



What Can 8-Month-Olds Pull Out of Means-End Training? Generalization of Training Effects on Understanding of Actions in Others

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Introduction

Means-ends actions are essential to everyday life. Human adults readily interpret the intention behind sequences of actions and apply this knowledge to predict future actions.

Development of Means-End Actions

Previous research demonstrates that infants' ability to produce and perceive means-end actions develops throughout the first year of life.

- 12-month-olds spontaneously produce and understand means-end actions (Sommerville & Woodward, 2005).
- 10-month-olds are variable as a group but the ability to produce and understand is correlated.
- 8 month-olds are limited in their production of means-end actions, and do not show evidence of understanding others' means-end actions.
- Both 10- and 8-month-olds can be trained to produce means-end actions and subsequently understand others' means-end actions (Mahajan, Woodward, Eisenband, & Sommerville, 2008; Sommerville, Hildebrand, & Crane, 2008).

Current Research

- How does infants' action experience shape their action perception?
- Can infants take what they've learned and generalize to new means and goals with less perceptual similarity?

References

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Mahajan, N., Woodward, A. L., Eisenband, L. R., & Sommerville, J. A. (March, 2008). Perception and production of means-end goal structures in eight-month-old infants. Poster presented at the International Conference for Infant Studies, Vancouver, BC.

Sommerville, J. A., Hildebrand, E. A., & Crane, C. C. (2008). Experience matters: The impact of doing versus watching on infants' subsequent perception of tool use events. *Developmental Psychology*, 44, 1249-1256.

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Study One: A closer look at how infants' action experience shapes their action perception

Methods

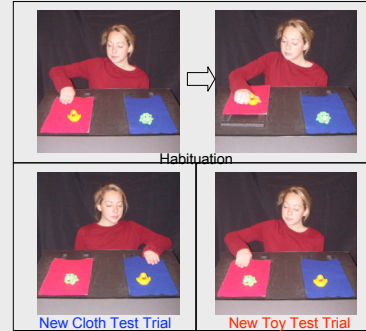
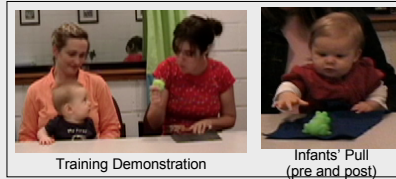
Participants: (18 8-month old infants; mean age = 7.81 months; 10 female)

Procedure:

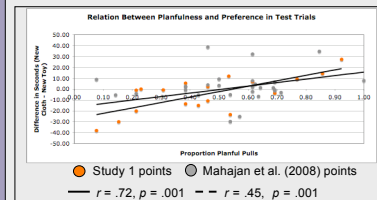
Training Session (gaining experience producing own actions): Four pre-training trials, five training trials (demonstrations), and four post-training trials

Habituation Procedure (assessing understanding of others' actions):

- Infants were habituated to an experimenter reaching for one of two cloths and grasping a toy at the end of the cloth.
- After habituation, the placement of the toys was switched and infants saw two alternating test trials.
- New-cloth test trials:** Preserves the mean from habituation but disrupts the goal
- New-toy test trials:** Preserves the goal but disrupts the means
- Longer looking to a particular trial-type indicates that the infant viewed the disrupted feature as more salient

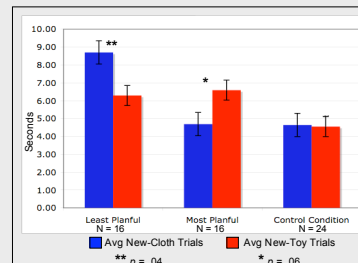


Results



Infants' actions during training were correlated with their relative preference for new-cloth versus new-toy trials in the habituation paradigm, $r = .72, p = .001$.

Because these results were comparable to Mahajan et al. (2008), we combined data from the two studies for subsequent analyses (see figure).



We examined the bottom and top third most planful infants in the combined data set. The least planful infants preferred new-cloth trials, whereas the most planful infants preferred new-toy trials. Infants in Mahajan et al. (2008) who received no experience producing cloth-pulling actions demonstrated no preference for either type of test-trial.

Discussion

- Consistent with prior findings, this study demonstrated a strong effect of infants' own actions on their understanding of others' actions.
- We hypothesize that these results reflect the way in which infants' attention shifts during skill acquisition from attention to the means at early stages to attention to the goal in later stages.

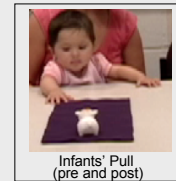
Study Two: Can infants take what they've learned and generalize to new means and goals with less perceptual similarity?

Methods

Participants: (24 8-month old infants; mean age = 7.94 months; 12 female)

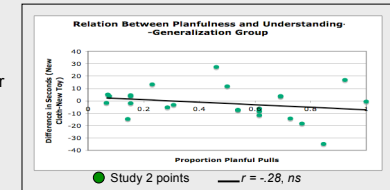
Procedure: Training session replicated Study 1 except that infants used novel cloths and toys during pre- and post-training trials

Habituation Procedure replicated Study 1



Results

Infants' actions during training were not correlated with their preference for either new-cloth or new-toy trials. There was no reliable preference for the group as a whole or for the most planful infants.



Discussion

- Infants in this study behaved similarly to infants without training despite having the same amount of training as infants in Study One.
- These results are consistent with infants' limited ability to generalize their own means-end actions (Barrett, Davis, & Needham, 2007; Chen, Sanchez, & Campbell, 1997).
- They contrast with the correlation between production and understanding of means-end actions at ten months despite lack of physical similarity (Sommerville & Woodward, 2005).
- Together, this raises the question of how infants progress from relatively circumscribed representations seen in eight-month-olds to the more abstract representations that are beginning to emerge by ten months of age.

Conclusions and Future Directions

These studies highlight the way that infants' own experience in acquiring means-end actions shapes their perception of others' actions.

- When infants were trained to produce the action with perceptually similar objects, they were able to generalize information about that experience to others' actions.
 - The nature of this information varied as a function of the level at which they had acquired the skill.
- When infants were trained with perceptually dissimilar objects, they did not benefit from training in the same way.
- Future research should consider what aspects of training are essential for generalizing one's own experience and how infants' action development supports the acquisition of more abstract and generalizable representations.

Acknowledgments

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