

Mindreading and Joint Action

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

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(Onishi & Baillargeon 2005;
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- attention
- working memory

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first

What could infants, chimps and scrub-jays represent that would enable them, within limits, to track others' perceptions, knowledge, beliefs and other propositional attitudes?

question

A black and white photograph of two young children, likely infants or toddlers, smiling and looking towards the camera. They are wearing denim overalls and patterned shirts.

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question



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



Your *field* = a set of
objects related to you by
proximity, orientation,
lighting and other factors



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proximity

orientation

lighting

barriers

trajectory

Your *field* = a set of objects related to you by proximity, orientation, lighting and other factors

You *encounter* an object = it is in your field



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Principle 1: one can't goal-directedly act on an object unless one has encountered it.



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You *encounter* an object = it is in your field

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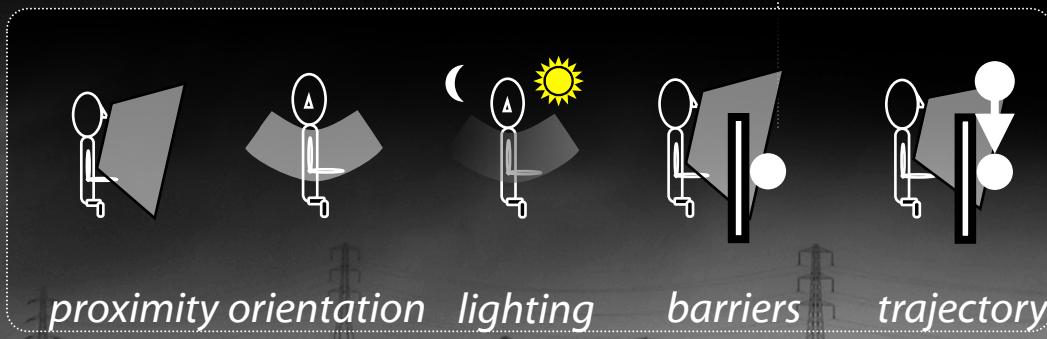
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Principle 3



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proximity



orientation



lighting



barriers



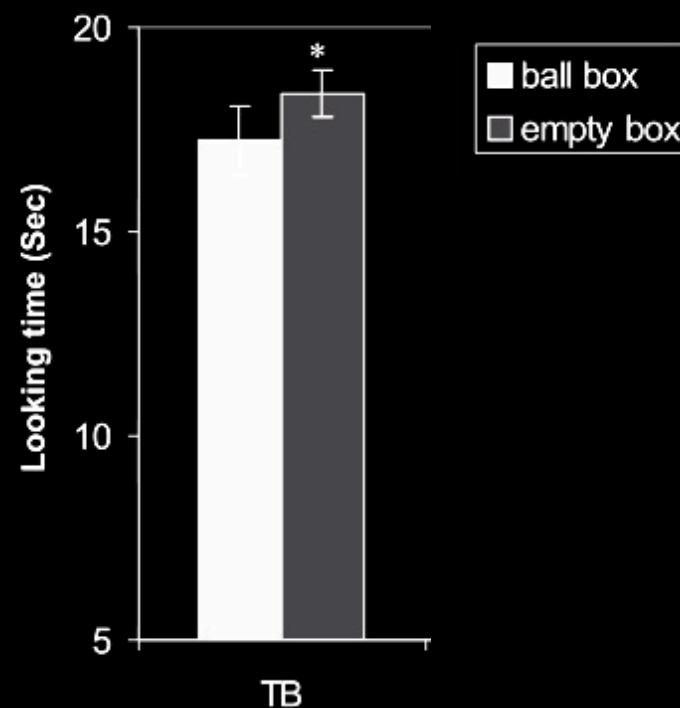
trajectory



source Träuble, Marinovic, & Pauen (2010)



