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**Electrophysiological markers of newly acquired symbolic numerical representations: the role of magnitude and ordinal information.**

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Summary: It is not yet understood how children acquire the meaning of numerical symbols and most existing research has focused on the role of approximate non-symbolic representations of number in this process. However, numerical symbols necessitate an understanding of both order and magnitude, therefore order likely also plays a role in learning about number. Here, we used an artificial symbol-learning paradigm to contrast learning approximate numerical magnitude with learning numerical order. Thirty-two adult participants were randomly assigned to either the magnitude training group, in which they were trained to associate novel abstract symbols with non-symbolic numerical magnitudes, or the order training group, in which they were taught the ordinal sequence of the symbols, in analogy to the count sequence. Subsequently, electroencephalographic (EEG) data were recorded while participants completed a magnitude comparison task with the newly learned symbols. Comparing these newly acquired symbols affected event related potentials (ERPs) in a way that resembled comparisons of real numerical symbols. Furthermore, these ERP effects did not differ across learning groups, suggesting that adults formed similar representations regardless of method of instruction. In turn, the current findings highlight the potential role of ordinal information in symbolic acquisition.

*Classification:* C80 F20 C30

*Keywords:* order; magnitude; ERPs; symbol

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