Which Joint Actions Ground Social Cognition?

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challenge

Explain the emergence, in evolution or development, of sophisticated forms of social cognition.

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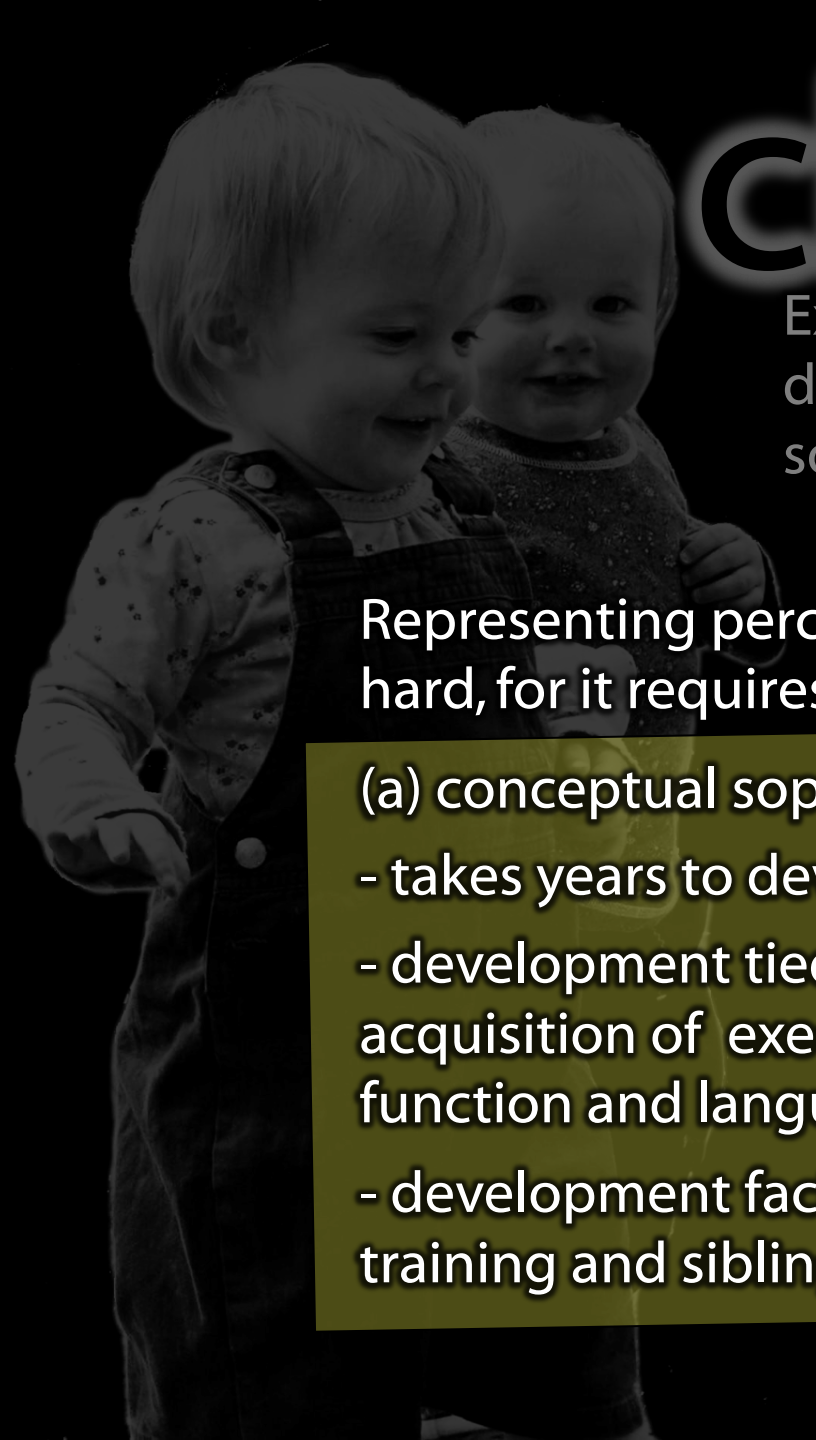

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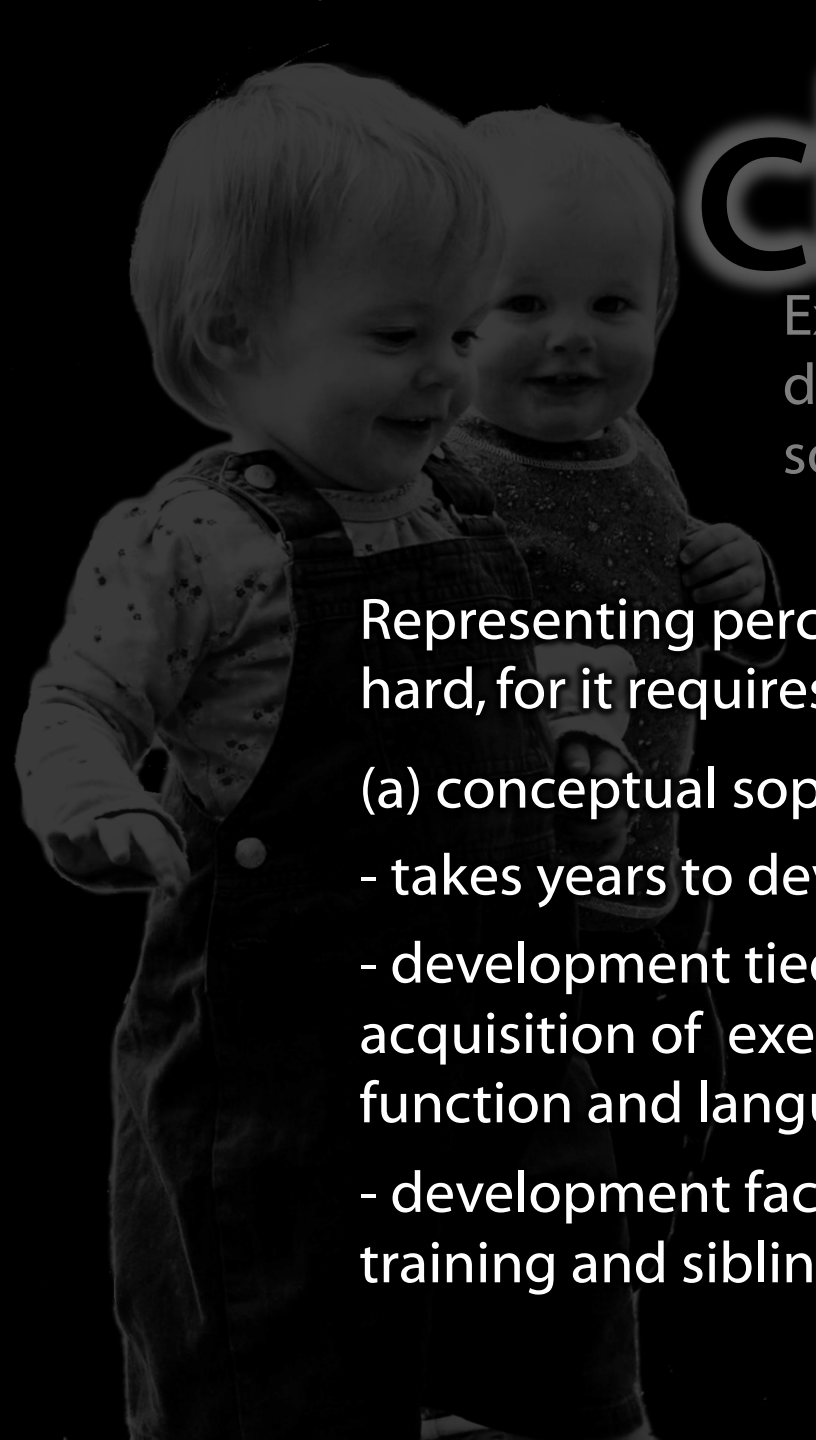
(a) conceptual sophistication

- takes years to develop
- development tied to acquisition of executive function and language
- development facilitated by training and siblings

(b) scarce cognitive resources

- attention
- working memory



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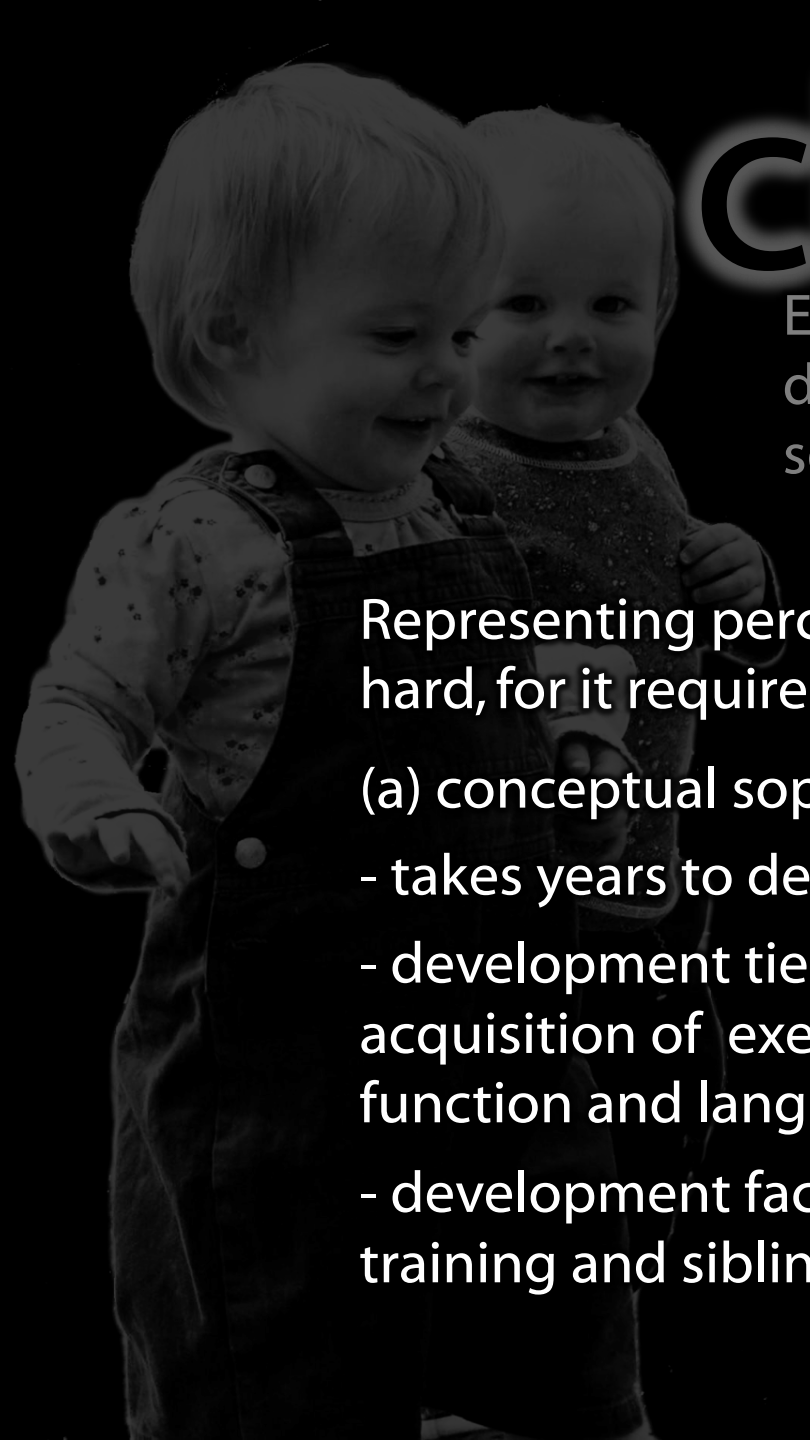

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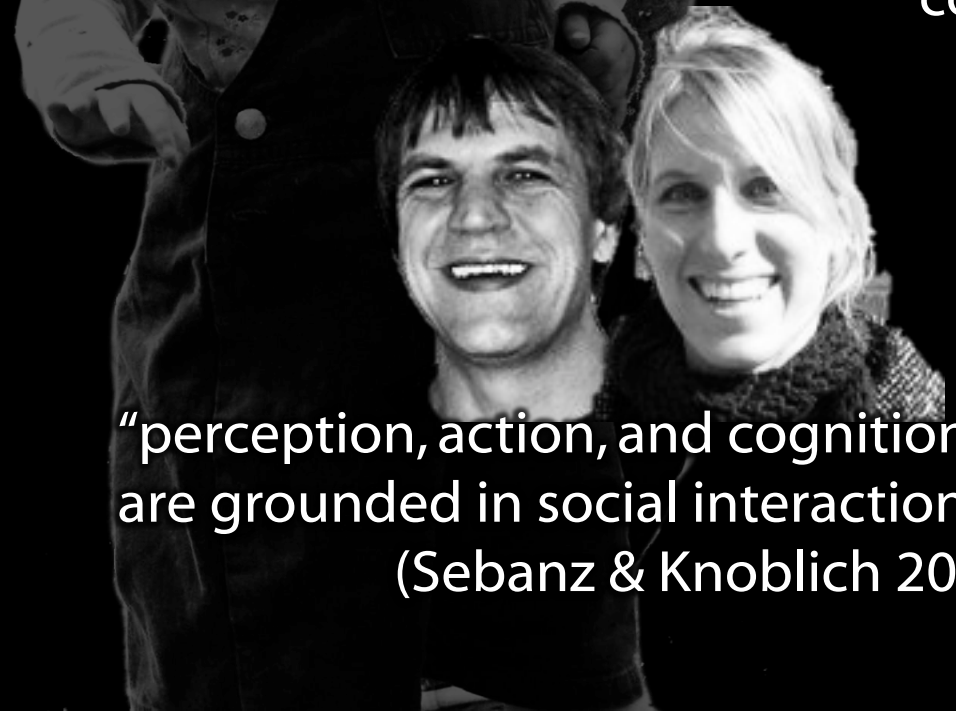
"the unique aspects of human cognition ... were driven by, or even constituted by, social co-operation"
(Moll & Tomasello 2007)



"perception, action, and cognition are grounded in social interaction"
(Sebanz & Knoblich 2008)

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Given the conjecture, what could joint action be?

tidying up the toys together

(Behne et al 2005)

cooperatively pulling handles in sequence to make a dog-puppet sing

(Brownell et al 2006)

bouncing a ball on a large trampoline together

(Tomasello & Carpenter 2007)

pretending to row a boat together

painting a house together
(Bratman 1992)

lifting a heavy sofa together
(Velleman 1997)

preparing a hollandaise sauce together
(Searle 1990)

going to Chicago together
(Kutz 2000)

walking together
(Gilbert 1990)

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shared intention

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‘the key property of joint action lies in its internal component [...] in the participants’ having a “collective” or “shared” intention.’

(Alonso 2009, pp. 444-5)

‘Shared intentionality is the foundation upon which joint action is built.’

(Carpenter 2009, p. 381)

What is shared intention?

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Functional characterisation

Substantial account

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shared intention serves to (a) coordinate activities, (b) coordinate planning and (c) structure bargaining

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Substantial account

We have a shared intention that we J if

"1. (a) I intend that we J and (b) you intend that we J

"2. I intend that we J in accordance with and because of Ia, Ib, and meshing subplans of Ia and Ib; you intend [likewise] …

"3. 1 and 2 are common knowledge between us"

(Bratman 1993: View 4)

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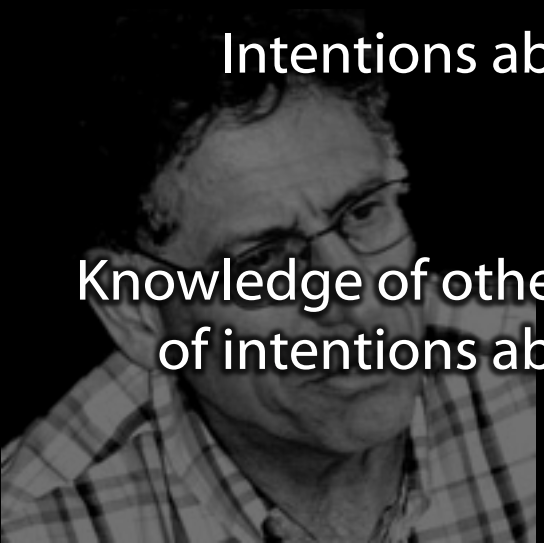

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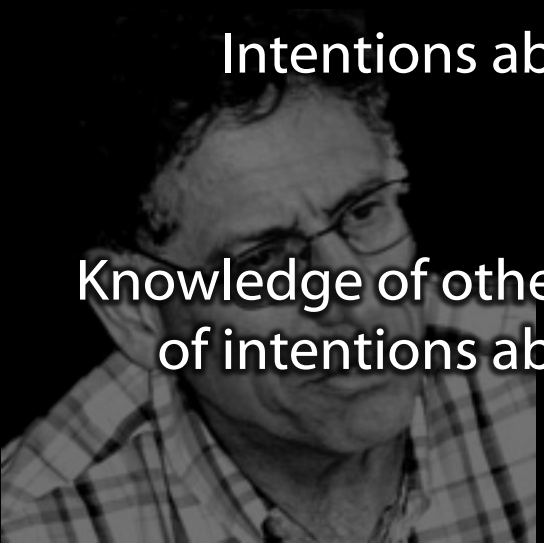

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'shared intentional agency consists, at bottom, in interconnected planning agency of the participants.'

(Bratman 2011, p. 11)

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2. Shared intention requires sophisticated theory of mind cognition.

