Correction to: Effects of grammar complexity on artificial grammar learning

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Correction to: Mem Cogn

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In the article “Effects of Grammar Complexity on Artificial Grammar Learning” by E. Van den Bos and F. Poletiek, published in *Memory & Cognition*, 2008, 36(6), 1122–1131, doi:10.3758/MC.36.6.1122, an error was made in the computation of topological entropy (TE). A transition between n -grams was coded on the basis of one overlapping letter instead of $n - 1$ overlapping letters (e.g., in Grammar B, transitions were coded from _ZT to TPR and TPQ instead of to ZTP). This led to an inflation of transitions in grammars described by larger n -grams (i.e., lifted more than once; Bollt & Jones, 2000), and hence TE. Corrected values are reported in Table 1.

The article examined two aspects of complexity: the number of associations and the length of the associations that have to be learned. Corrected TE is no longer correlated with the number of elements required to predict the next (i.e., the length of the associations, NE, $r = .53$, $p = .113$), but highly correlated with the number of bigrams and the number of rules (i.e., the number of associations, $r = .99$, $p < .001$, for both). The regression analyses were redone with corrected TE as a measure of the number of associations and NE as a measure of the length of the associations. The pattern of results was similar to that reported in the paper.

NE was the best predictor of the overall proportion of correct classifications in the memorize condition. The model including only TE accounted for 13.2% of the variance, $F(1, 28) = 4.27$, $p = .048$, $\beta = -.364$. The model including only NE accounted for 15.7% of the variance, $F(1, 28) = 5.21$, $p = .030$, $\beta = -.396$. Adding TE was no significant improvement to the model including only NE, $F_{\text{change}}(1, 27) = 1.09$, $p = .306$. In the look for rules condition, all models remained nonsignificant.

In the analyses by type of test string, the model including only NE was significant for strings containing two or more second-order violations in the memorize condition, $F(1, 22) = 6.02$, $p = .023$, $\beta = -.463$. In the look for rules condition, the model including only NE was significant for strings containing three first-order violations, $F(1, 22) = 7.13$, $p = .014$, $\beta = .495$. The models including TE no longer reached significance: TE only, $F(1, 22) = 1.03$, $p = .320$; TE and NE, $F(2, 21) = 3.41$, $p = .052$. All other models remained nonsignificant.

Our conclusions that implicit learning of artificial grammars is affected by complexity and that the length of the dependencies that have to be acquired seems the most influential aspect of complexity remain valid. However, topological entropy should not be considered a sensitive measure of this aspect.

The online version of the original article can be found at <https://doi.org/10.3758/MC.36.6.1122>

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Table 1 Values on four measures of complexity by grammar

Grammar	NR	NB	NE	Corrected TE
A	20	30	2	0.5543
B	21	33	3	0.6019
C	22	36	3	0.6753
D	22	36	4	0.6823
E	23	38	2	0.7131
F	24	41	4	0.7465
G	24	40	3	0.7586
H	25	44	4	0.8021
I	26	45	3	0.8449
J	27	47	4	0.8587

NR = number of rules; NB = number of bigrams; NE = number of elements required to predict the next; corrected TE = corrected topological entropy

Open practices statement The data and materials for the experiment are available upon request: <https://hdl.handle.net/10411/EATY2Z>. The experiment was not preregistered.

Reference

Boltt, E. M., & Jones, M. A. (2000). The complexity of artificial grammars. *Nonlinear Dynamics, Psychology, and Life Sciences*, 4, 153–168.

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