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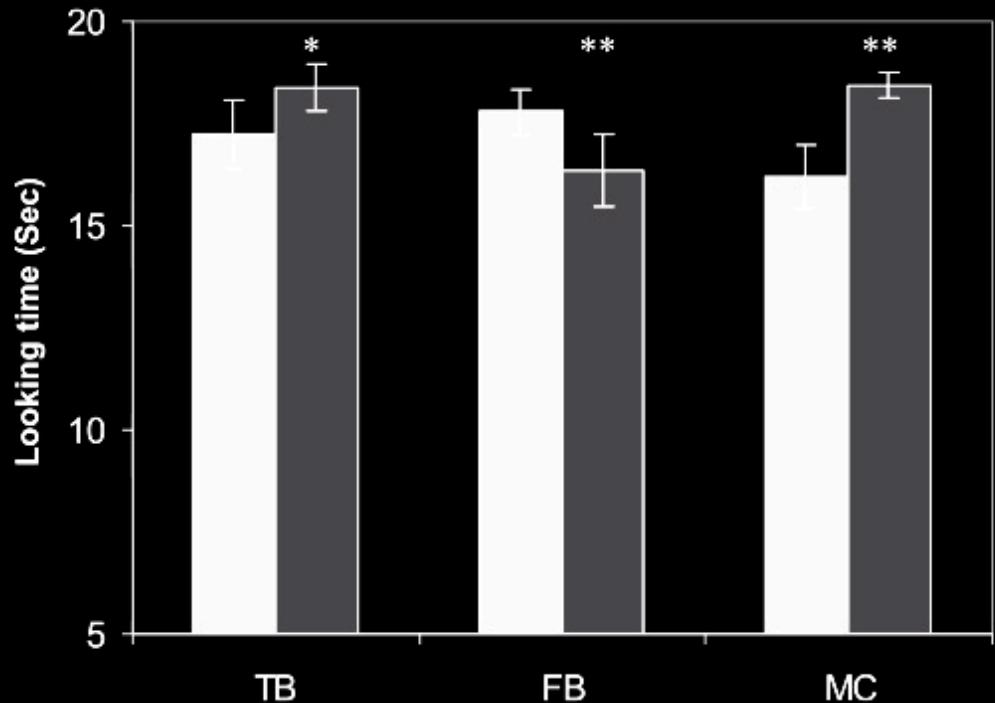
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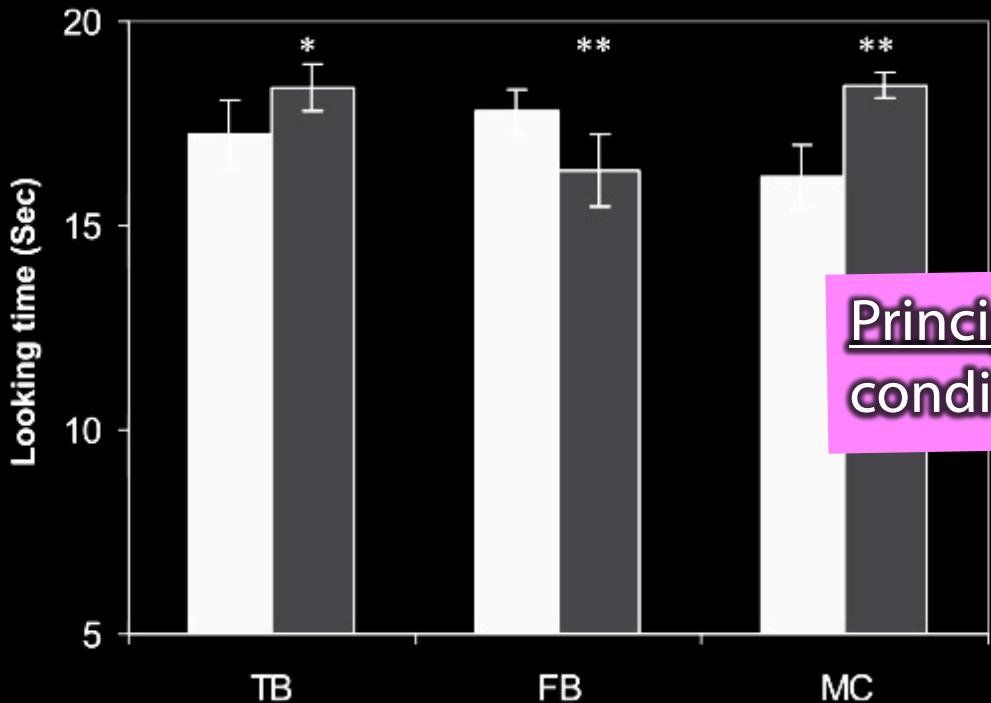
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trajectory



Principle 2: correct registration is a condition of *successful* action.



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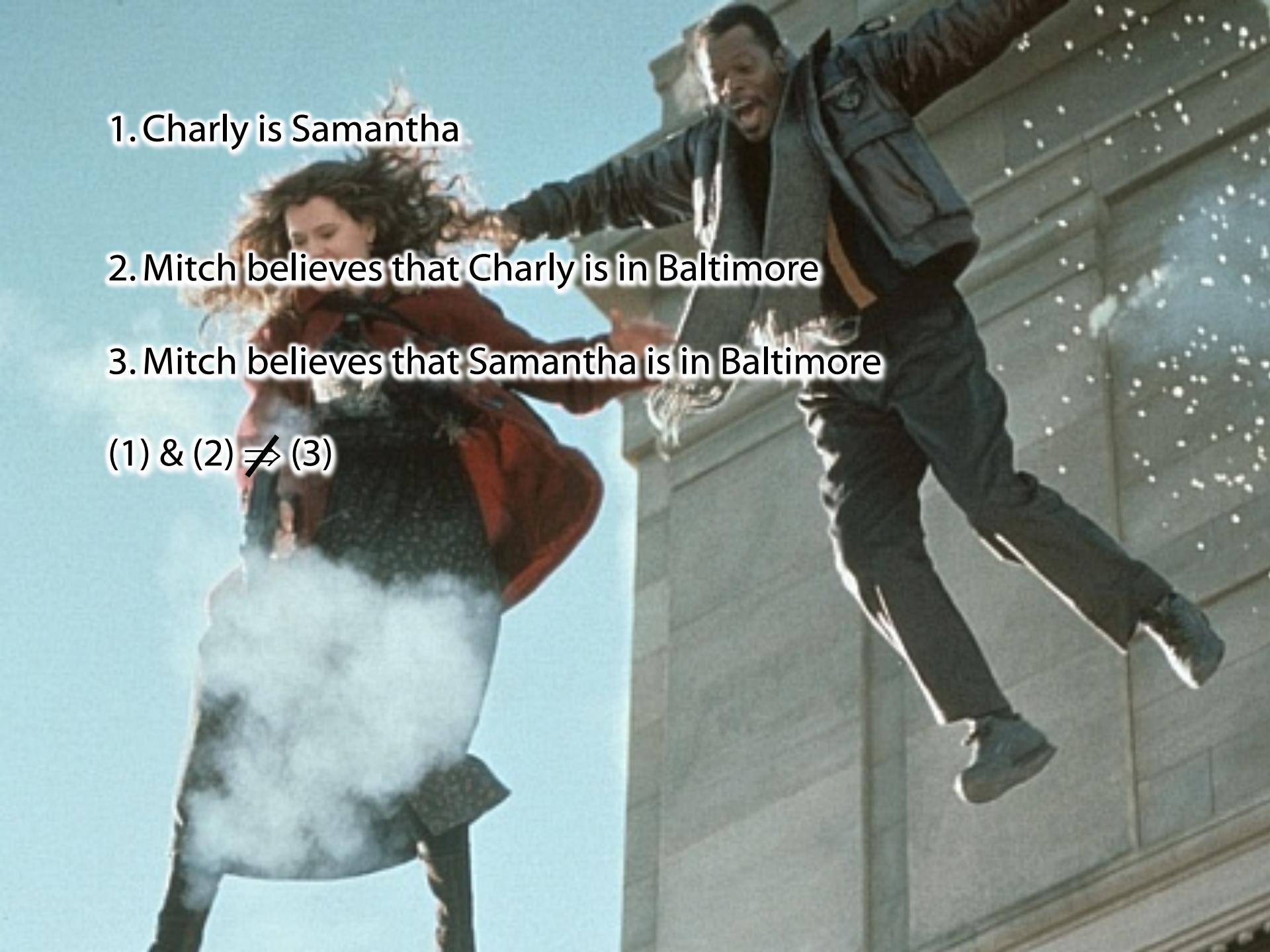
signature limits