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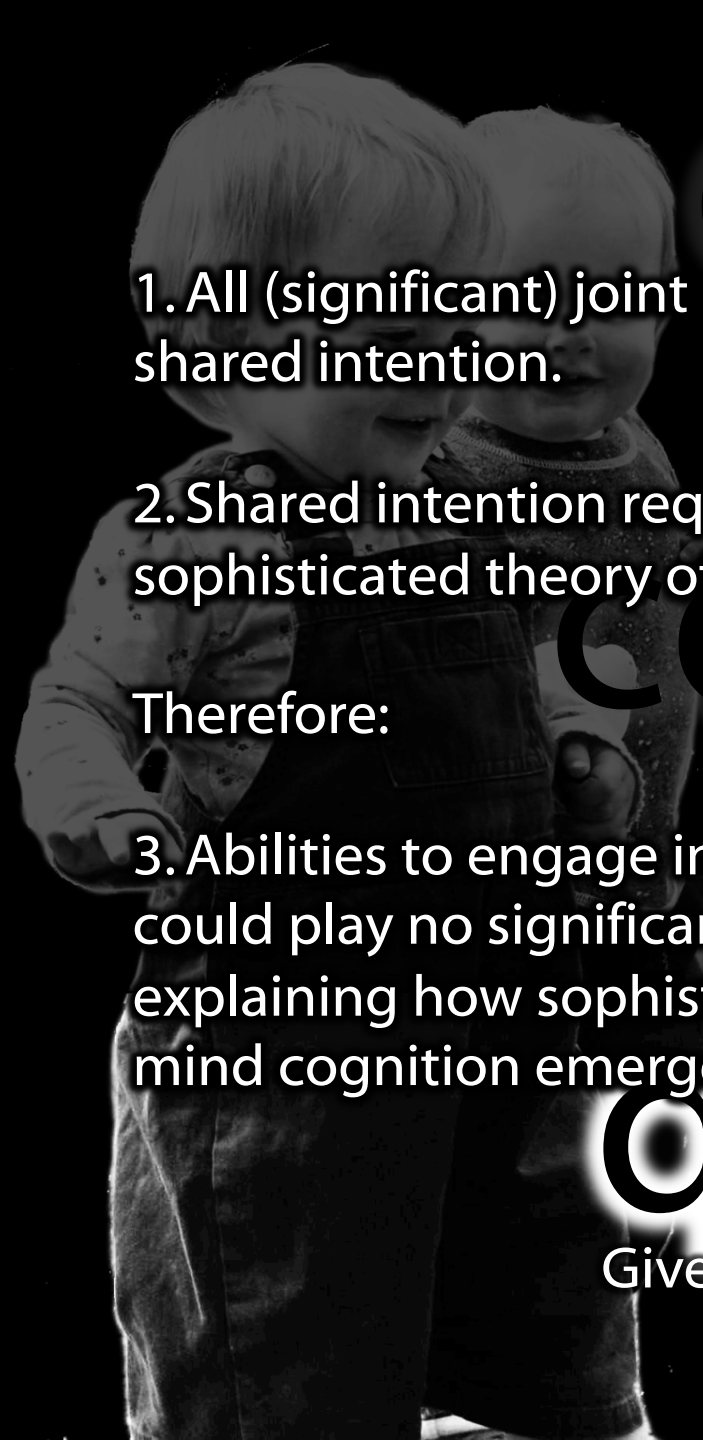

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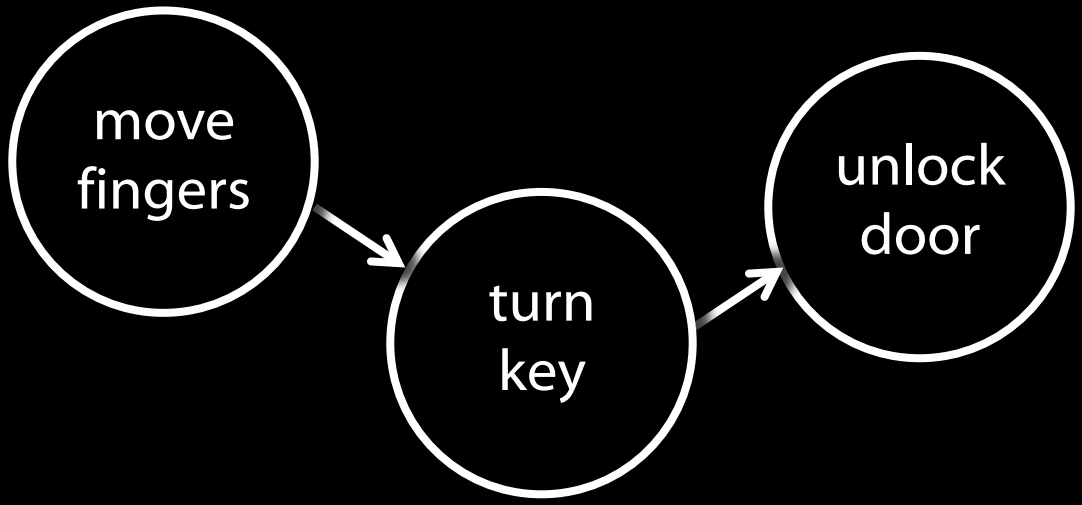

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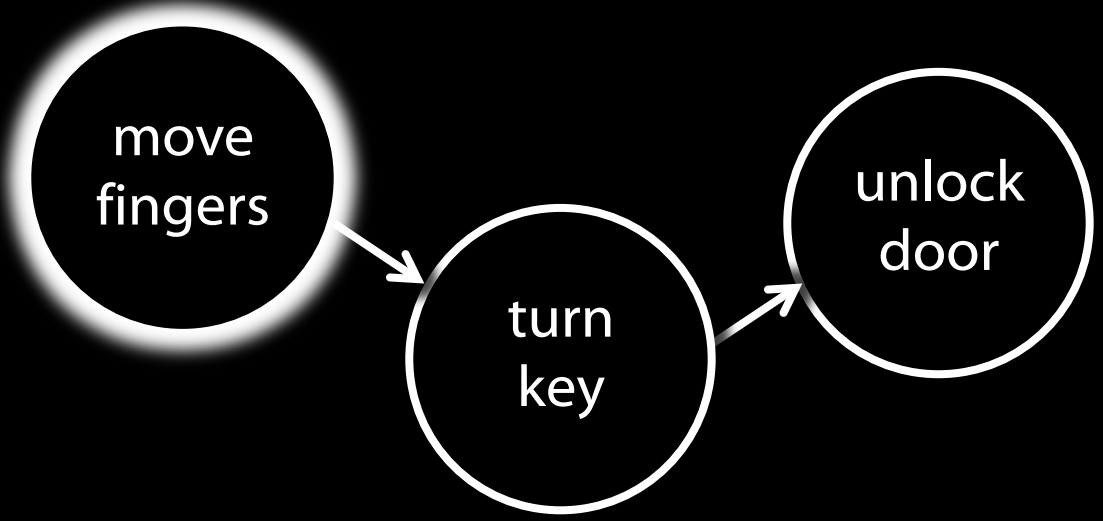

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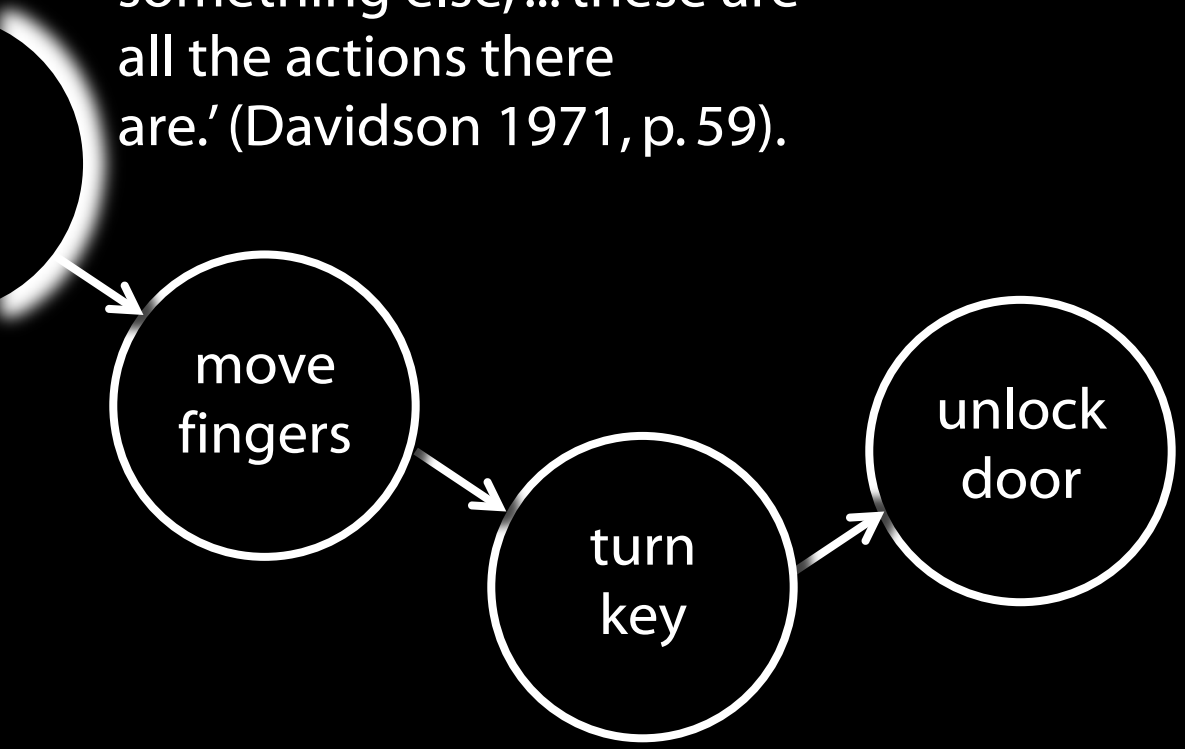

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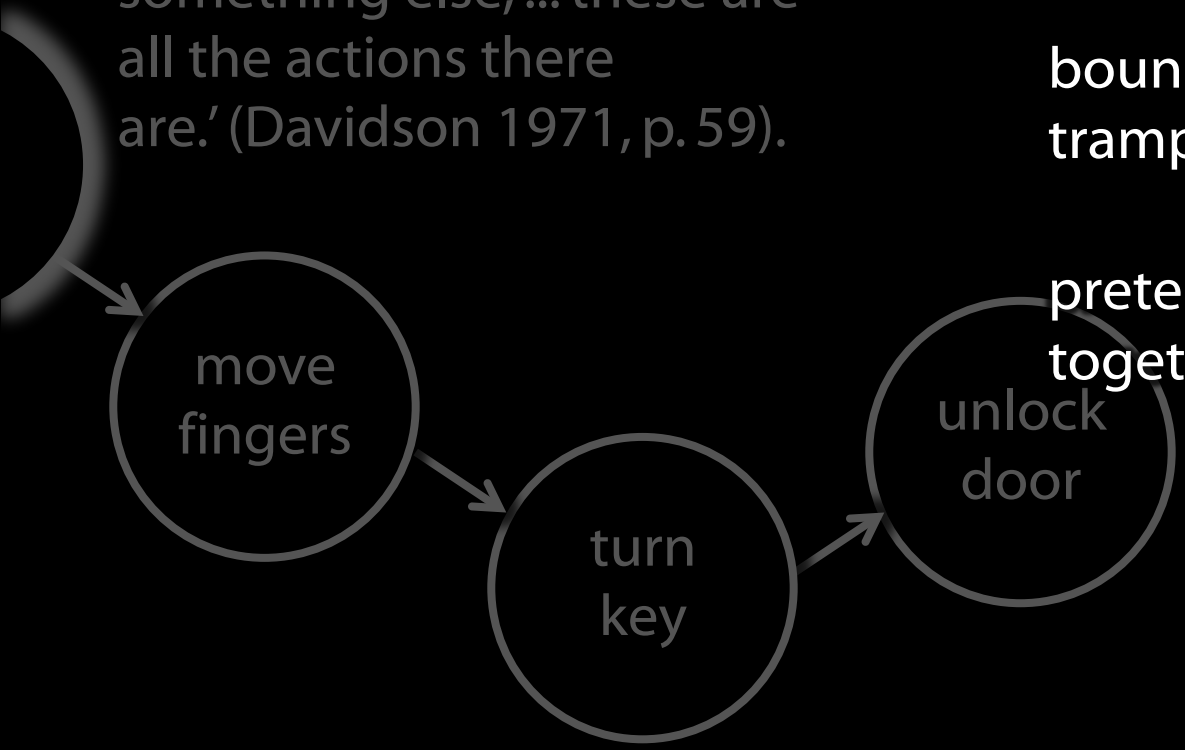

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(Behne et al 2005)

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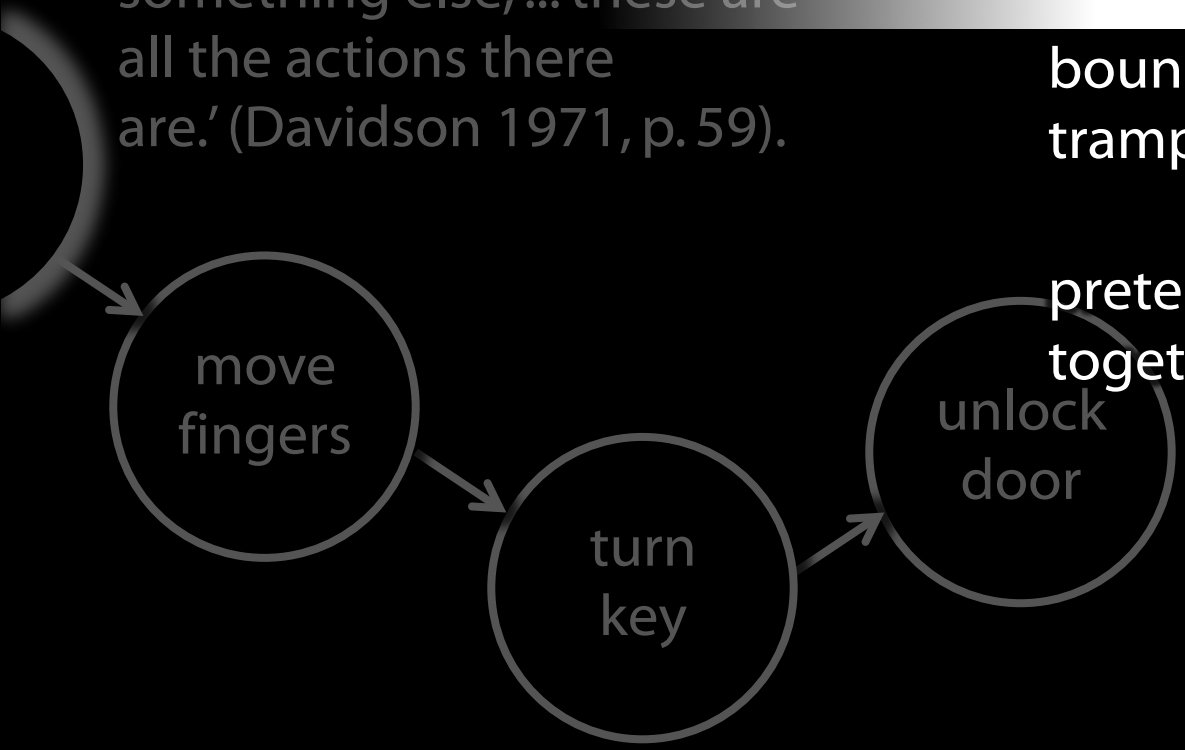

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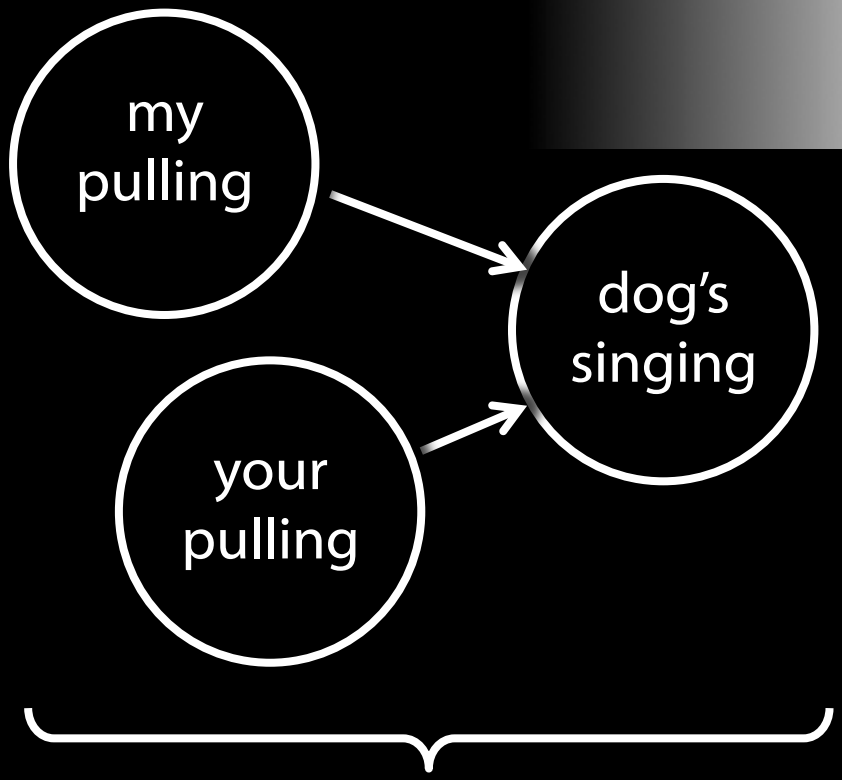

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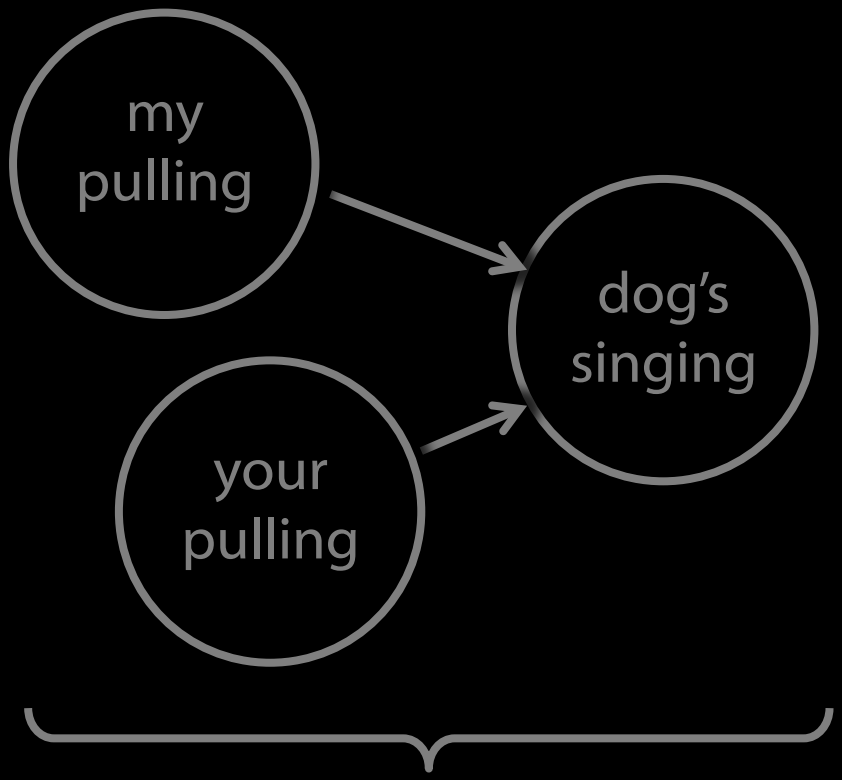

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an ~~action~~ event with two or more agents (Ludwig 2007)

Grounding

events $D_1, \ldots D_n$ *ground* E, if:

$D_1, \ldots D_n$ and E occur;

$D_1, \ldots D_n$ are each (perhaps improper) parts of E; and

every event that is a proper part of E but does not overlap $D_1,\ldots D_n$ is caused by some or all of $D_1, \ldots D_n$.

Agency

For an individual to be among the agents of an event is for there to be actions $a_1, \ldots a_n$ which ground this event where the individual is an agent of one or more of these actions.

