

Lecture 02: Pure Goal Tracking

- A Developmental Puzzle

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1. When can infants first track goals?

‘Six-month-olds and 9-month-olds showed a stronger novelty response (i.e., looked longer) on new-goal trials than on new-path trials (Woodward 1998). That is, like toddlers, young infants selectively attended to and remembered the features of the event that were relevant to the actor’s goal.’ (Woodward et al. 2001, p. 153)

2. How are infants first able to track goals?

The Teleological Stance: The goals of an action are those outcomes which the means is a best available way of bringing about (Gergely et al. 1995; Csibra & Gergely 1998).

‘an action can be explained by a goal state if, and only if, it is seen as the most justifiable action towards that goal state that is available within the constraints of reality’ (Csibra & Gergely 1998, p. 255).

‘when taking the teleological stance one-year-olds apply the same inferential principle of rational action that drives everyday mentalistic reasoning about intentional actions in adults’ (Csibra 2003).

The Simple View The principles comprising the Teleological Stance are things infants know or believe, and infants are able to track goals by making inferences from these principles plus their beliefs about the means agents have selected.

3. A signature limit of infant goal tracking?

Flanagan & Johansson (2003) showed that ‘patterns of eye–hand coordination are similar when performing and observing a block stacking task’.

From at least three months of age, some of infants’ abilities to identify the goals of actions they observe are linked to their abilities to perform actions (Woodward 2009).

In adults, tying the hands impairs proactive gaze (Ambrosini et al. 2012); in infants, boosting grasping with ‘sticky mittens’ facilitates proactive gaze (Sommerville et al. 2005; see also Sommerville et al. 2008, Ambrosini et al. 2013; Skerry et al. 2013).

4. The Motor Theory of Goal Tracking

According to the Motor Theory, infants’ (and adults’) pure goal-tracking sometimes depends on the double life of motor processes (see Sinigaglia & Butterfill 2015, for details).

More carefully the *Motor Theory of Goal Tracking* states that:

1. in action observation, possible outcomes of observed actions are represented motorically;
2. these representations trigger motor processes much as if the observer were performing actions directed to the outcomes;
3. such processes generates predictions;
4. a triggering representation is weakened if the predictions it generates fail.

The result is that, often enough, the only only outcomes to which the observed action is a means are represented strongly.

5. A Developmental Puzzle about Goal-Tracking

‘by the end of the first year infants are indeed capable of taking the intentional stance (Dennett, 1987) in interpreting the goal- directed behavior of rational agents.’ (Gergely et al. 1995, p. 184)

‘12-month-old babies could identify the agent’s goal and analyze its actions causally in relation to it’ (Gergely et al. 1995, p. 190)

6. Perceptual Animacy

Perceptual animacy is the detection by broadly perceptual processes of animate objects and their targets Gao et al. (e.g. 2009).

In adults, abilities to perceptually detect chasing depend on several cues including whether the chaser ‘faces’ its target (‘directionality’) and how directly the chaser approaches its target (‘subtlety’).

The detection of animacy appears to be a broadly perceptual phenomena since it depends on areas of the brain associated with vision and influences how perceptual attention is allocated (Scholl & Gao 2013) irrespective of your beliefs and intentions (van Buren et al. 2016).

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