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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 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)

Subjects represent
registration

pass

fail

Subjects represent
beliefs

pass

pass

False belief
about location

False belief
about identity















"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)

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

second
Which theory of mind cognition is
required for joint action?
question

shared intention

'I take a collective action to involve a collective [shared] intention.'

(Gilbert 2006, p. 5)

'The sine qua non of collaborative action is a joint goal [shared intention] and a joint commitment'

(Tomasello 2008, p. 181)

'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)

A black and white photograph of Michael Bratman, a middle-aged man with dark hair and glasses, wearing a plaid shirt. He is looking slightly to his left with a thoughtful expression.

We have a shared intention
that we J =

“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 la, lb, and
meshing subplans of la and
lb; you intend [likewise] ...

“3. 1 and 2 are common
knowledge between us”

(Bratman 1993:View 4)



Intentions about intentions



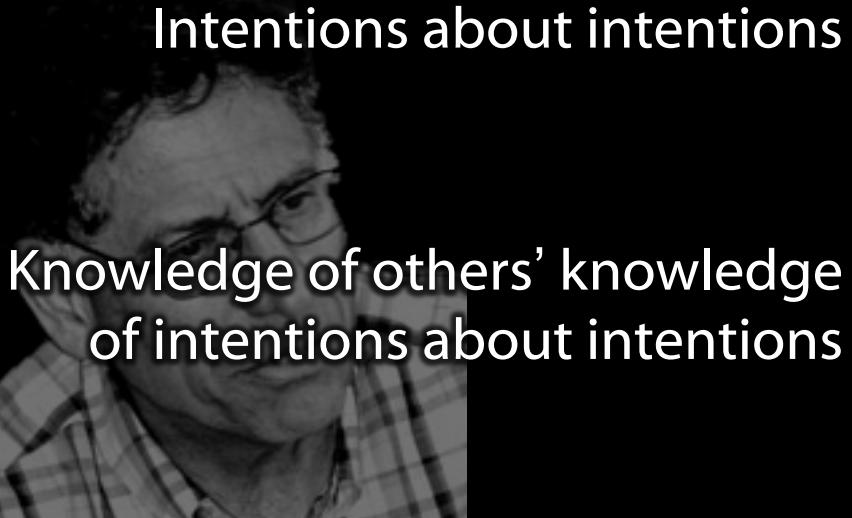
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Intentions about intentions

Knowledge of others' knowledge
of intentions about intentions



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2. Shared intention requires sophisticated theory of mind cognition.

Therefore:

3. Abilities to engage in joint action could play no significant role in explaining the emergence, in evolution or development, of mindreading.

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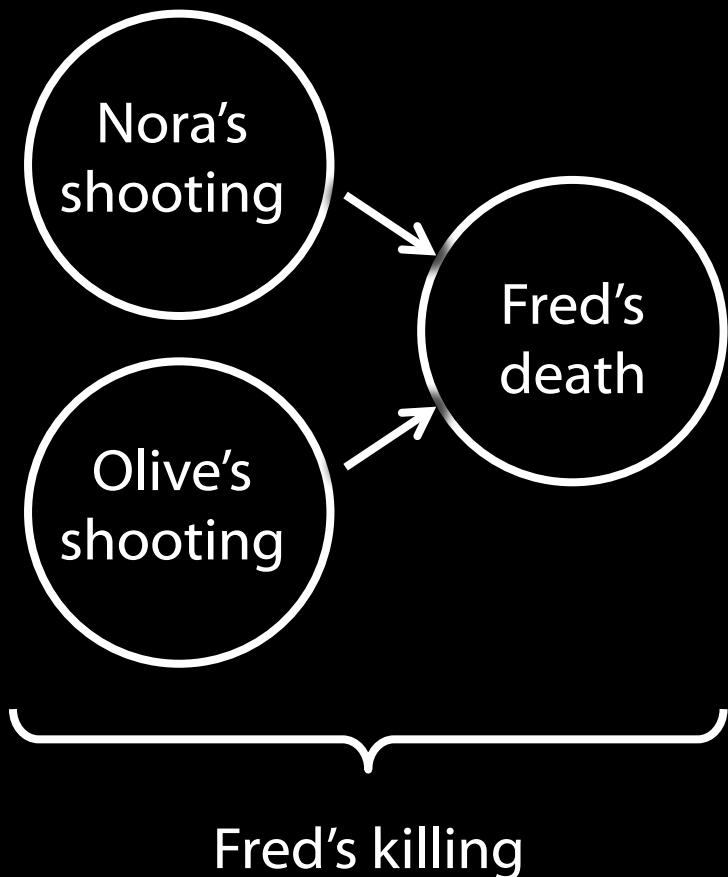
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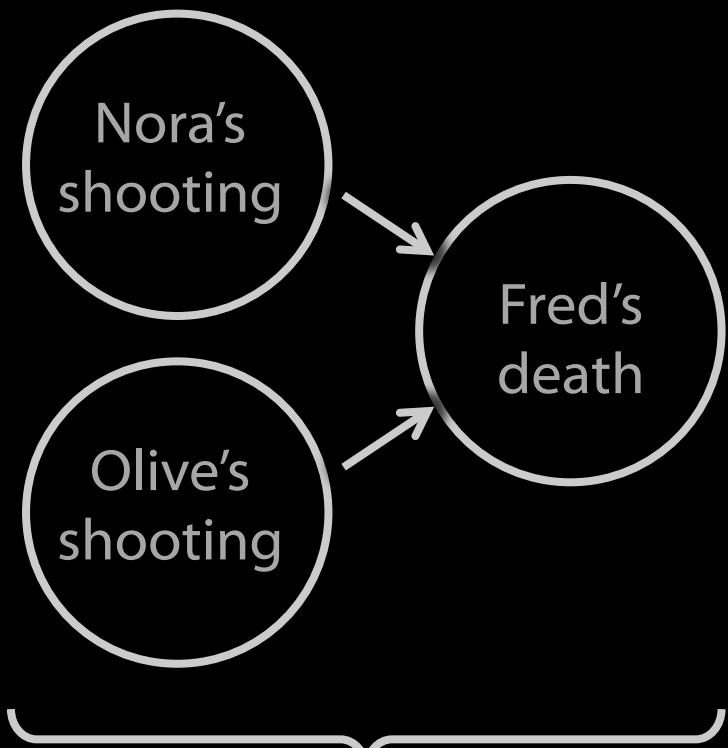
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Joint action:
an event with two or more
agents (Ludwig 2007)