(Adapted from Pietroski 1998)

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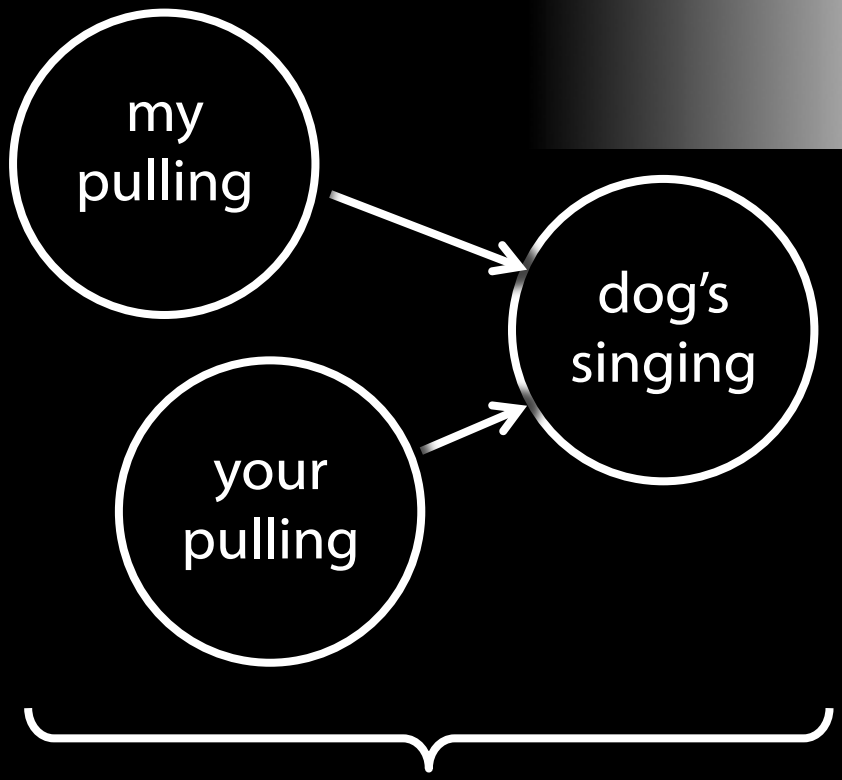

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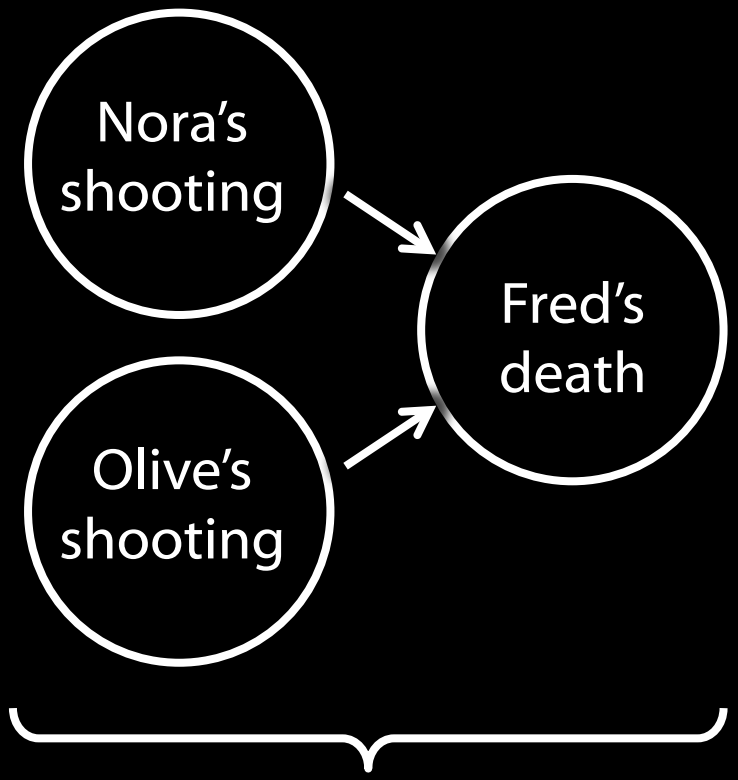

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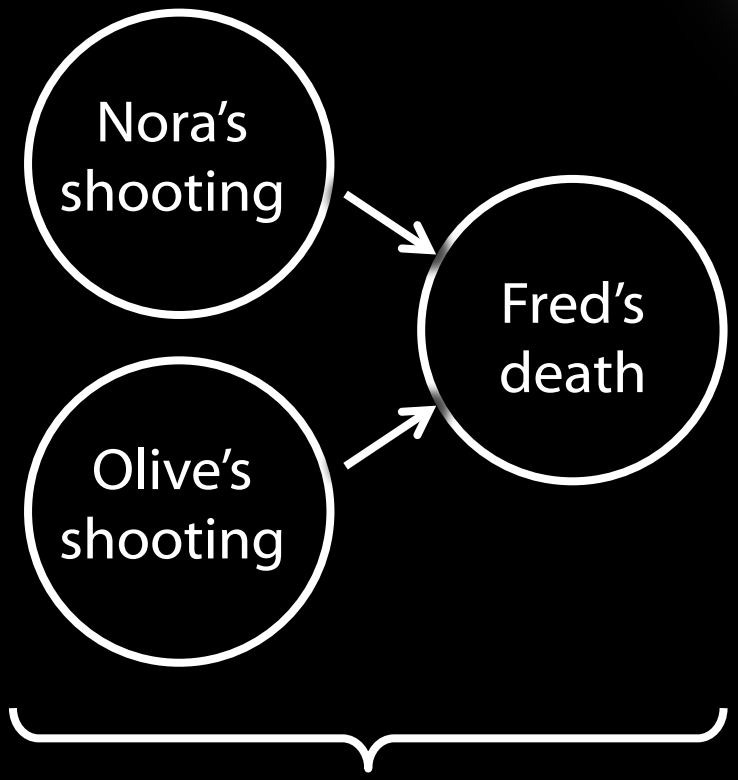

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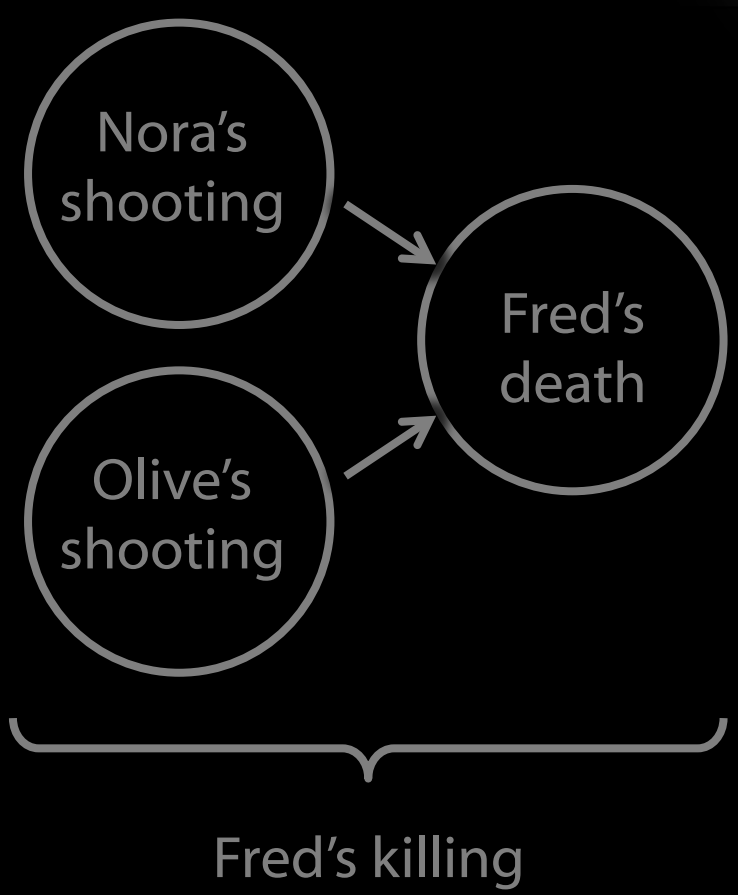
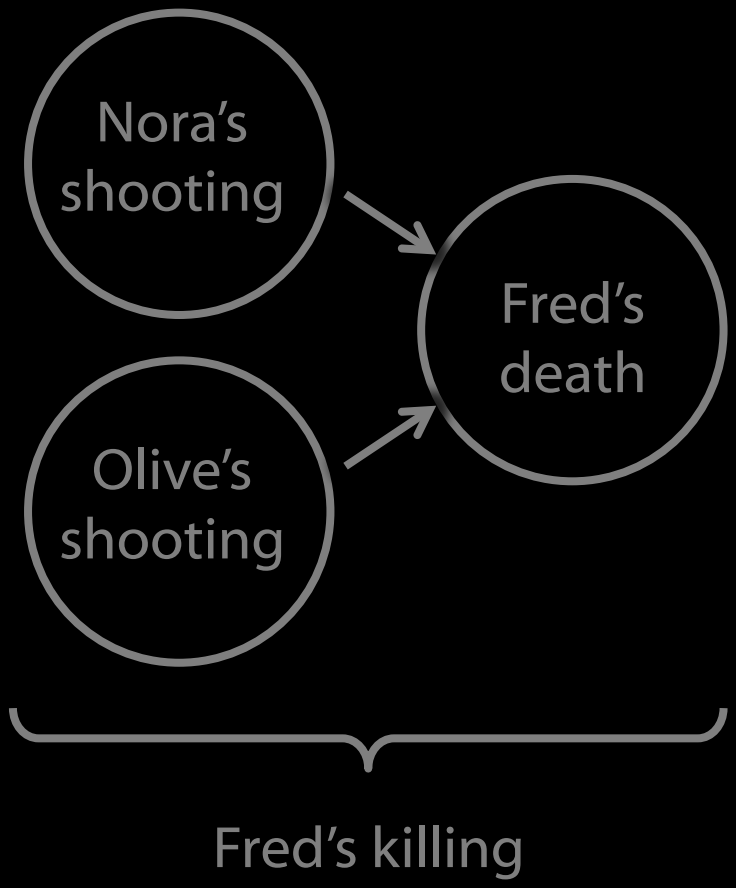


Goal-directed joint action: an event with two or more agents which, taken as a whole, is directed to a goal.



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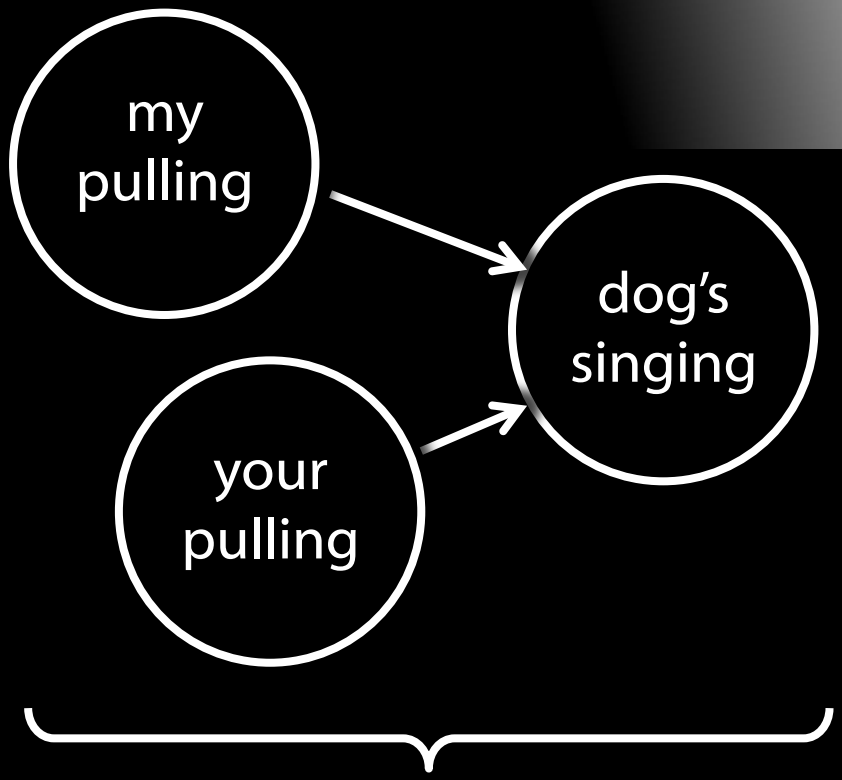

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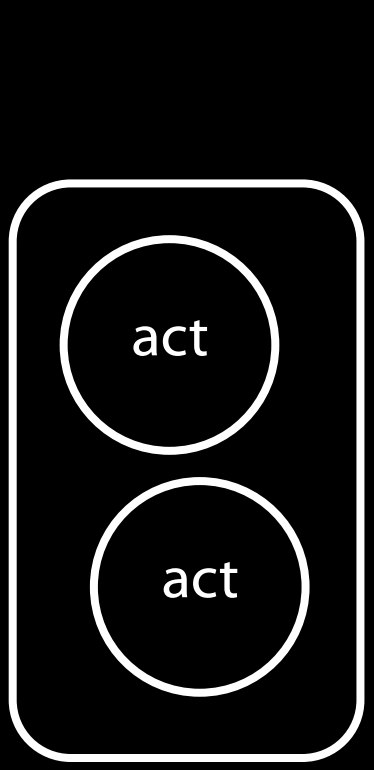

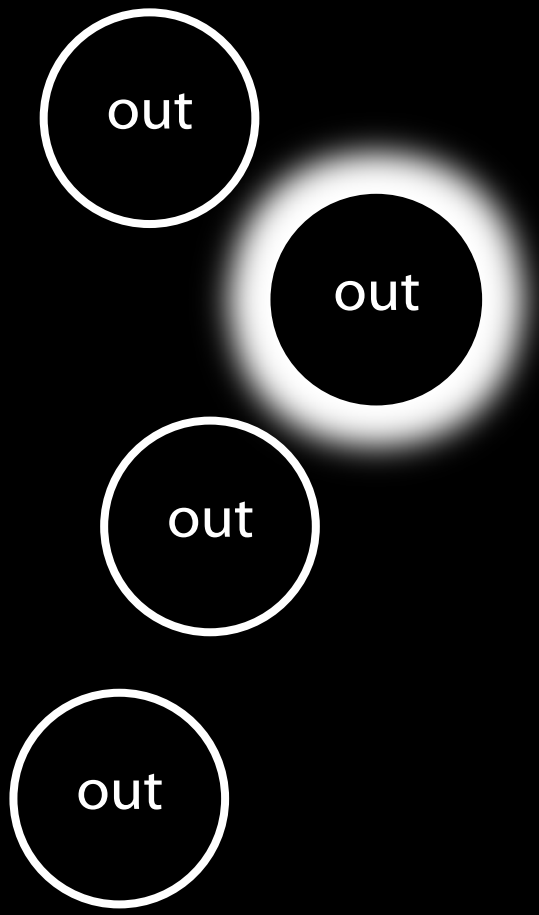

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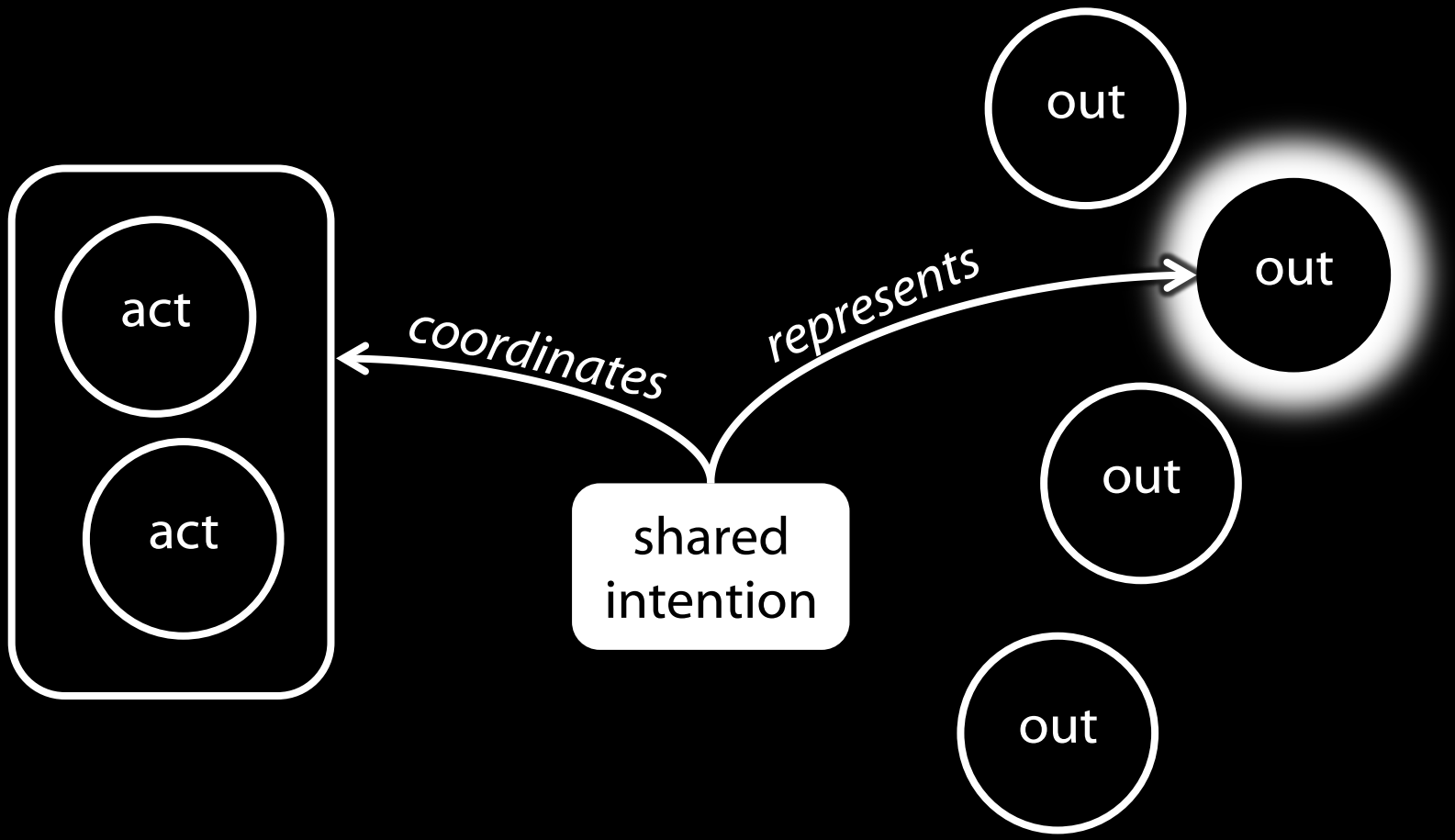

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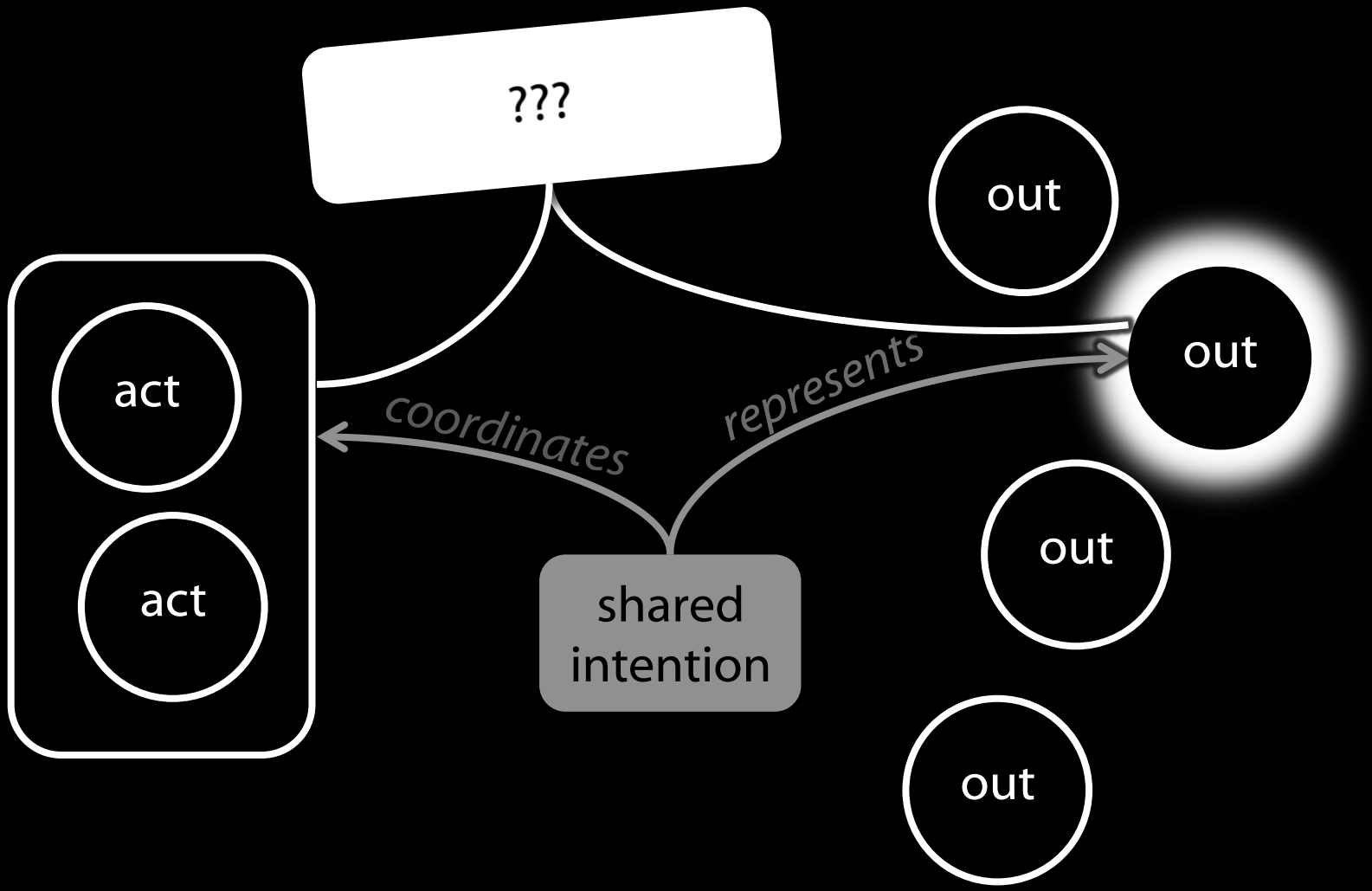

