12-month-olds' understanding of negation

Ágnes Melinda Kovács[1], Rachel Dudley[1], Ernő Téglás[1]
[1]Central European University (CEU)
kovacsag@ceu.edu; dudleyr@ceu.edu; teglase@ceu.edu

Do pre-verbal infants possess a negation operator (NOT) that can support their reasoning and serve as a basis for later acquisition of negative vocabulary[1-2]? We present infants with a visual (non-verbal) disjunctive reasoning problem: One ball could be in A, B or C; it is not in A; therefore it is in B or C. Crucially, we also have a fourth location (D) which was never a potential hiding location, and therefore does not need to be eliminated from the set of possibilities in the same way as A. We use looking-time methods to ask whether 12-month- olds distinguish between an outcome where the ball is revealed in A (negated) vs. D (impossible) vs. B/C (possible). If 12-month-olds possess NOT and it supports their reasoning about location A, they should distinguish the A outcome from both B/C and D outcomes. In 3 experiments (N=24/experiment), we test each pair of outcome. We find that infants look longer to impossible outcomes than possible ones (Exp 1: t(23)=2.7872, p=0.01047); but we do not find a significant difference between looking to impossible vs. negated outcomes (Exp 2: t(23)=-0.32844, p=0.7456), or negated vs. possible outcomes (Exp 3: t(23)=0.44147, p=0.663). This pattern of results is compatible with the NOT hypothesis if we assume (i) negated possibilities have a status that is intermediate between possibilities and impossibilities (because a possibility is first represented and then ruled out) and (ii) our dependent measure lacks the sensitivity to reveal this pattern.

References

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