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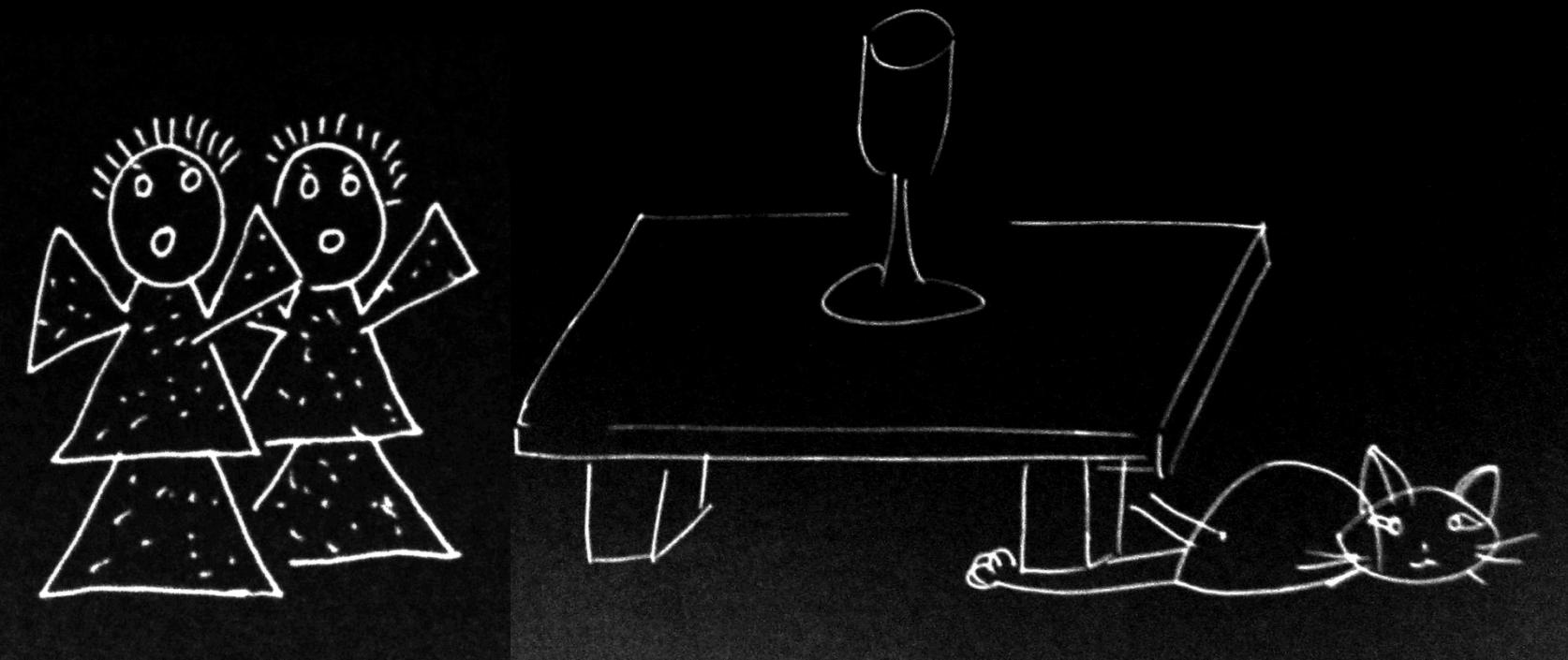
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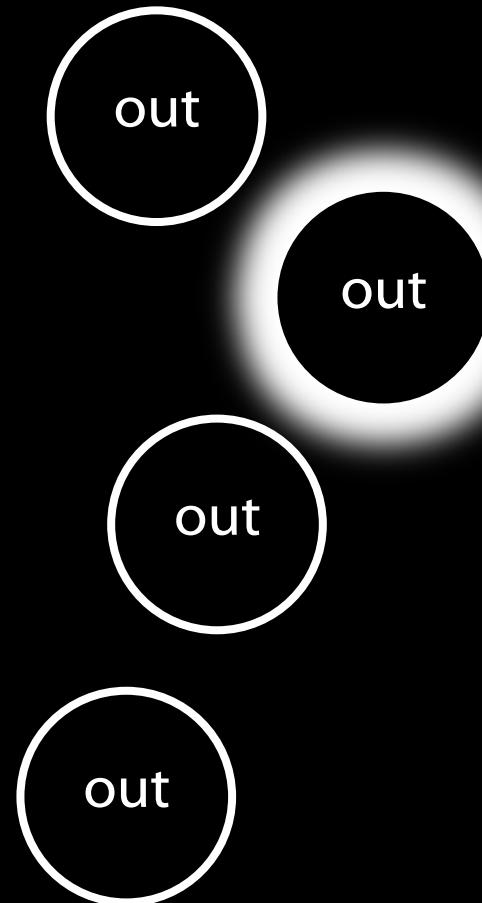
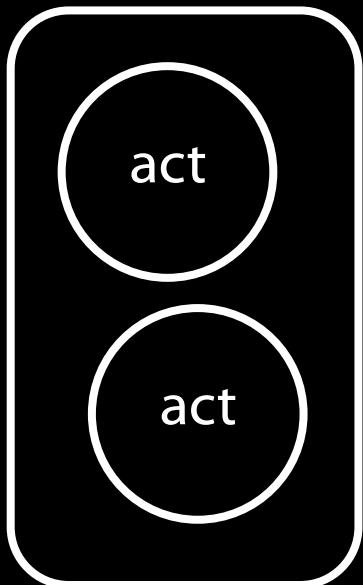
pretending to row a boat
together