Detour
Goals are not intentions

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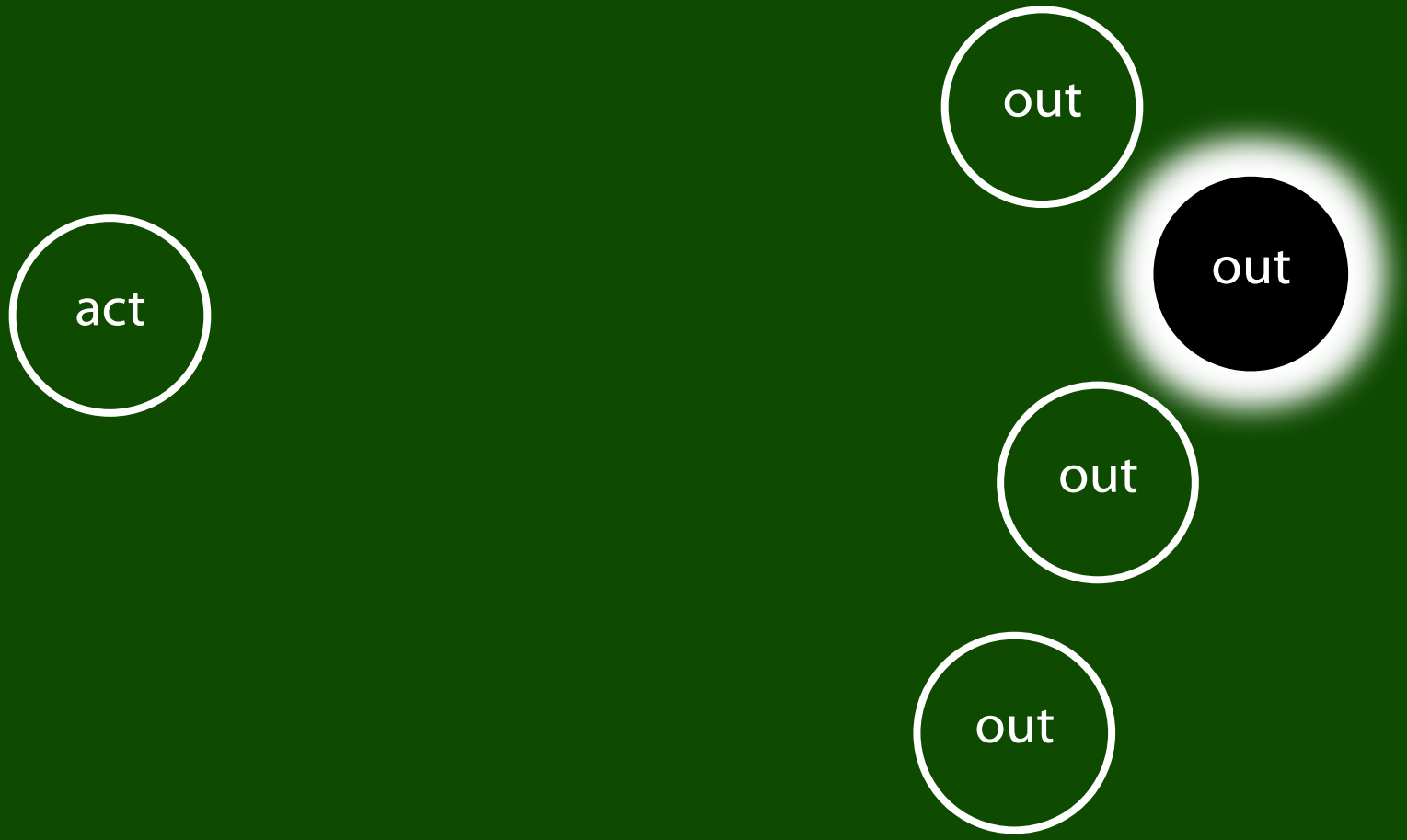

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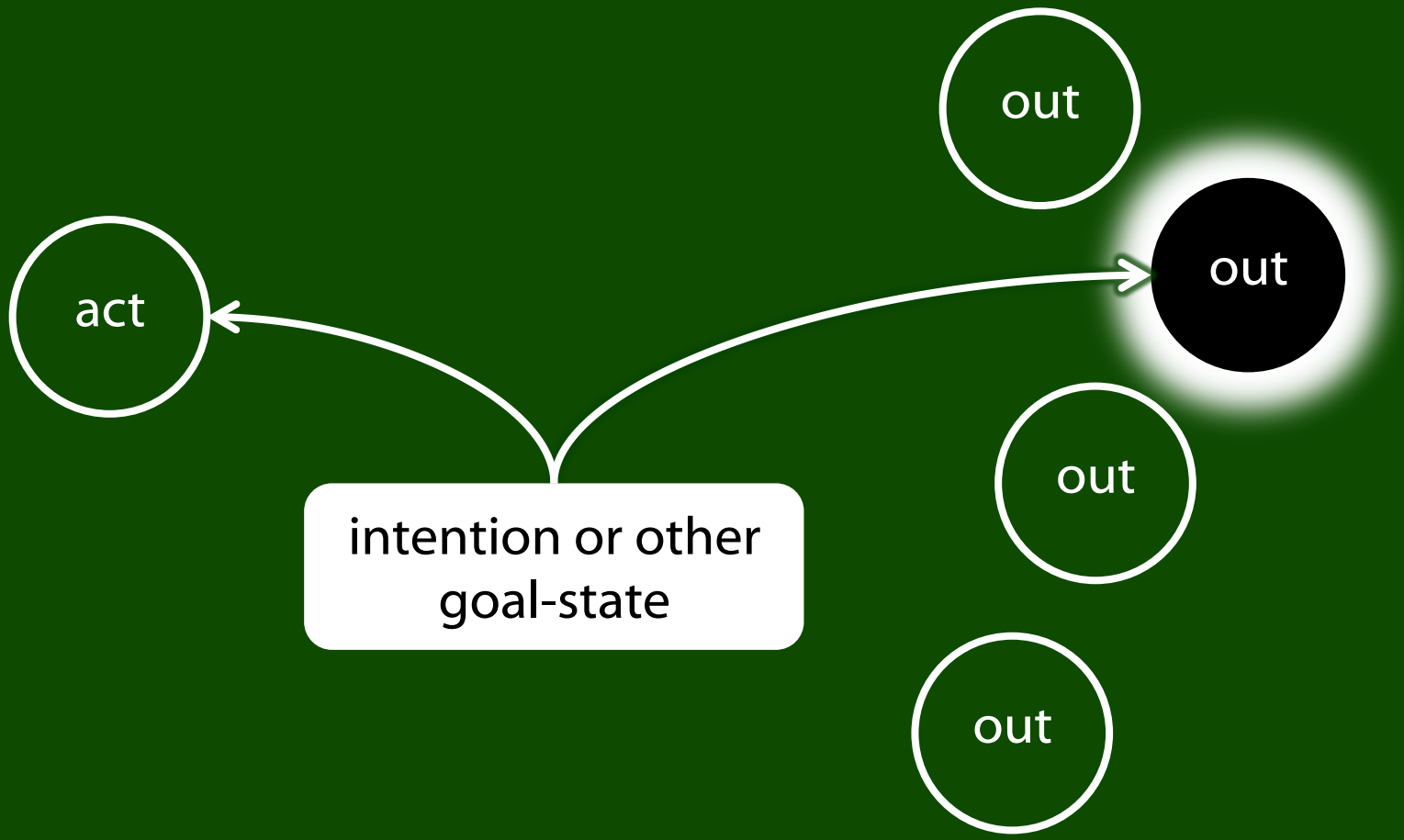

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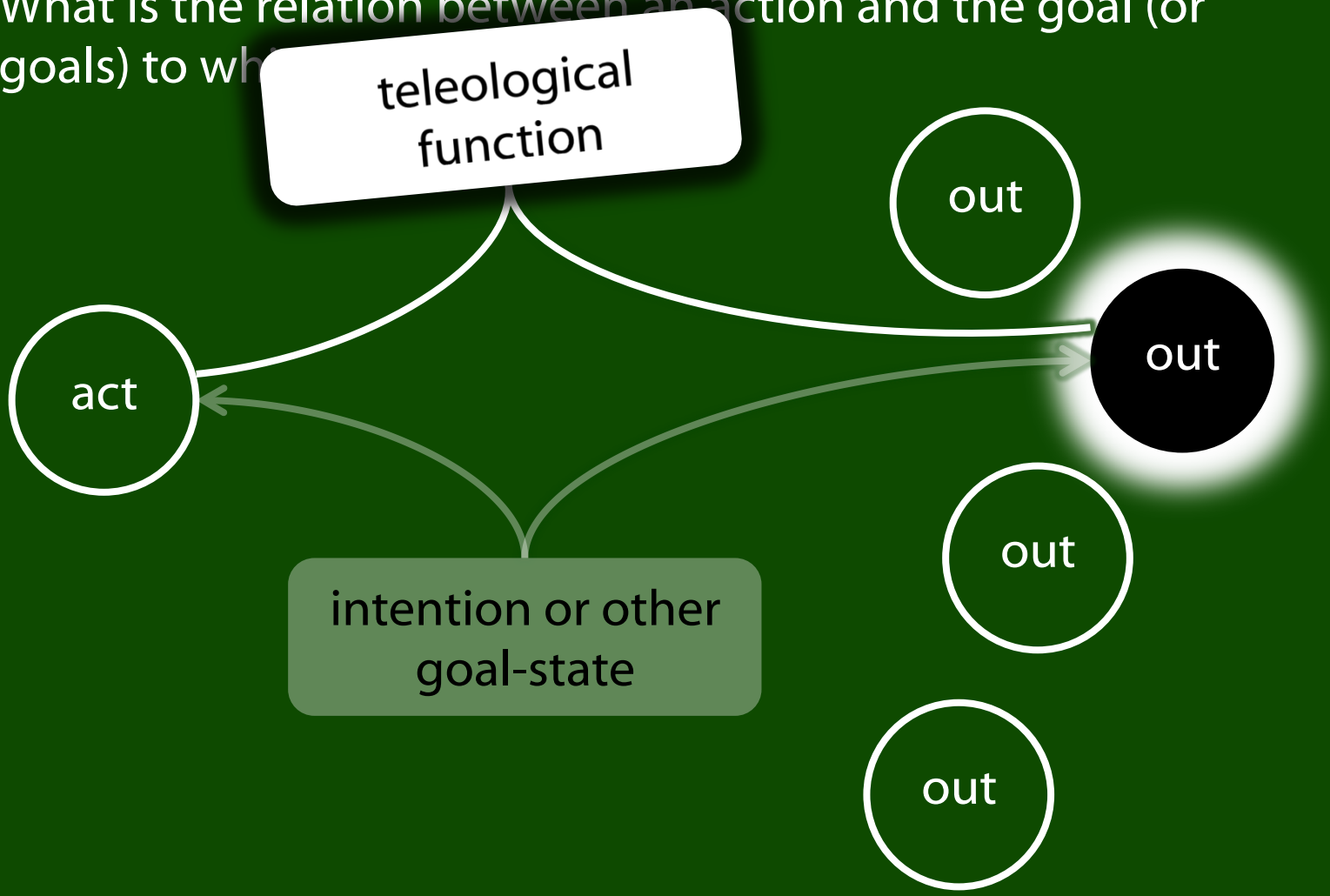

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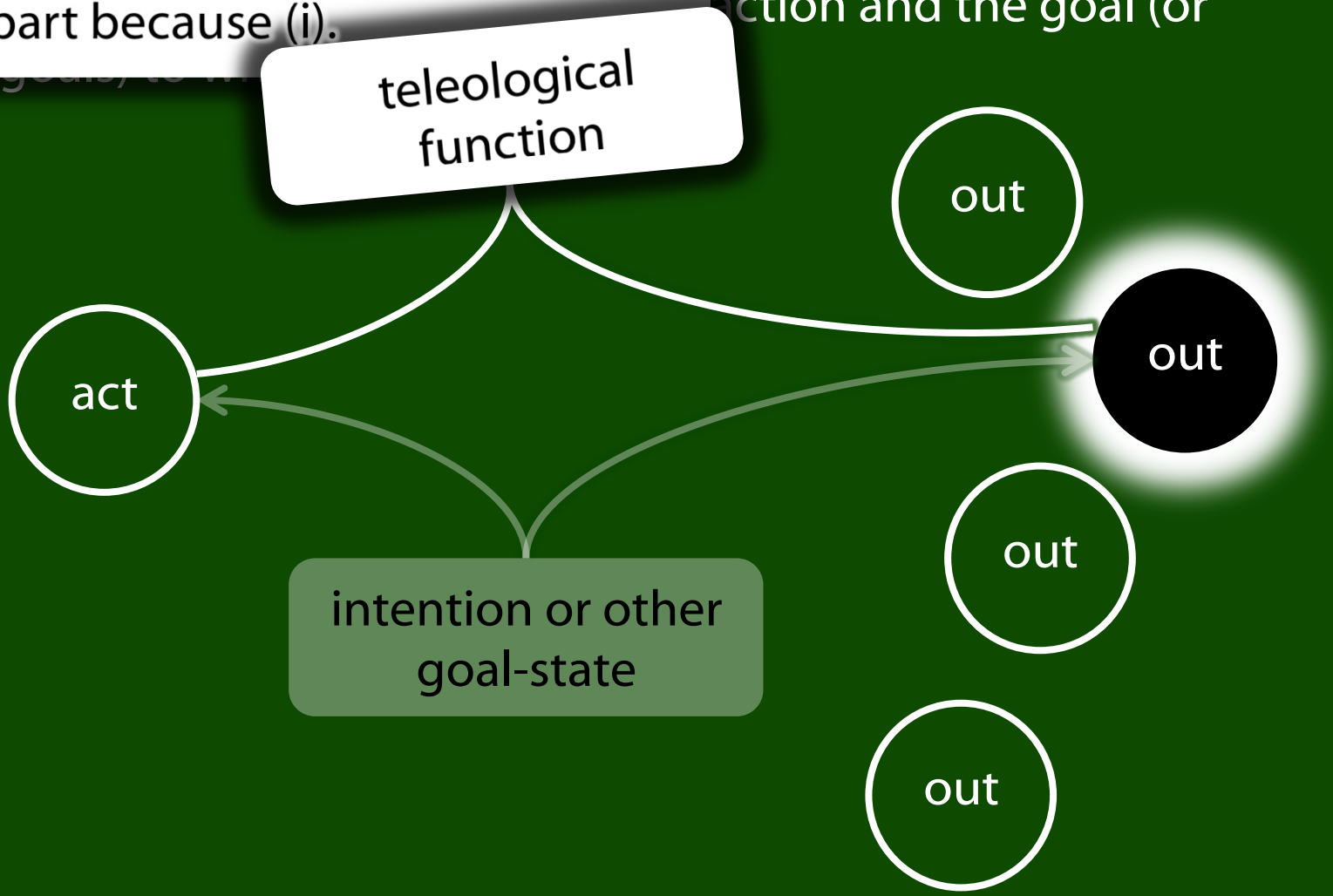

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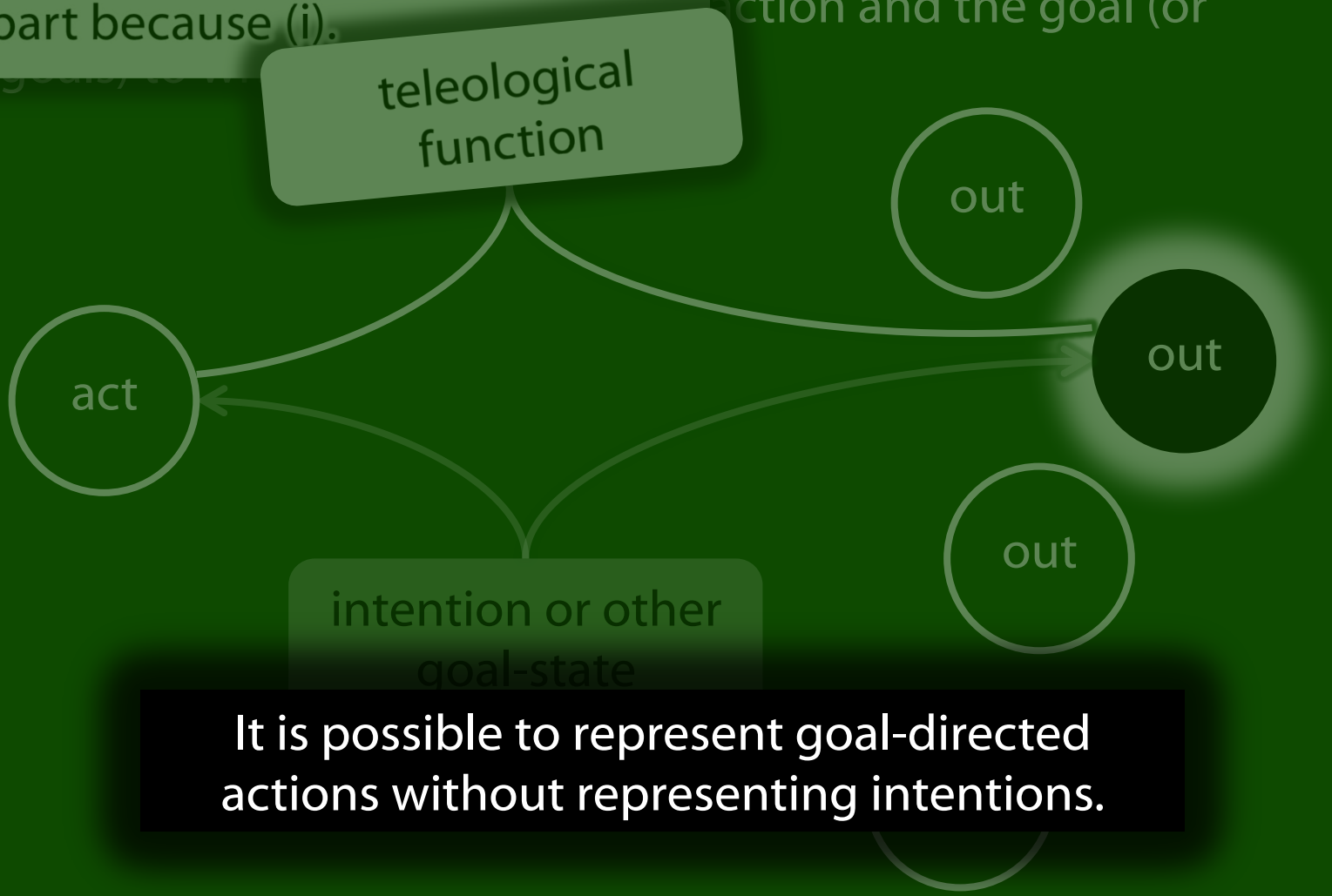
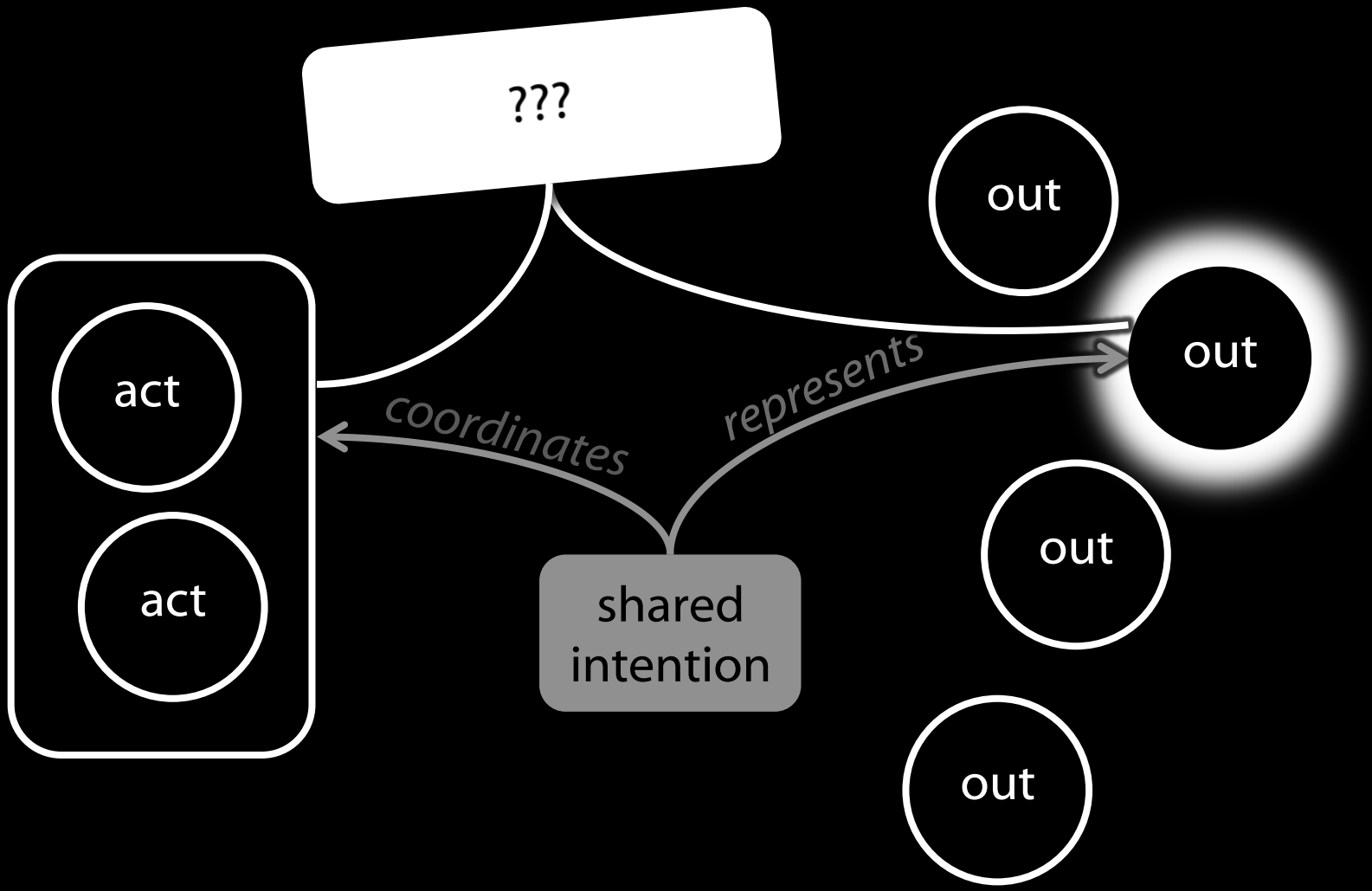


It is possible to represent goal-directed actions without representing intentions.

