Infants’ ability to enumerate multiple spatially-overlapping sets in parallel

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Abstract
We provide the first demonstration that young infants can enumerate multiple sets in parallel.

Introduction
Previous studies\(^1\)\(^2\) show that by 6-months, infants successfully enumerate 1 set such that they dishabituate when the number of dots in a display doubles. Most adults can enumerate up to 3 sets in parallel (enumerating two subsets and the superset).\(^3\)

Most adults can enumerate up to 3 sets in parallel (enumerating two subsets and the superset).\(^3\) Infants, like adults, can enumerate more than 1 set in parallel.

Question
Can 8-month-old infants, like adults, enumerate more than one spatially-overlapping set in parallel?

The Current Experiment

Trial structure:
- Habituation (up to 15 trials): 2-4 colored subsets, each containing a fixed number of dots
- Beginning of trial

Test (6 trials):
- Discriminable (3 trials): The numerosity of one of the color subsets doubles
- Non-Discriminable (3 trials): The numerosity of all of the color subsets changes by an amount known to be non-discriminable to 8-month-olds

Success: Enumeration of 2 subsets in parallel

Failure: Enumeration of 3 & 4 subsets in parallel

Summary & Conclusions
- Infants, like adults, can enumerate more than 1 set in parallel.

Discussion
Infants, like adults, can store up to 3 individual objects in memory (Feigenson, 2003, 2005).\(^4\)\(^5\)

Adults can store up to 3 sets of objects in working memory.\(^3\)

Here, we show that infants can store at least 2 sets of objects in memory, for the purpose of enumeration.

Future directions
- Do infants, like adults, also succeed with 3 total sets (2 subsets and the superset), suggesting an even stronger parallel in enumeration abilities between infants and adult?
- Is there a ‘cost’ of storing multiple sets? Does the resolution of each representation suffer as the number of sets to remember increases?

References
\(^3\) Halberda, J., Lipton, L., & Spelke, E. S. (2008). Evidence of large-number discrimination in human infants. Psychological Science, 19(7), 729-733.


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