Background

The English universal quantifiers "All", "Every", and "Each" can be used to describe scenes in which agents engage in actions exhaustively (i.e. everyone is doing it). But, while "Each" can only be used with distributive predicates(i), "All" can also be used with collective predicates (iii) (Dowty, 1987). A recent study in adults provided evidence that "Each" and "All" may express different forms of quantification, one based on individuals, the other on groups of them (Knowlton et al., submitted). In the present study, we tested adults' and infants' ability to distinguish visually presented exhaustive collective (All) and exhaustive individual actions (Each).

Methods:

• Each infant was habituated to either collective or distributed exhaustive actions and was tested with either the same type of action or the other one (4 groups, 8 participants each).
• In a between subjects visual habituation procedure, in infants (N = 36, M_age = 9.27 months) were presented with several animated movies displaying continuous chasing events involving three chevrons and three balls.

Results: nine-month-old infants may distinguish collective and individual exhaustive actions.

• Infants who were habituated to exhaustive collective actions dis-habituated to exhaustive individual actions, and vice versa, with 3 chasers. These results shows that infants successfully internalized distinct representations of the two scenes.
• Just like adults, infants might have relied on quantification over individual events (i.e., each chevron was chasing a different ball) in one case and on quantification over the members of a group in the other (i.e., all the chevrons were chasing the same ball). However, nailing this will require ongoing work in our Future directions.

Future directions

What is the content of infants' representation of the two types of movies?

If, similarly to adults, infants represent the two types of chasing events via two distinct forms of quantification (over discrete individuals vs. over members of a group), then they will be able to internalize an exhaustive action with five agents when it is collective but not when it is individual. In contrast, if infants internalize the dispersion of the chevrons or the relative entropy of the scene, then they might succeed regardless of the number of chasers. We are currently running an experiment to address this question.

References


Concepts of universal quantification ("each" and "all") may support infant and adult understanding of collective and distributive actions.

Nicolò Cesana-Arlootti §, Tyler Knowlton 4, Jeffrey Lidz 4, Paul Pietroski 1 & Justin Halberda 5

§ Department of Psychological and Brain Sciences, Johns Hopkins University, Baltimore, MD
4 Department of Linguistics, University of Maryland, College Park, MD
5 Department of Philosophy, Rutgers University, New Brunswick, NJ
nicolocesanaarlootti@gmail.com

Babies

All

Each

Exhaustive Collective Chasing

Exhaustive Individual Chasing

Habituation to fully-collective chasing

Habituation to fully-individual chasing

Methods:

• In a between subjects visual habituation procedure, in infants (N = 36, M_age = 9.27 months) were presented with several animated movies displaying continuous chasing events involving three chevrons and three balls.
• Each infant was habituated to either collective or distributed exhaustive actions and was tested with either the same type of action or the other one (4 groups, 8 participants each).

Future directions

What is the content of infants' representation of the two types of movies?

If, similarly to adults, infants represent the two types of chasing events via two distinct forms of quantification (over discrete individuals vs. over members of a group), then they will be able to internalize an exhaustive action with five agents when it is collective but not when it is individual. In contrast, if infants internalize the dispersion of the chevrons or the relative entropy of the scene, then they might succeed regardless of the number of chasers. We are currently running an experiment to address this question.