End Detour

Goal-directed joint action: an event with two or more agents which, taken as a whole, is directed to a goal.



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G is a collective goal

(a) it is a distributive goal;

(b) the agents' activities are coordinated; and

(c) coordination of this type would normally facilitate occurrences of outcomes of this type.

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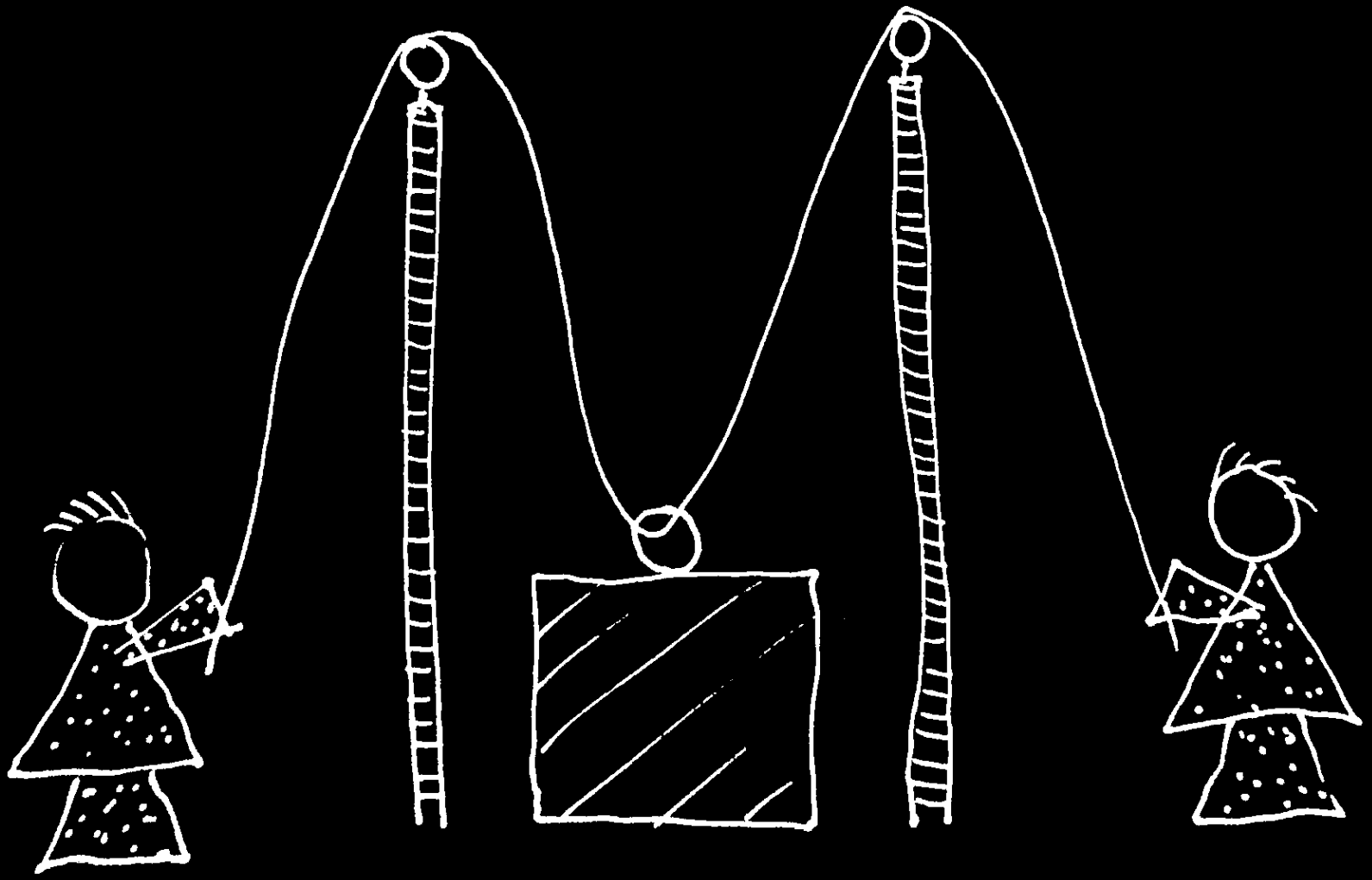


sting
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death
of fly

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Each agent expects each of the other agents to perform activities directed to the goal.

Each agent expects the goal to occur as a common effect of all their goal-directed actions.

Joint action:
an ~~action~~ event with two or more agents (Ludwig 2007)

challenge

Explain the emergence, in evolution or development, of sophisticated forms of social cognition.

conjecture

The existence of abilities to engage in joint action partially explains how sophisticated forms of social cognition emerge in evolution or development (or both)

question

Given the conjecture, what could joint action be?

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joint action &
knowing
others'
minds

failed reach

point

source: Hare & Tomasello (2004)

The problem of opaque means

The problem of false belief

your-goal-is-my-goal

your-goal-is-my-goal

1. We are about to engage in some joint action* or other

2. I am not about to change my goal.

Therefore:

3. Your actions also will be directed to this goal.

[*in at least the minimal sense associated with distributive goals]

failed reach

point

source: Hare & Tomasello (2004)

failed reach

point

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"to understand pointing, the subject needs to understand more than the individual goal-directed behaviour. She needs to understand that ... the other attempts to communicate to her ... and ... the communicative intention behind the gesture"

(Moll & Tomsello 2007)

failed reach

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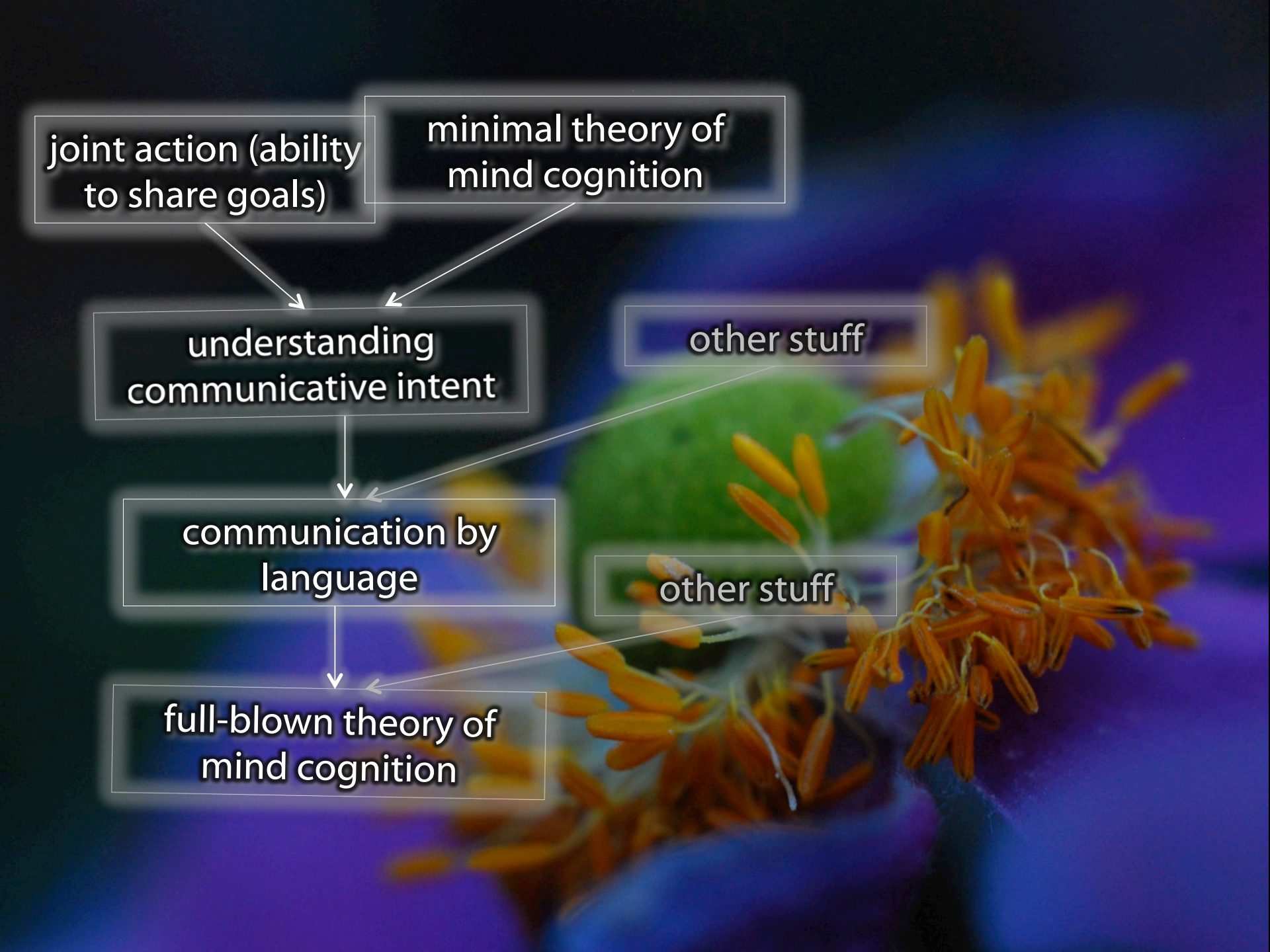
(Moll & Tomsello 2007)

Csibra's 'two stances':

Teleological and referential action interpretation 'rely on different kinds of action understanding'

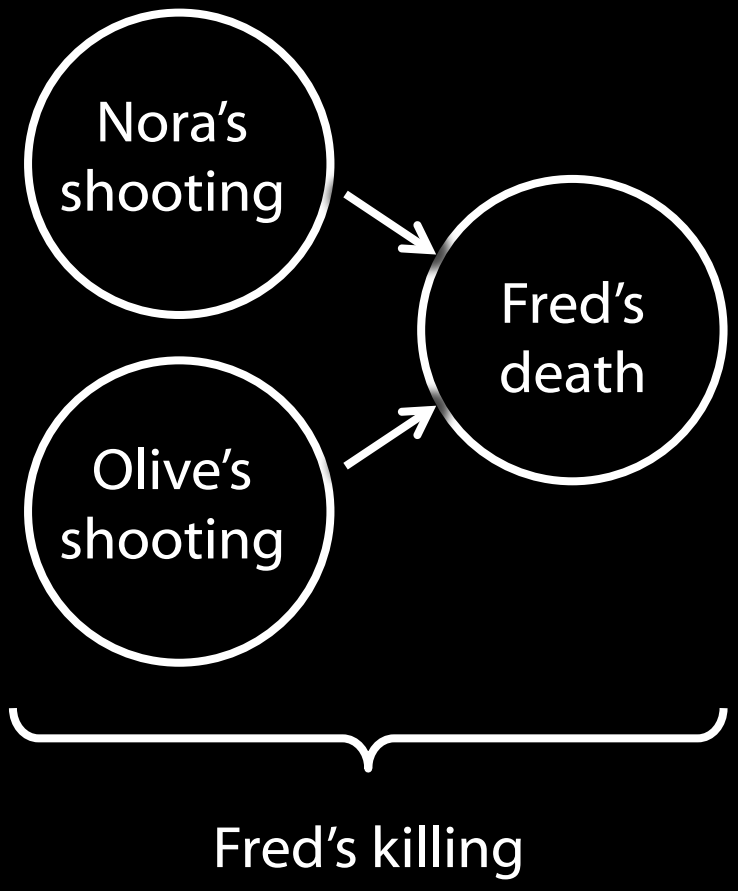
These are initially two distinct 'action interpretation systems' and they come together later in development

Csibra (2003, p. 456)


joint action (ability to share goals)
minimal theory of mind cognition
understanding communicative intent
other stuff
communication by language
other stuff
full-blown theory of mind cognition

Joint action:
an event with two or more agents (Ludwig 2007)

Goal-directed joint action:
a joint action which, taken as a whole, is directed to a goal




goal

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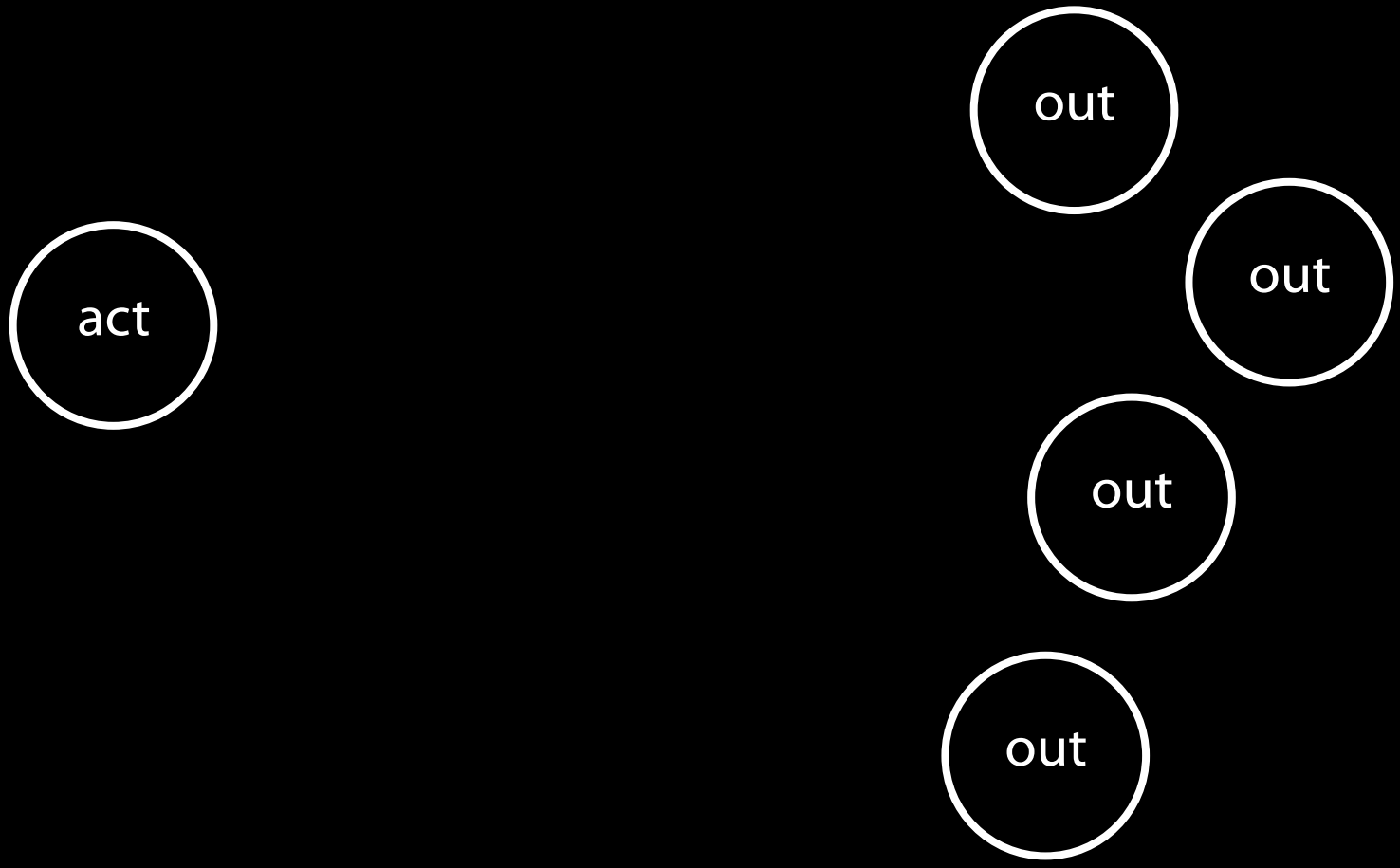

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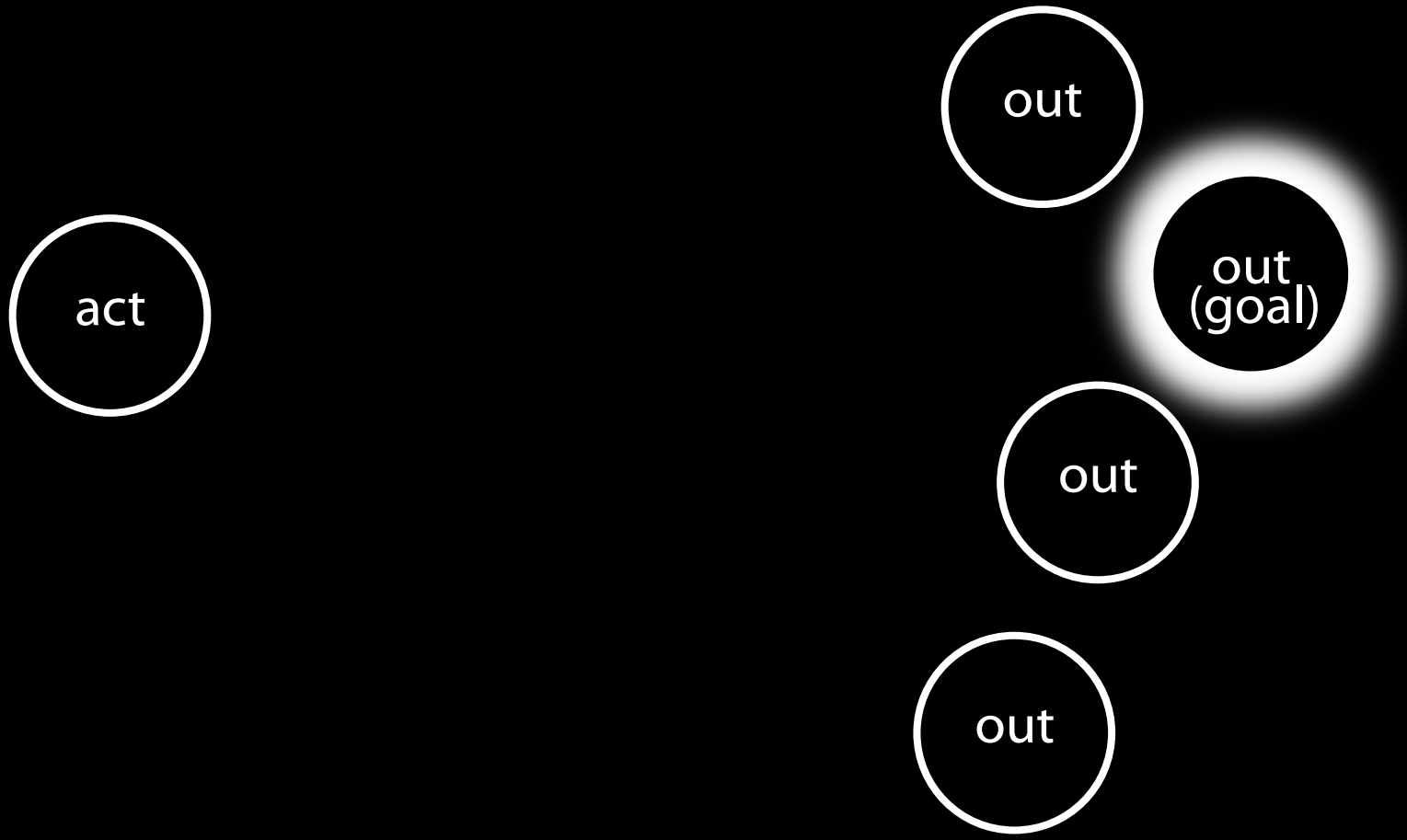

