Language processing reveals conceptual combination in infants

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The expressive power of human mind knows no limits. Available concepts can be combined in an infinite number of ways to create new thoughts. Natural language provides a powerful system to express complex thoughts and a natural practice for combinatorial thought on everyday basis. Whether uttering or interpreting speech (e.g., “I wish there were more women in science”), the cognitive system engages in combinatorial processes that require retrieving the concepts linked to constituent linguistic symbols (“women”, “science”, “in”, etc.) and combining them. Despite its ubiquity in human linguistic interaction and thought, the developmental origins of combinatorial mental processes remain unknown. To address this question, the present research investigated whether preverbal infants have access to mechanisms for extracting complex meaning from speech. Across three eye-tracking experiments, we taught 12-month-olds ($N = 60$) two novel quantity labels denoting sets of one and two (e.g., “mize” for 1; “padu” for 2). We then showed that they could not only generalize these labels to sets of previously unseen objects, but also combine them with familiar category labels acquired prior to the lab visit (e.g., “ball”, “duck”). Their eye movements revealed adult-like compositional procedures that go beyond serial processing of constituent meanings. These findings indicate that certain combinatorial processes involved in extracting complex linguistic meaning are already available by the end of the first year of life and are ready to support language comprehension.