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Limitations of Statistical Learning: the Case of Paradigmatic Relations

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Abstract

Extensive statistical learning literature suggests that regularities between co-occurring items can be learned implicitly. However, little is known whether higher-order statistics, such as paradigmatic relations, can be learned implicitly. Paradigmatic relations link items that may not co-occur but share each others patterns of co-occurrence. For example, A and B are paradigmatically related when they both co-occur with C (e.g., A-C, B-C). Therefore, paradigmatic relations could, in principle, be implicitly learned through co-occurrence regularities. Here, we modified a contextual cueing task, where some of the targets independently appeared within distractors that had the same spatial configuration. We found that only participants who noticed the repeating distractor patterns tend to learn the paradigmatic relations, while most participants were able to learn the simple co-occurring regularities. Our findings imply that the ability to learn simple co-occurrence regularities is not sufficient for forming paradigmatic relations and that explicit attention may be critical.