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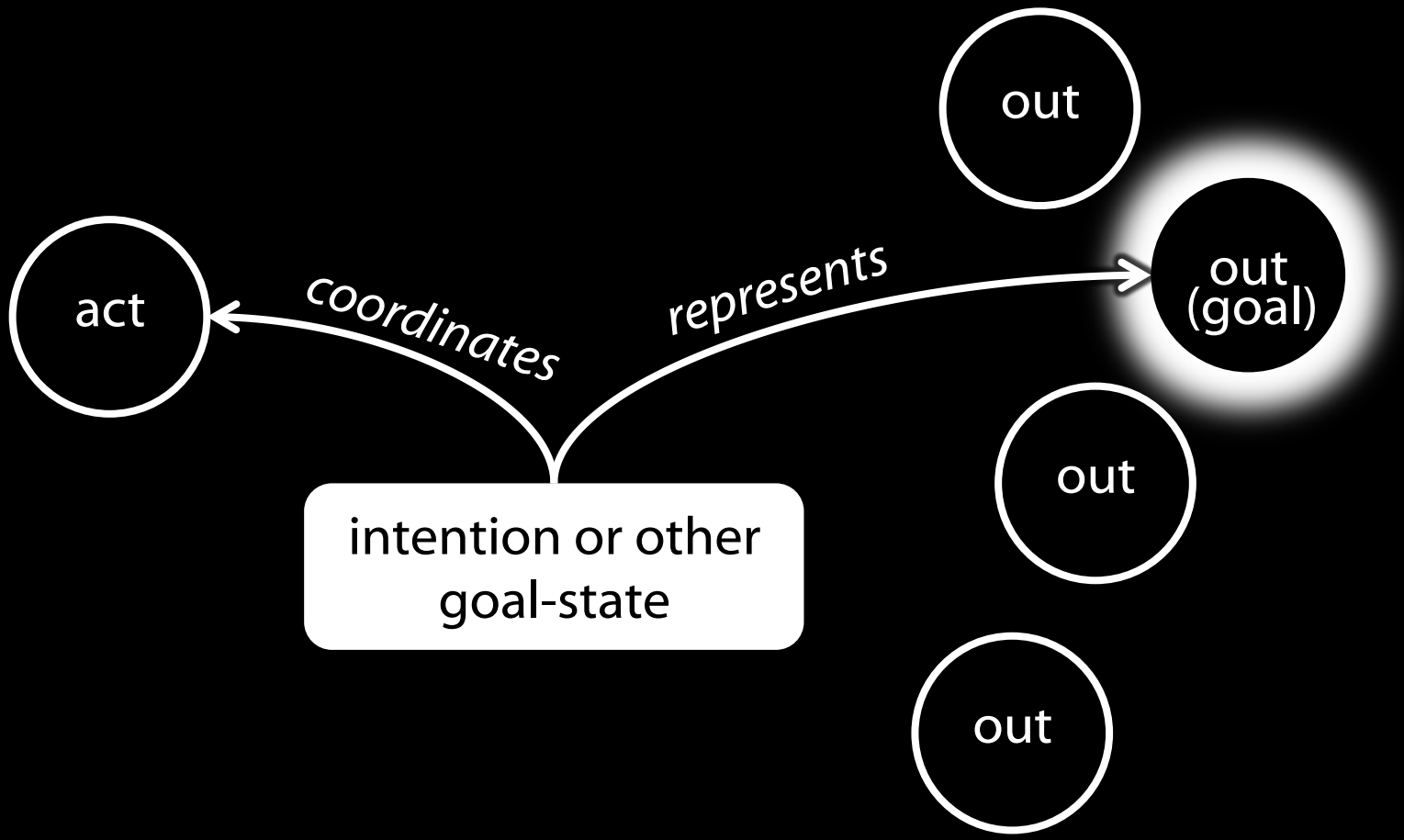

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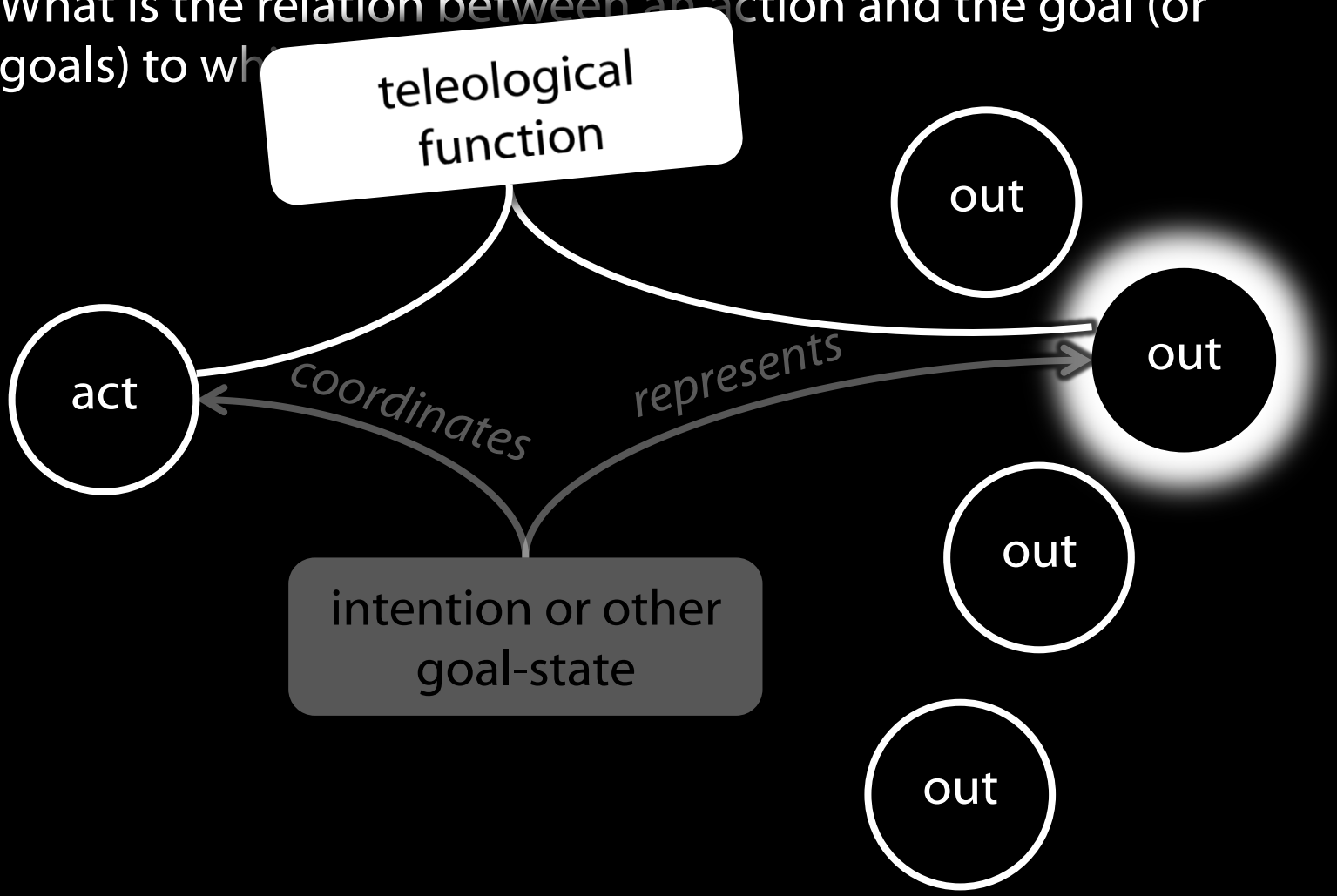

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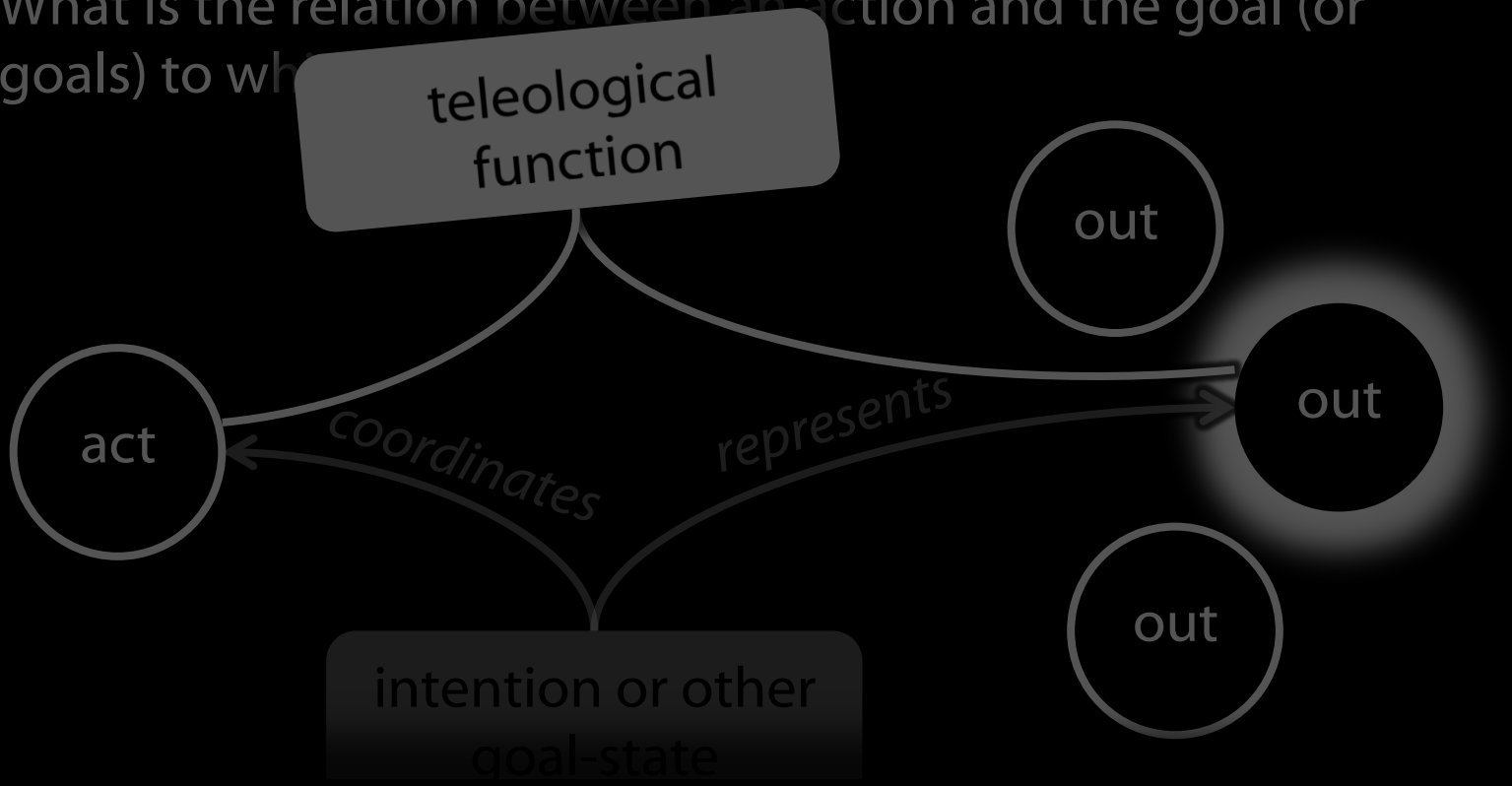

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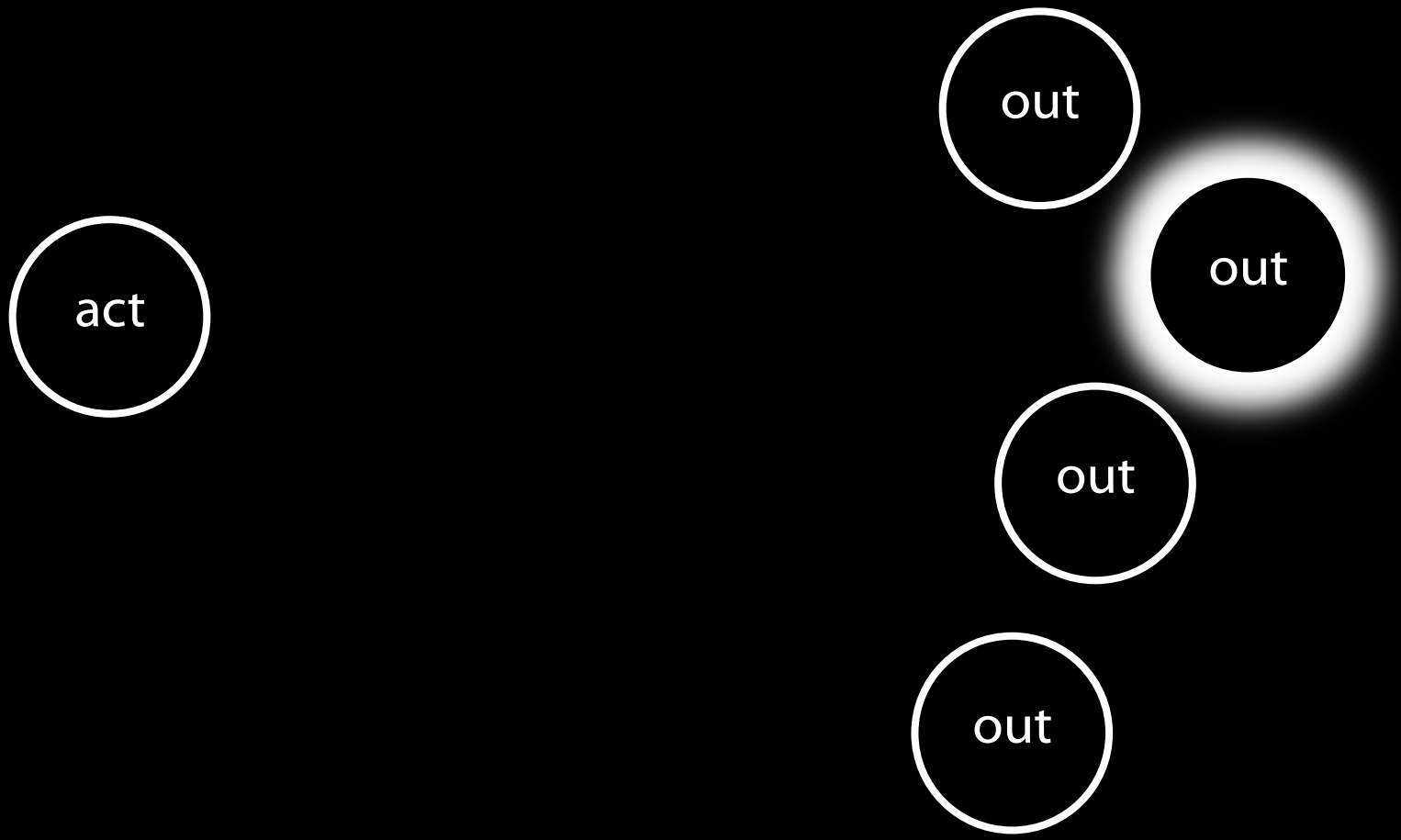
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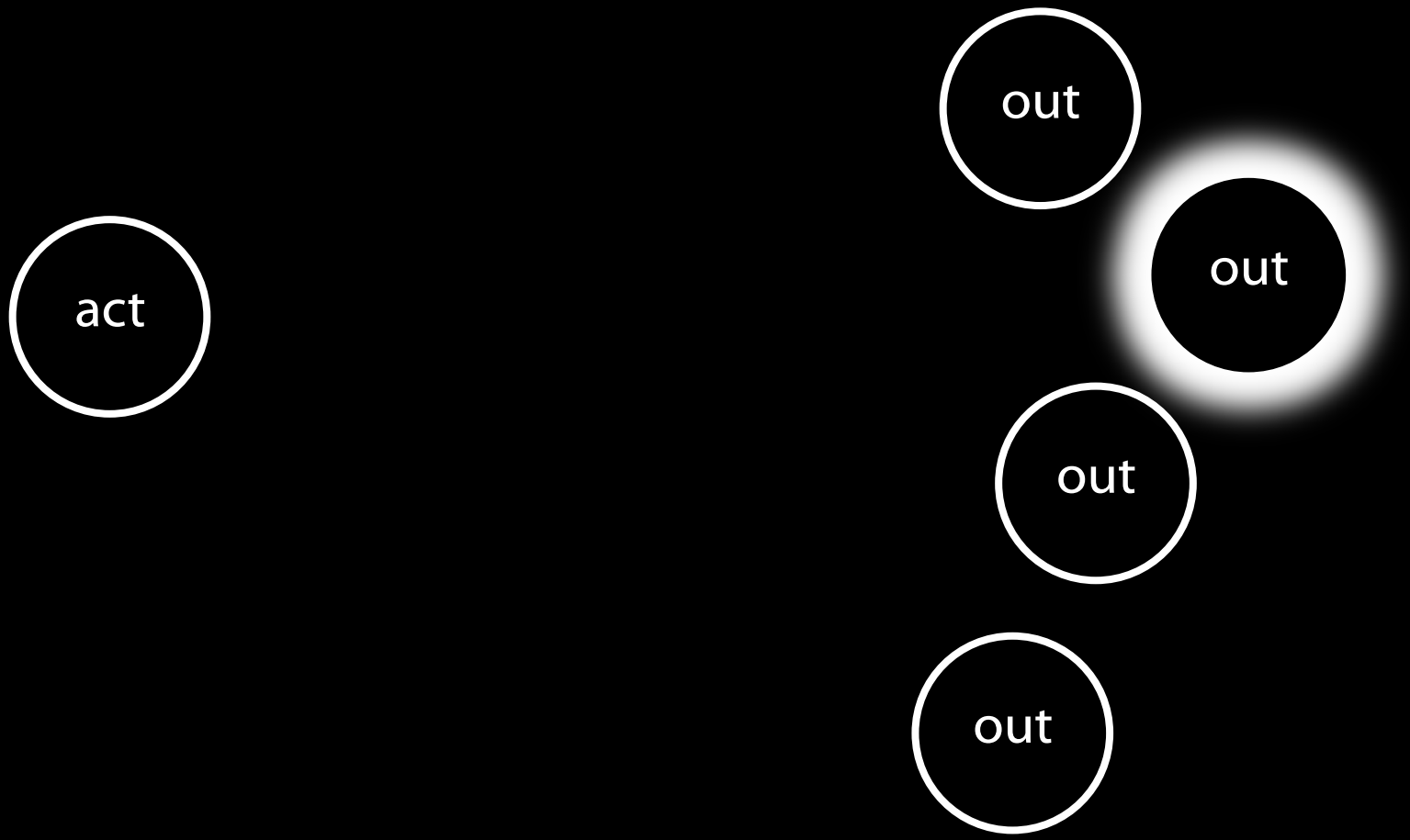