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

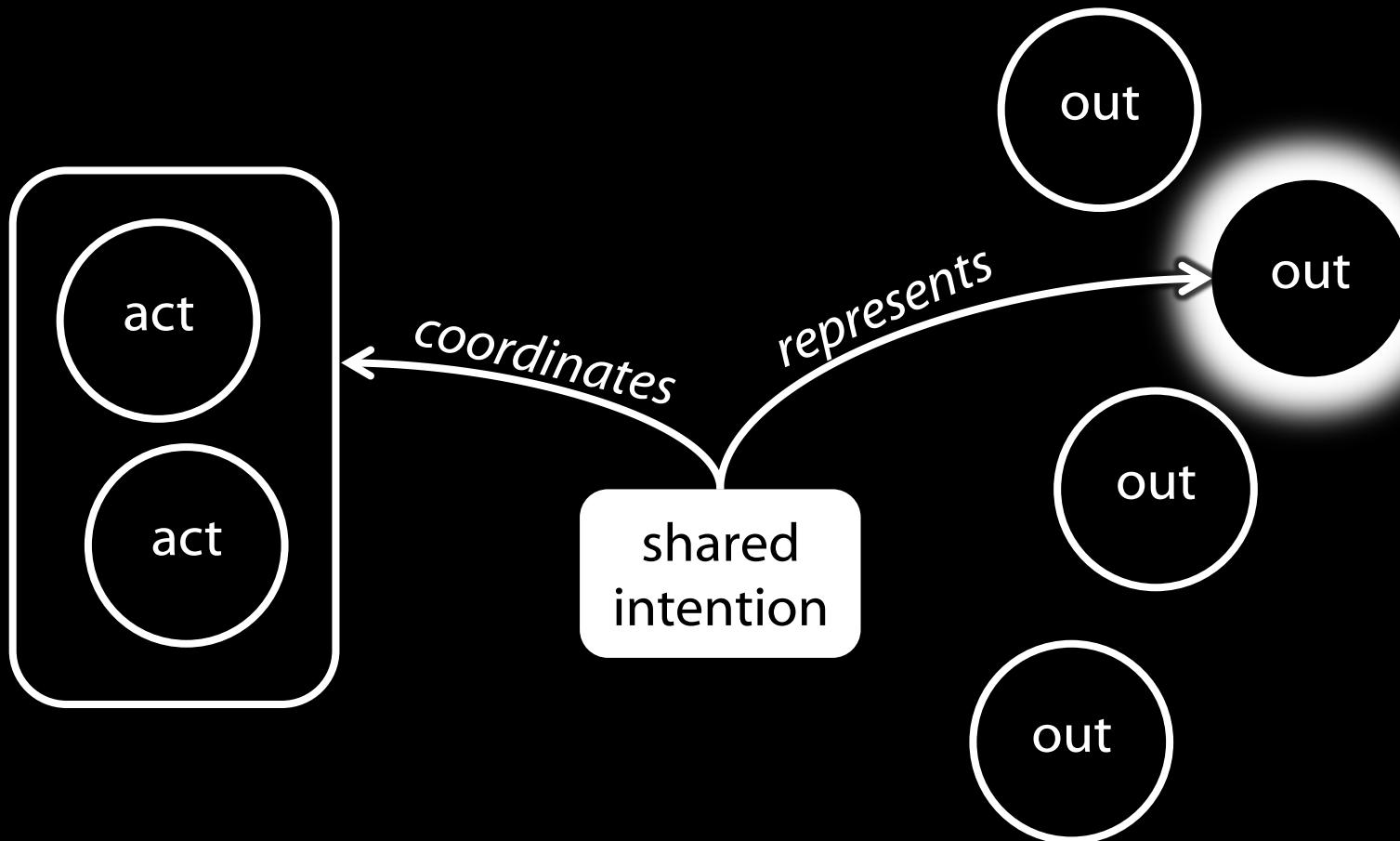
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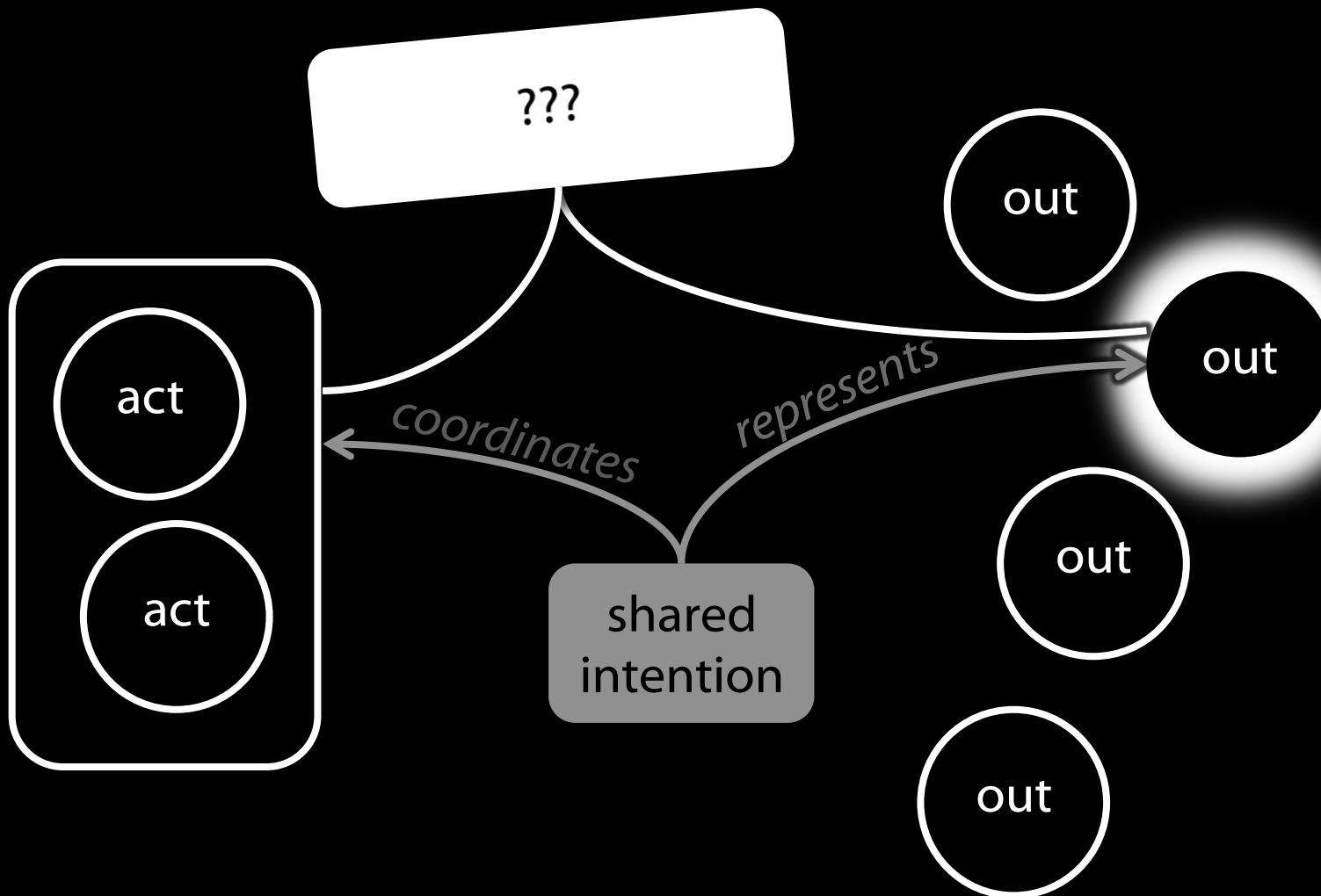
