item difficulty parameters ($R^2 = .098$). Given the more parsimonious model demonstrated an equivalent fit to the data, fixed and random effects were not evaluated.

Table S4-1

Model Fit Indices for the Descriptive IRT Model and Preliminary LLTM Models

Model	Number of Parameter s	AIC	BIC	Log Likelihood	Deviance	LRT			Item R ²
						χ^2	<i>df</i>	<i>p</i>	
1-PL IRT with random item effect	3	2608.7	2626.0	-1301.3	2602.7	— ^a	— ^a	— ^a	— ^a
LLTM with Fergadiotis et al. (2019) item covariates	6	2612.6	2647.1	-1300.3	2600.6	2.12	3	.547	.098

^aNot applicable

References

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