“We are stuck with our two main ways of describing and explaining things, one which treats objects and events as mindless, and the other which treats objects and events as having propositional attitudes. I see no way of bridging the gap by introducing an intermediate vocabulary.”
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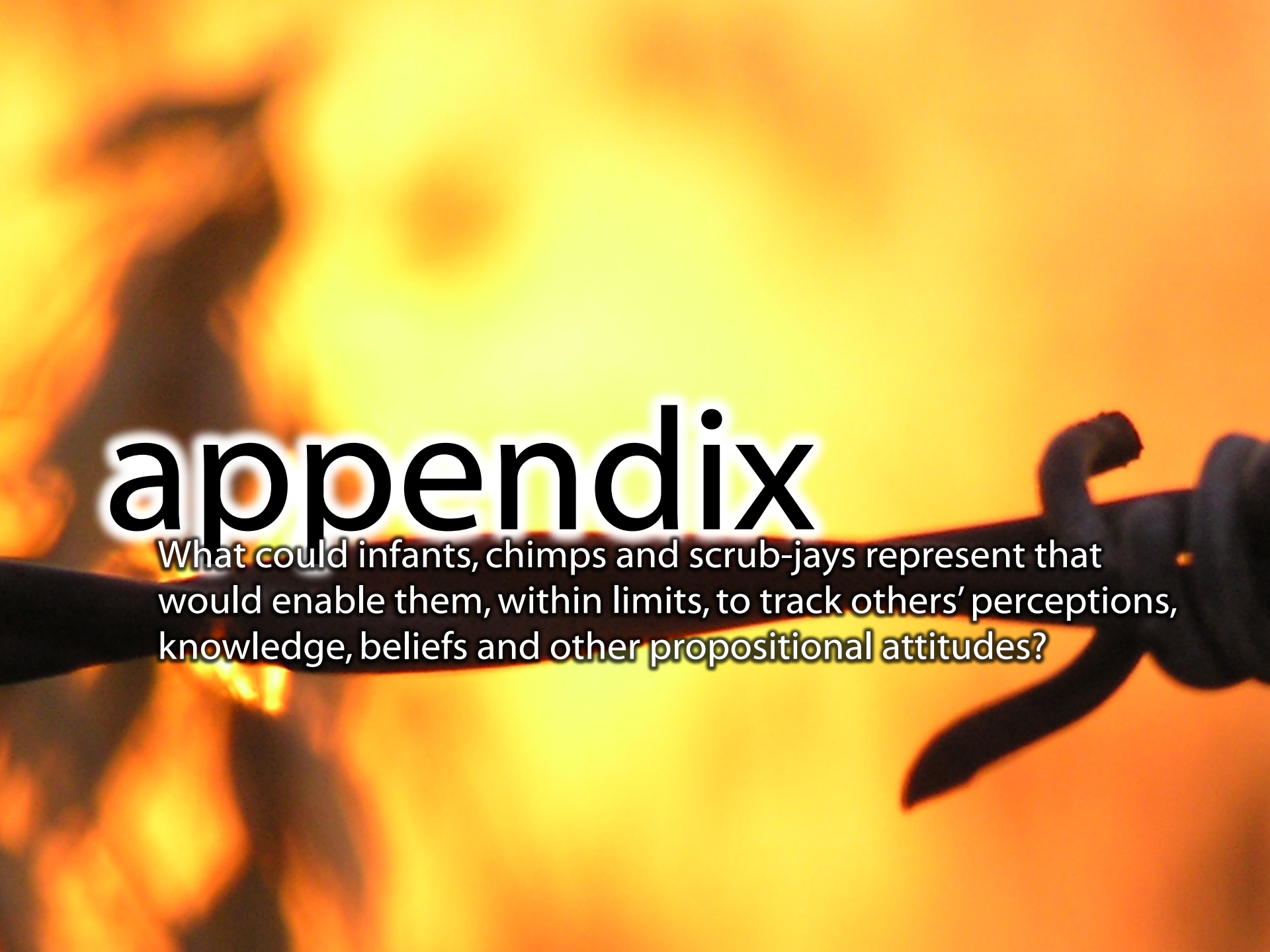
appendix
What could infants, chimps and scrub-jays represent that would enable them, within limits, to track others' perceptions, knowledge, beliefs and other propositional attitudes?

Intentional relation
e.g. She is interested in that chocolate
e.g. She is smiling at me

Propositional attitude
e.g. She believes that the chocolate is in that cupboard

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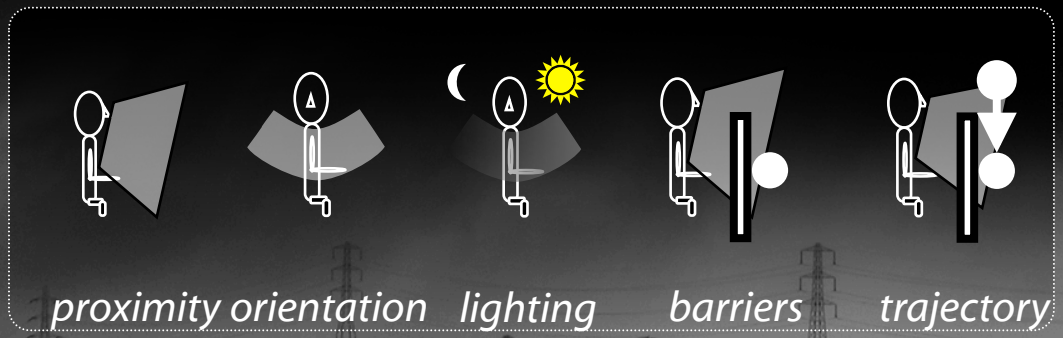

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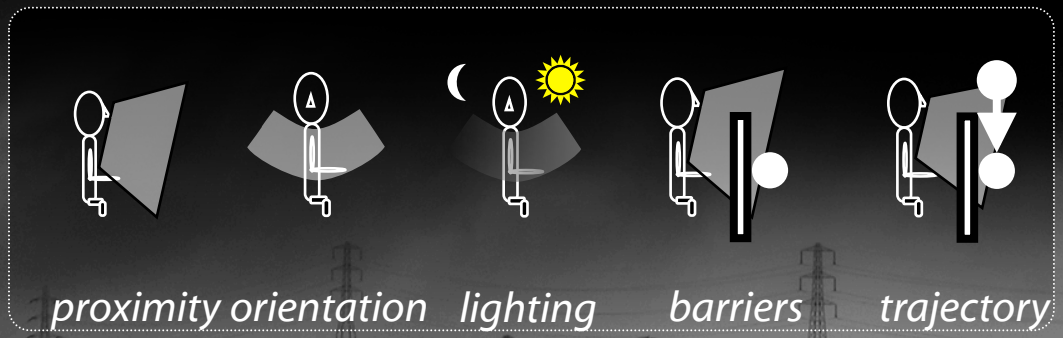

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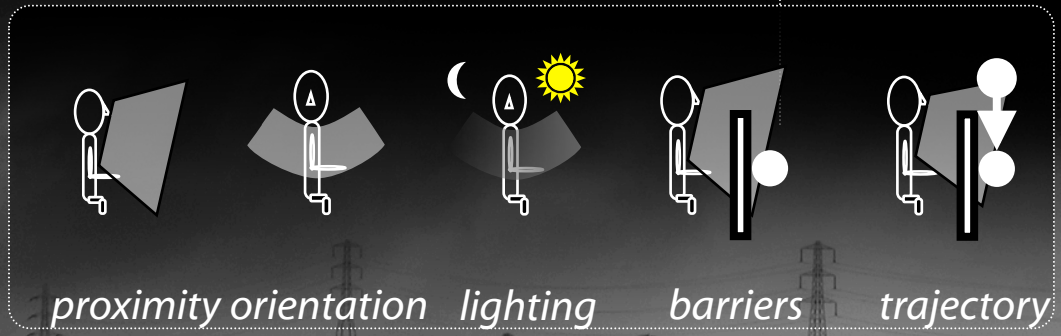

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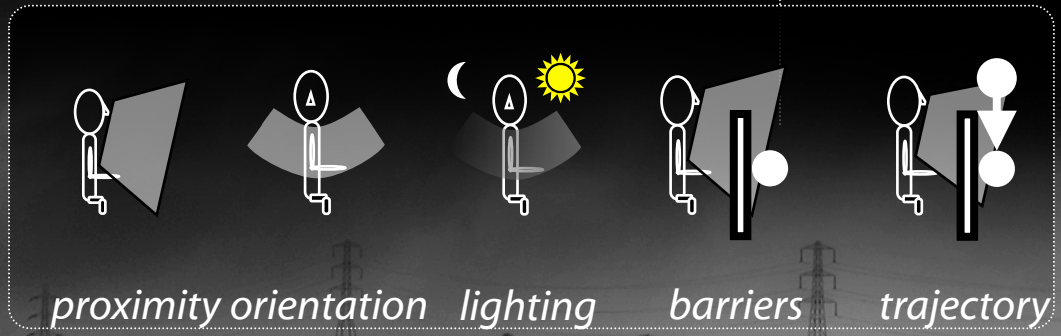

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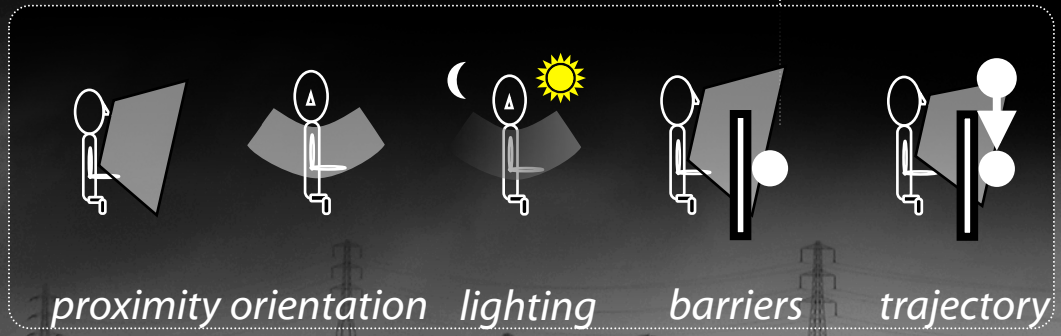

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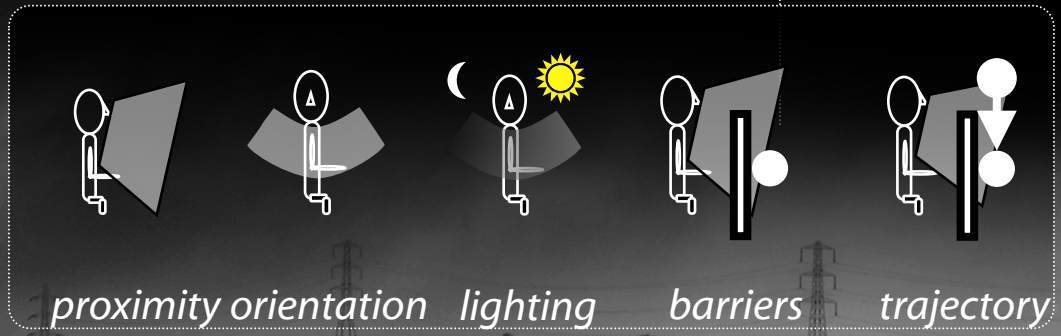

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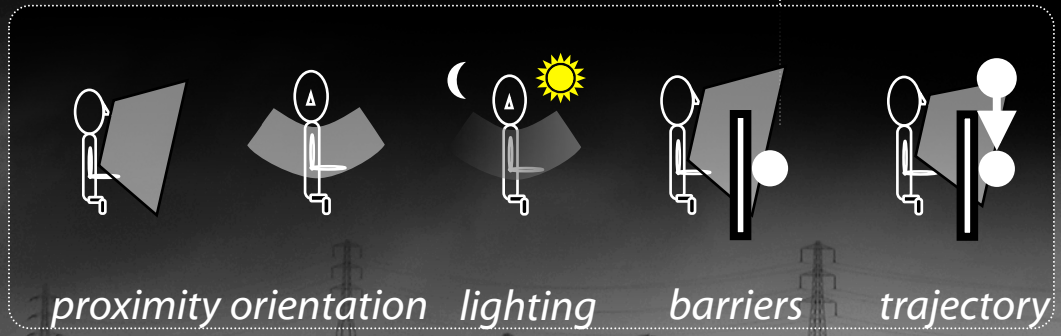

source Träuble, Marinovic, & Pauen (2010)

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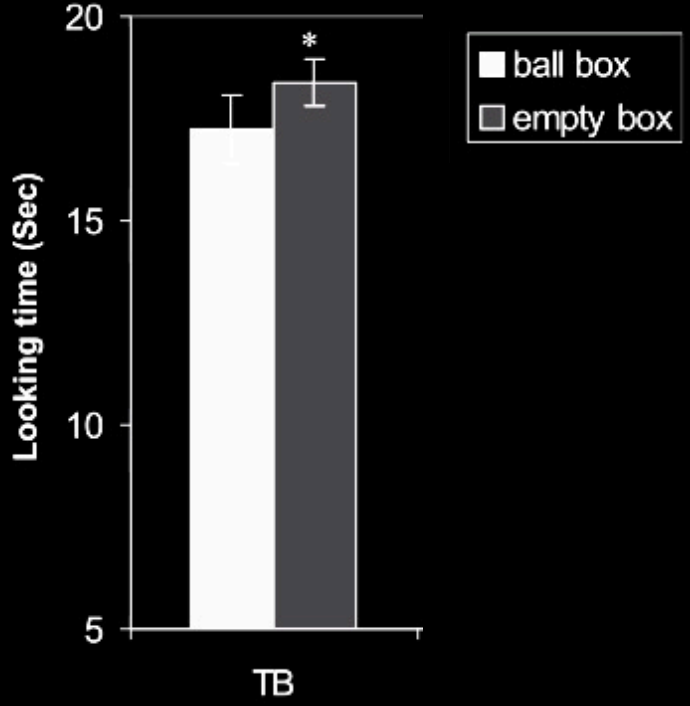

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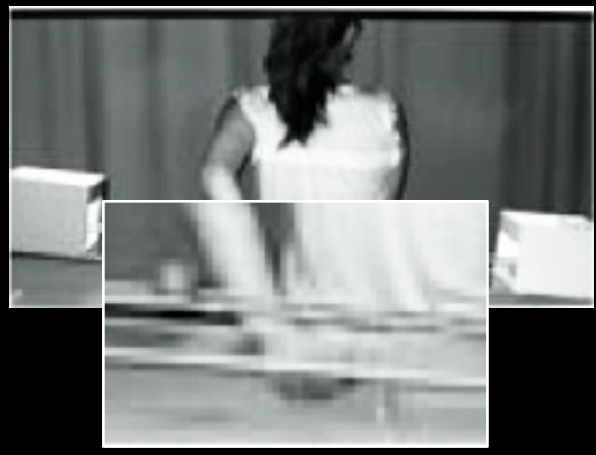

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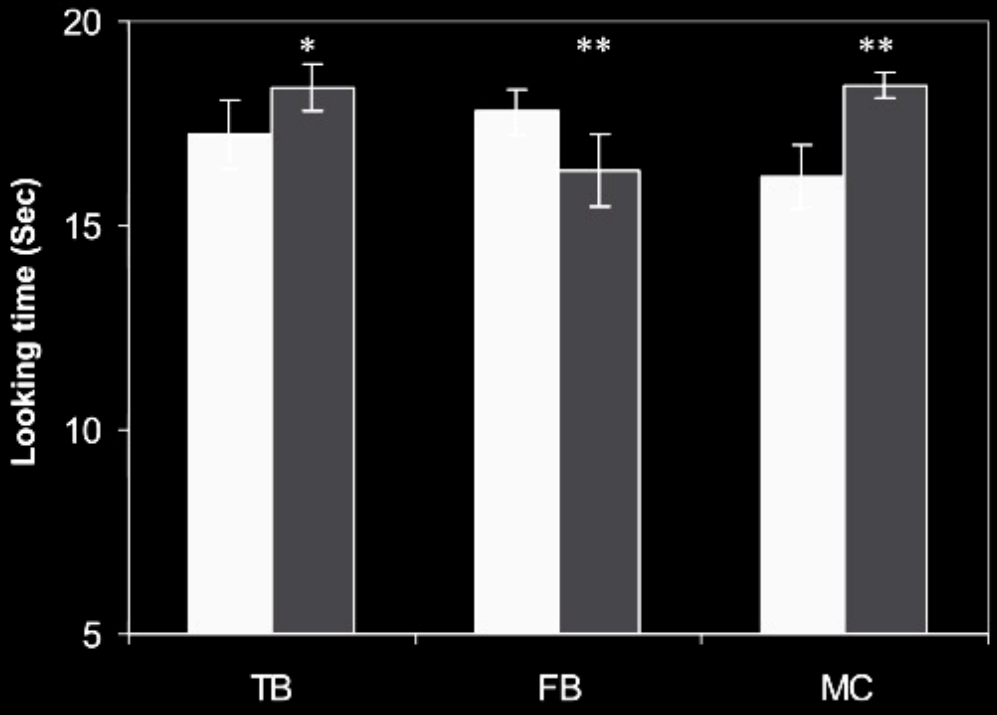

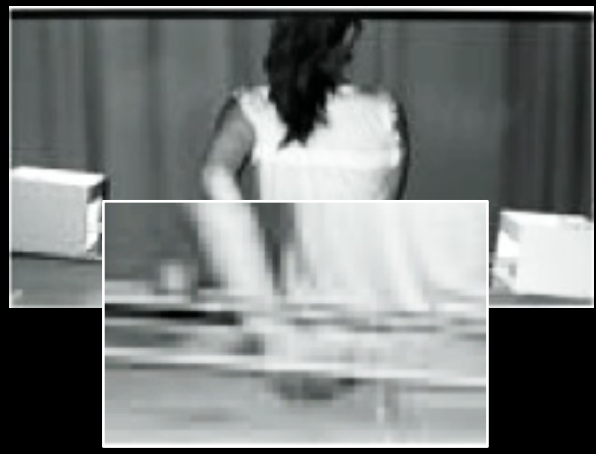

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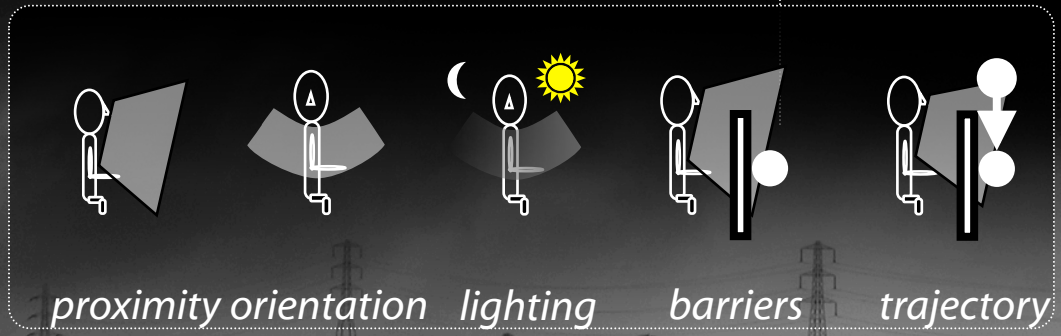

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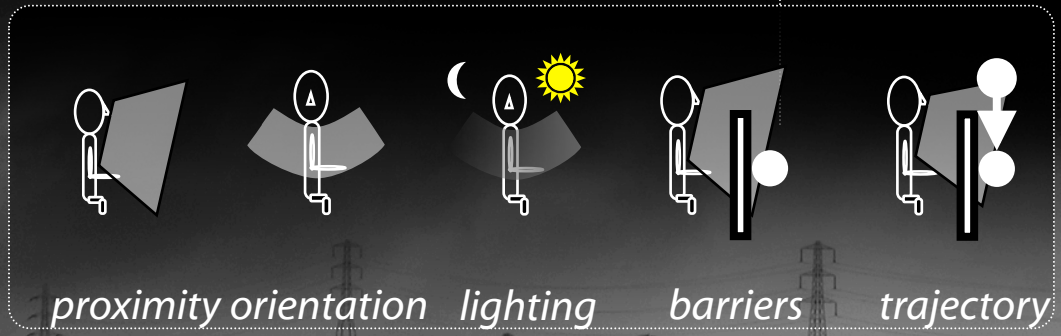