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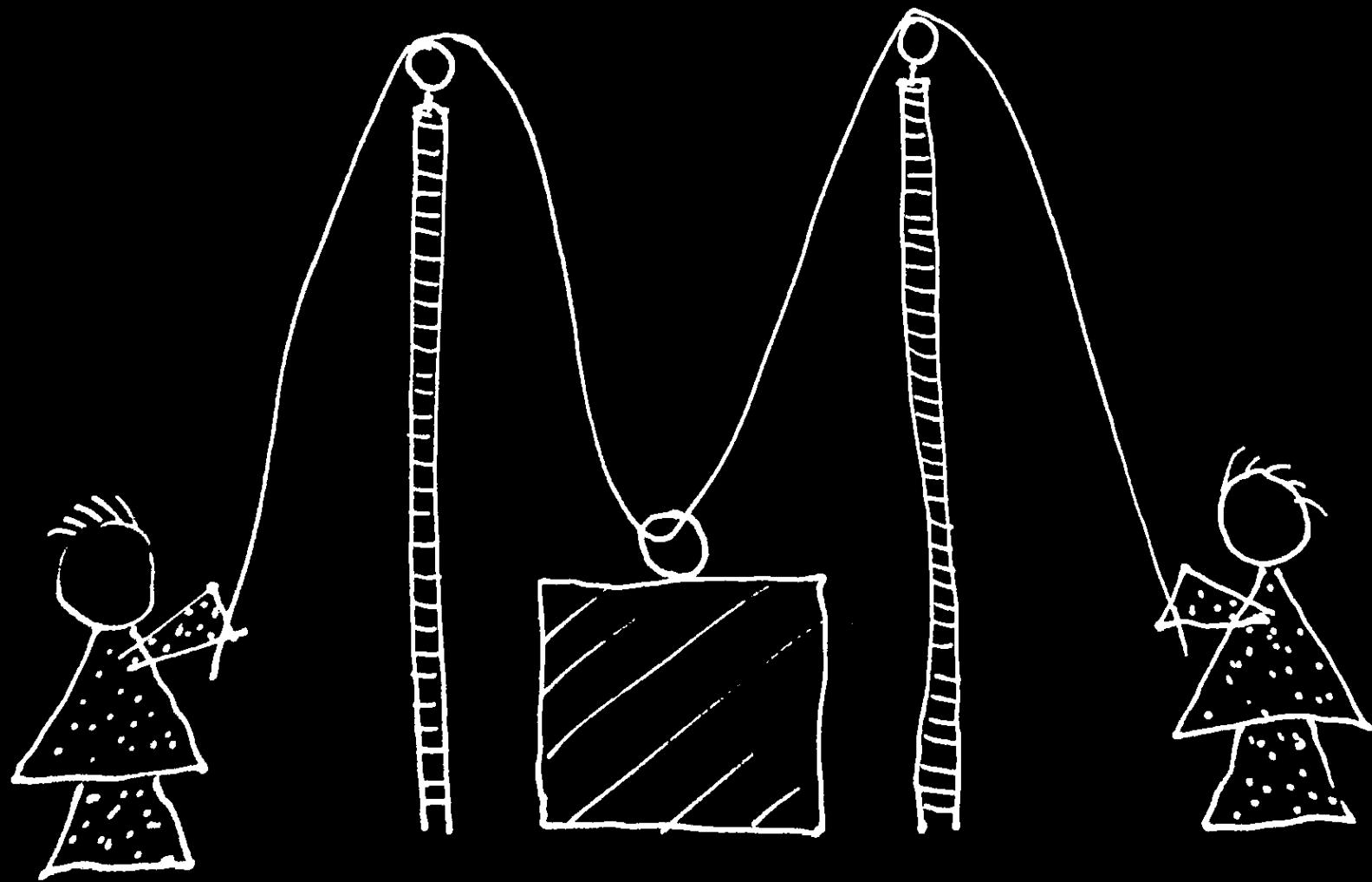
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G is a collective goal

