

Labels Refer to Object Categories in Adults and 9-Month-Old infants

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Infants as young as 6 months possess a small receptive vocabulary of common nouns (Bergelson & Swingley, 2012), and at least by 9 months show electrophysiological correlates of semantic integration (Parise & Csibra, 2012). Previous research has also shown that spoken words facilitate the categorization of perceptually similar objects in infants (Ferry, Hespos, & Waxman, 2010). Here we addressed the question whether labels alone, without perceptual similarities, could make adults and 9-month-olds group objects together, and constitute a potential mechanism for the creation of novel categories.

Using a high density electroencephalography, we measured EEG in adults and infants while they watched pictures of unfamiliar objects presented in a category oddball paradigm, and we looked at desynchronization of alpha-band EEG oscillations.

First, adults learnt one of two pseudo-words for each of six unfamiliar objects without shared perceptual features. Subsequently, four of the six objects, three sharing the label and one having the other label, were presented without labels on screen, with equal frequency and equal transitional probability. Participants responded to the oddball category with stronger attenuation of alpha oscillation over the left frontal region. A similar response was found for known categories.

In an infant version of the study, first 9-month-olds were engaged in a live familiarization with an experimenter presenting them the six unfamiliar objects one by one, while uttering the two novel labels. Then, right after the familiarization, we presented the infants with the four objects the same way as above. Stronger alpha attenuation in response to the oddball category suggested that 9-month-olds, just like adults, exploited the labels to form two groups of objects. We fully replicated the infant results in a second group of 9-month-olds.

These data strongly suggest that hearing a novel label applied to unfamiliar objects is sufficient for adults and infants who do not produce any language yet, to group these objects together, regardless of the objects visual appearance. Likely, this goes beyond pure associative learning, suggesting that infants interpret labels as symbols referring to object categories.

Bibliography

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