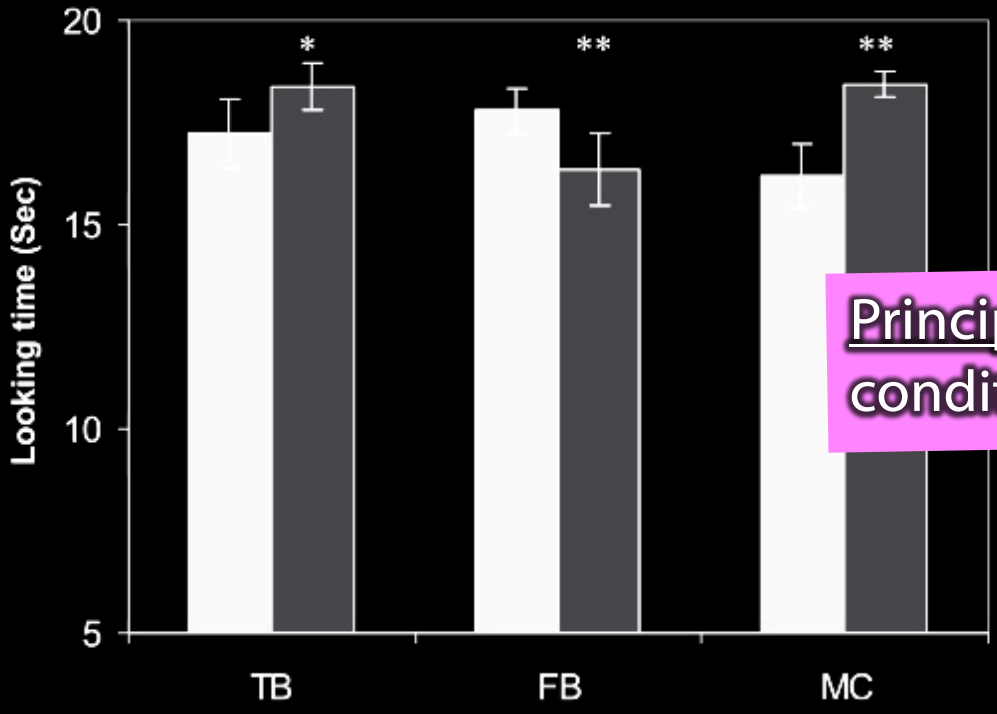

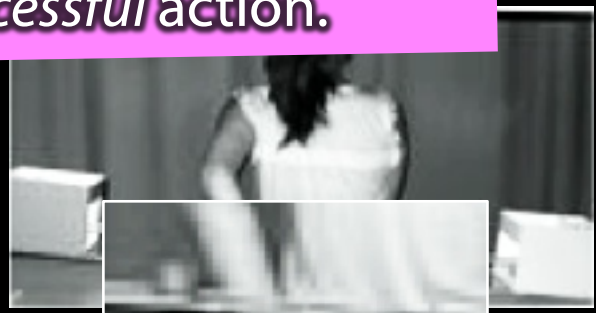

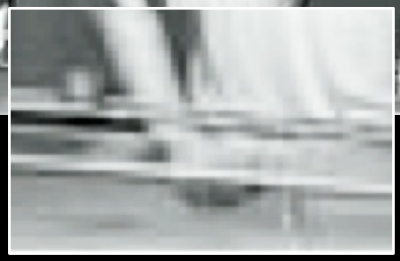

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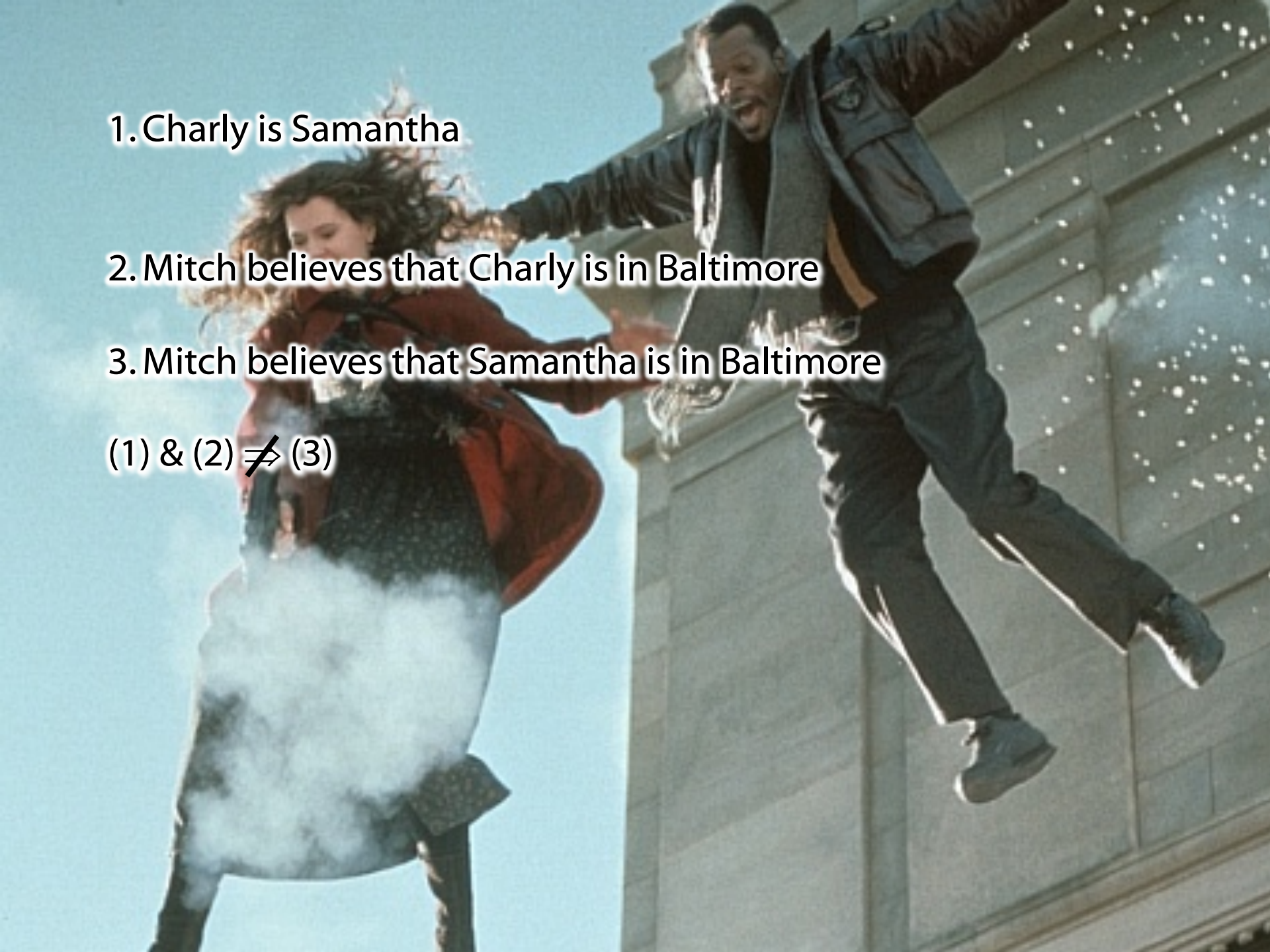
signature limits

1. Charly is Samantha

2. Mitch believes that Charly is in Baltimore

3. Mitch believes that Samantha is in Baltimore

(1) & (2) $\not\Rightarrow$ (3)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(1) & (2) ⇏ (3)

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2. Mitch believes that Charly is in Baltimore

3. Mitch believes that Samantha is in Baltimore

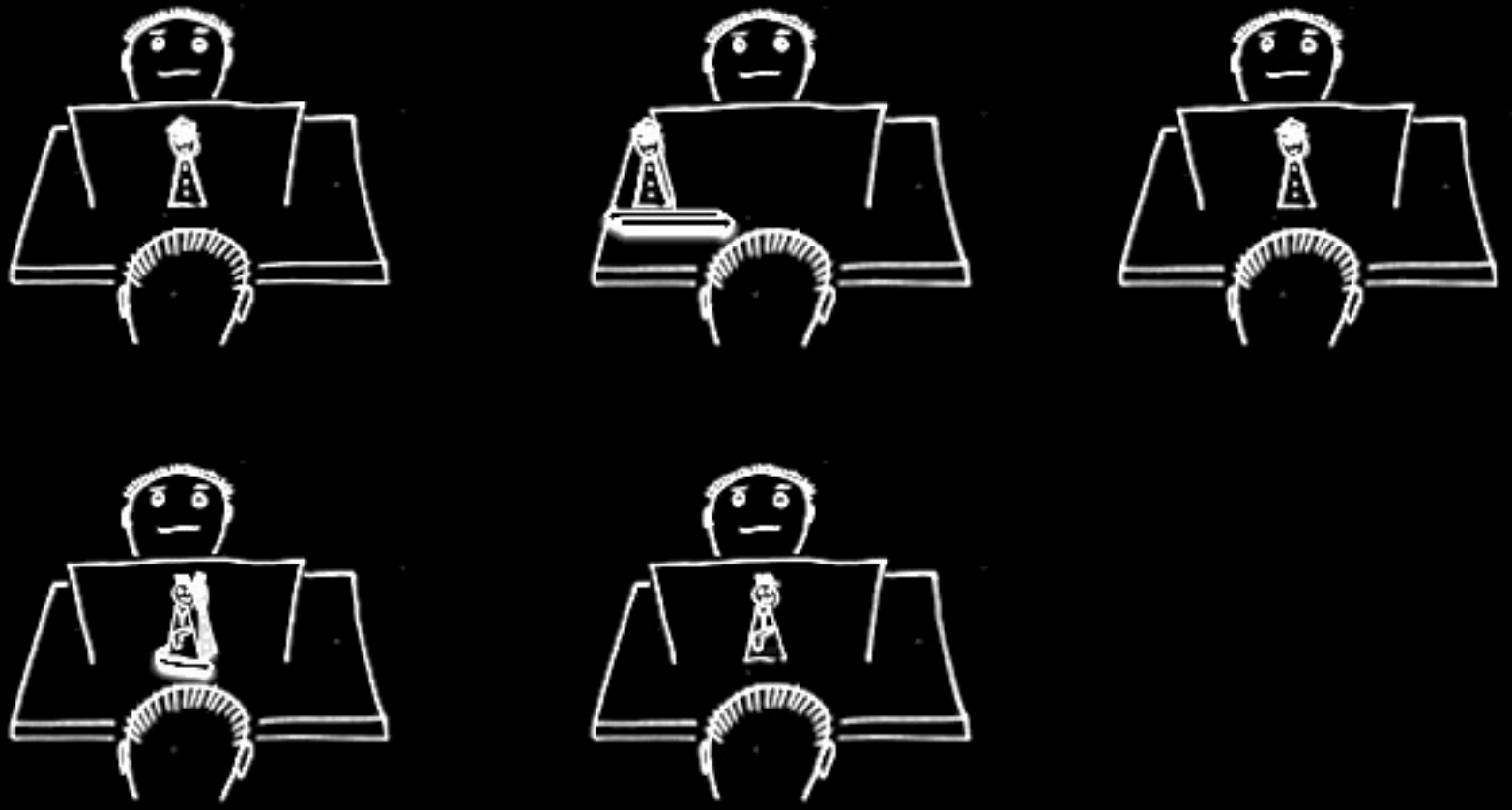
(1) & (2) $\not\Rightarrow$ (3)

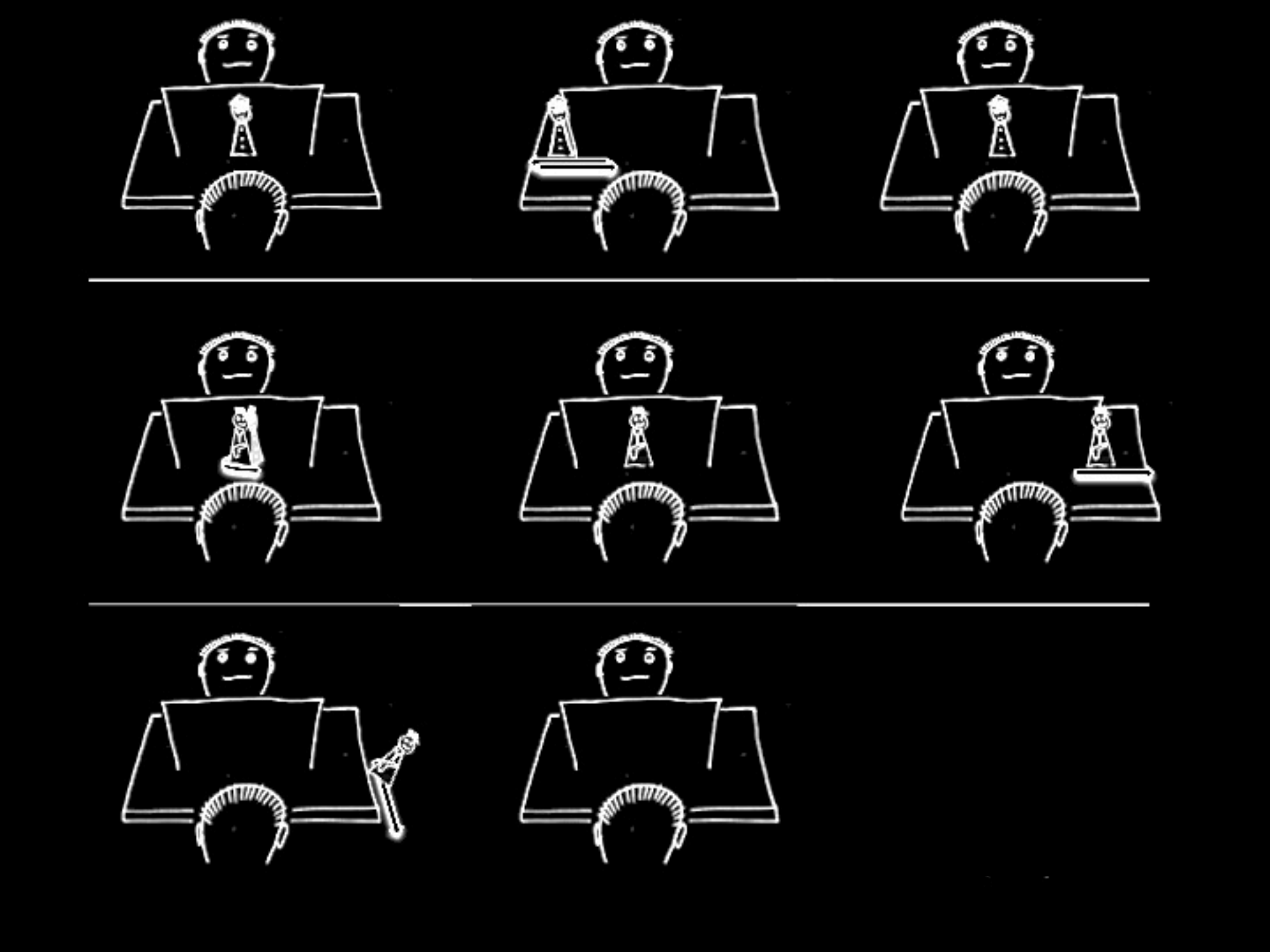
4. Mitch registers <Charly, Baltimore>

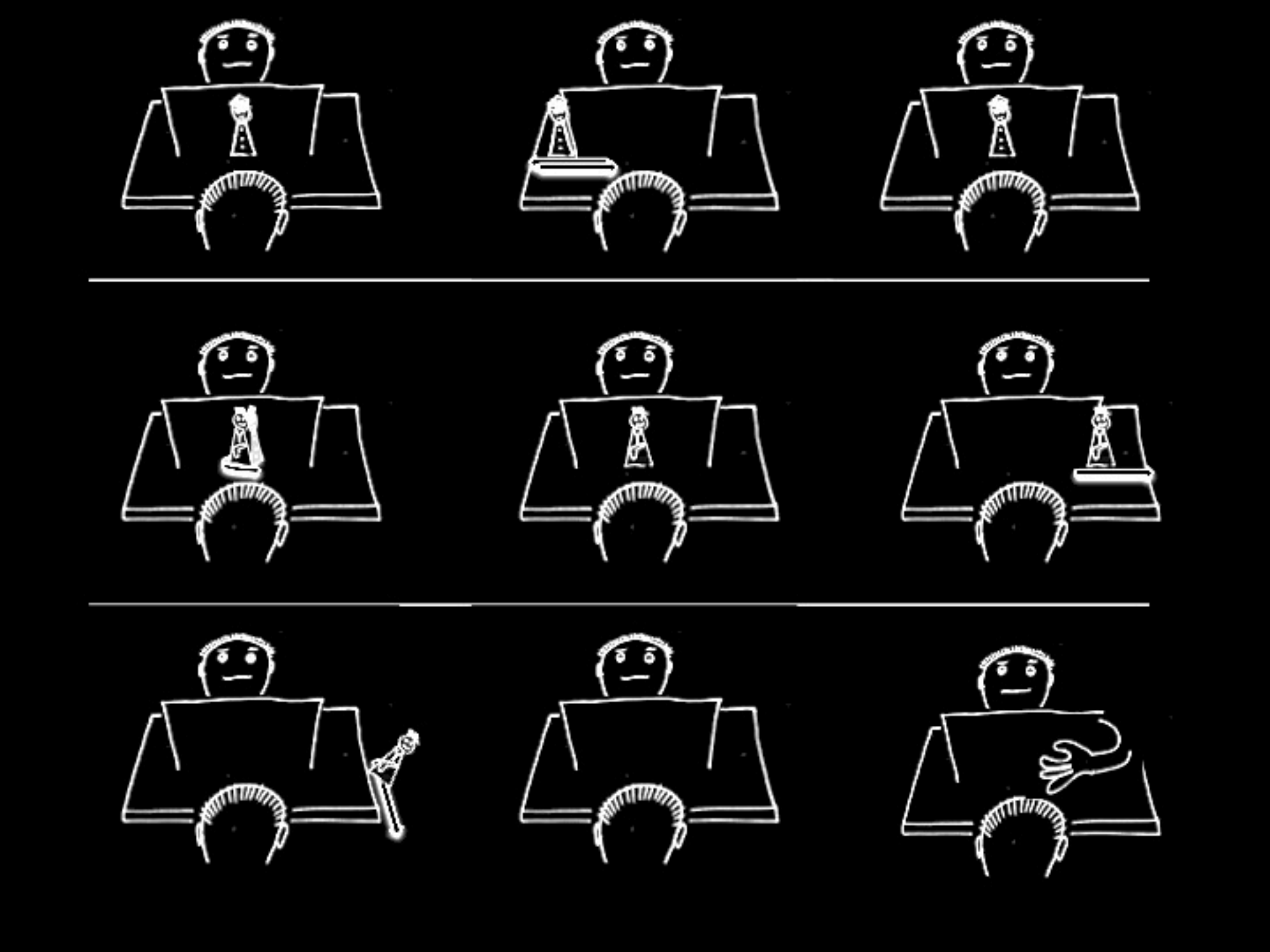
5. Mitch registers <Samantha, Baltimore>

(1) & (4) $\Rightarrow$ (5)

	False belief about location	False belief about identity
Subjects represent registration	*pass*	*fail*
Subjects represent beliefs	*pass*	*pass*







Which Joint Actions Ground Social Cognition?

s.butterfill@warwick.ac.uk

Theory of mind *abilities* are widespread

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18-month-olds point to inform, and predict actions based on false beliefs

(Liszkowski et al 2006)

(Onishi & Baillargeon 2005; Southgate et al 2007)

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Scrub-jays selectively re-cache their food in ways that deprive competitors of knowledge of its location

(Clayton, Dally & Emery 2007)

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(Onishi & Baillargeon 2005; Southgate et al 2007)

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