- (a) it is a distributive goal;
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- (c) coordination of this type would normally facilitate occurrences of outcomes of this type.



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G is a shared goal

G is a collective goal

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

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.



third question

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 & Tomasello 2007)

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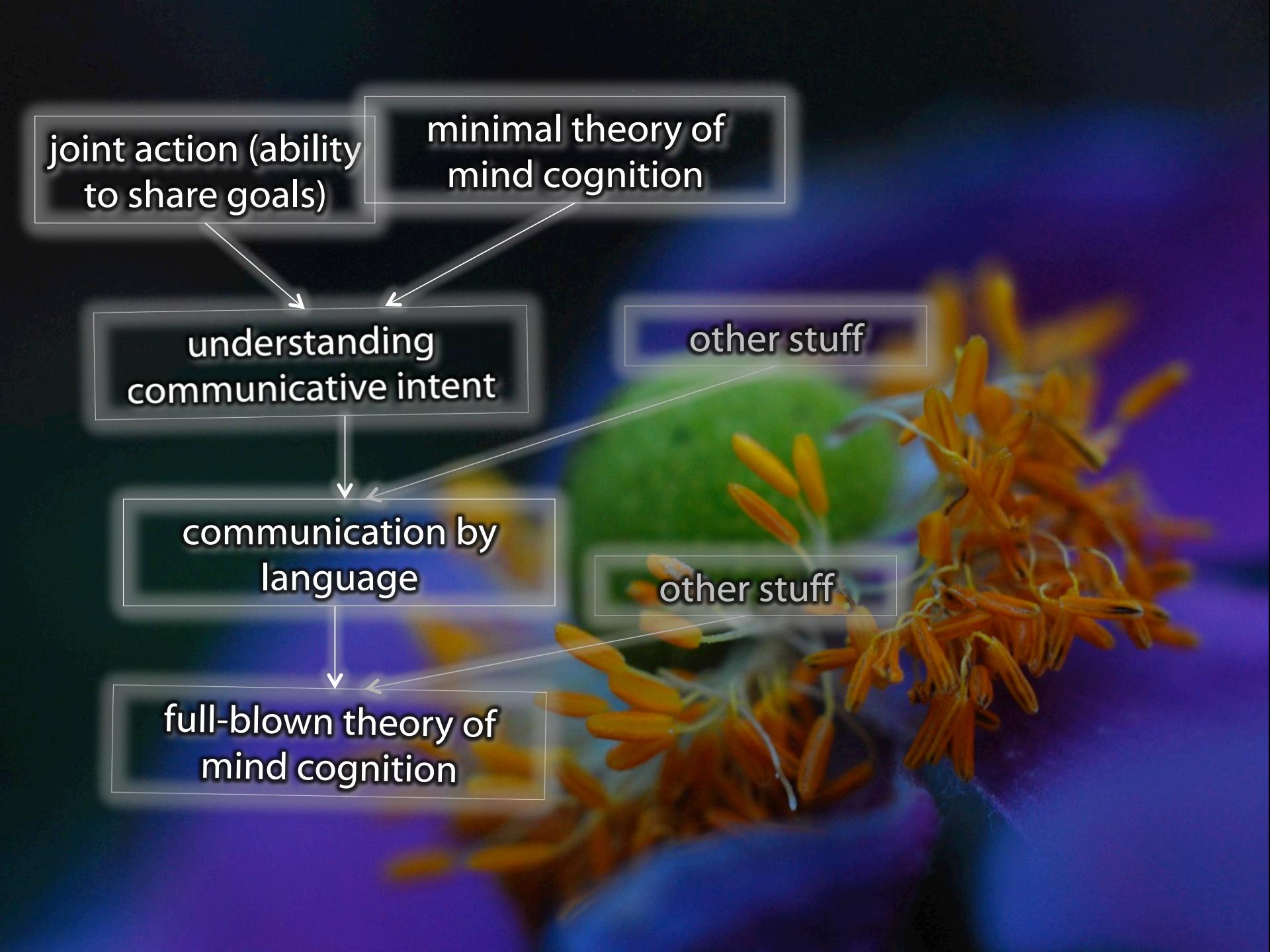
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Csibra's 'two stances':

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

communication by
language

full-blown theory of
mind cognition

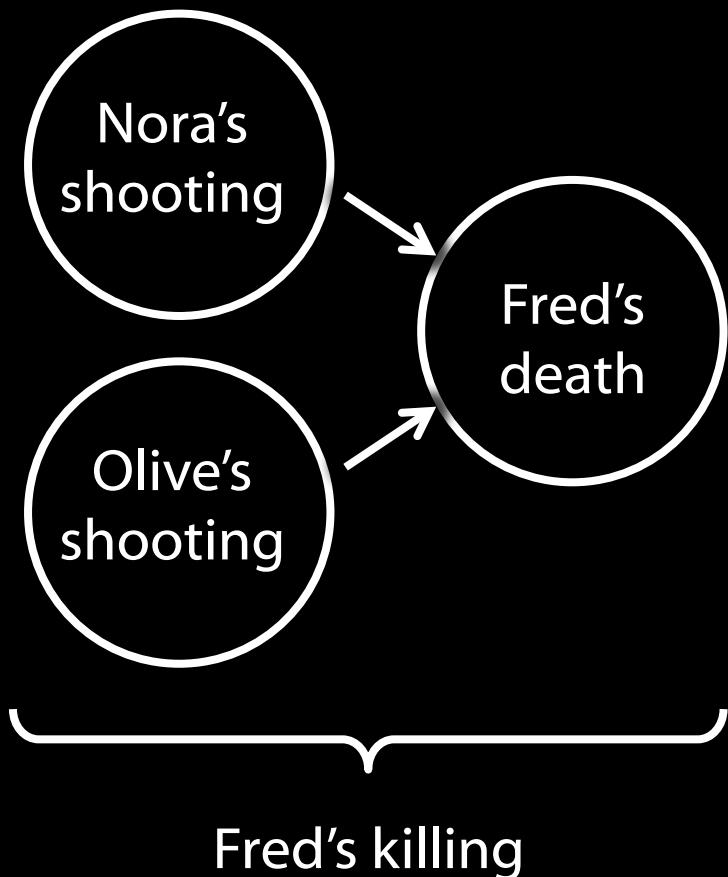
other stuff

other stuff



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Goal-directed joint action:
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goal

What is the relation between an action and the goal (or goals) to which it is directed?

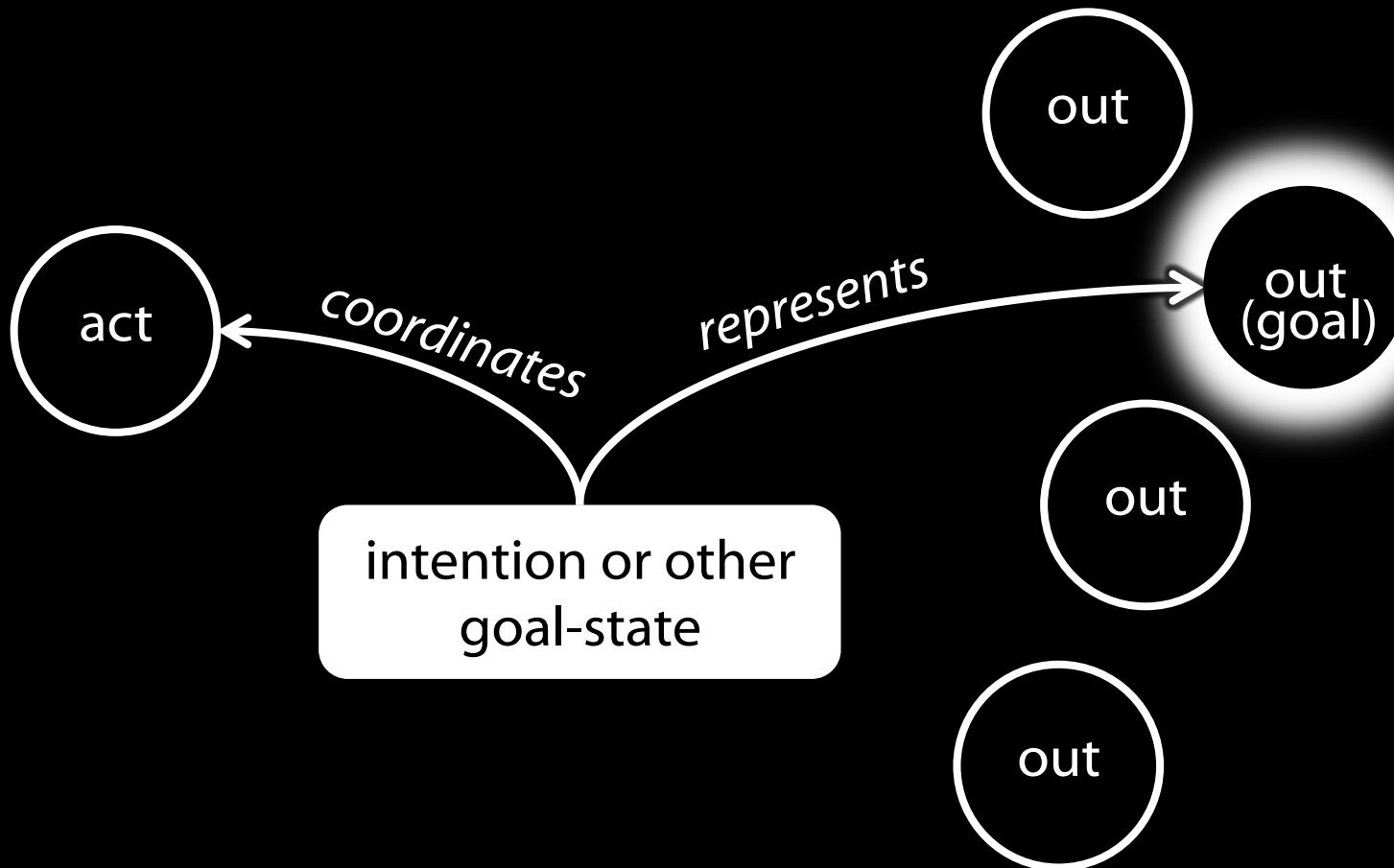
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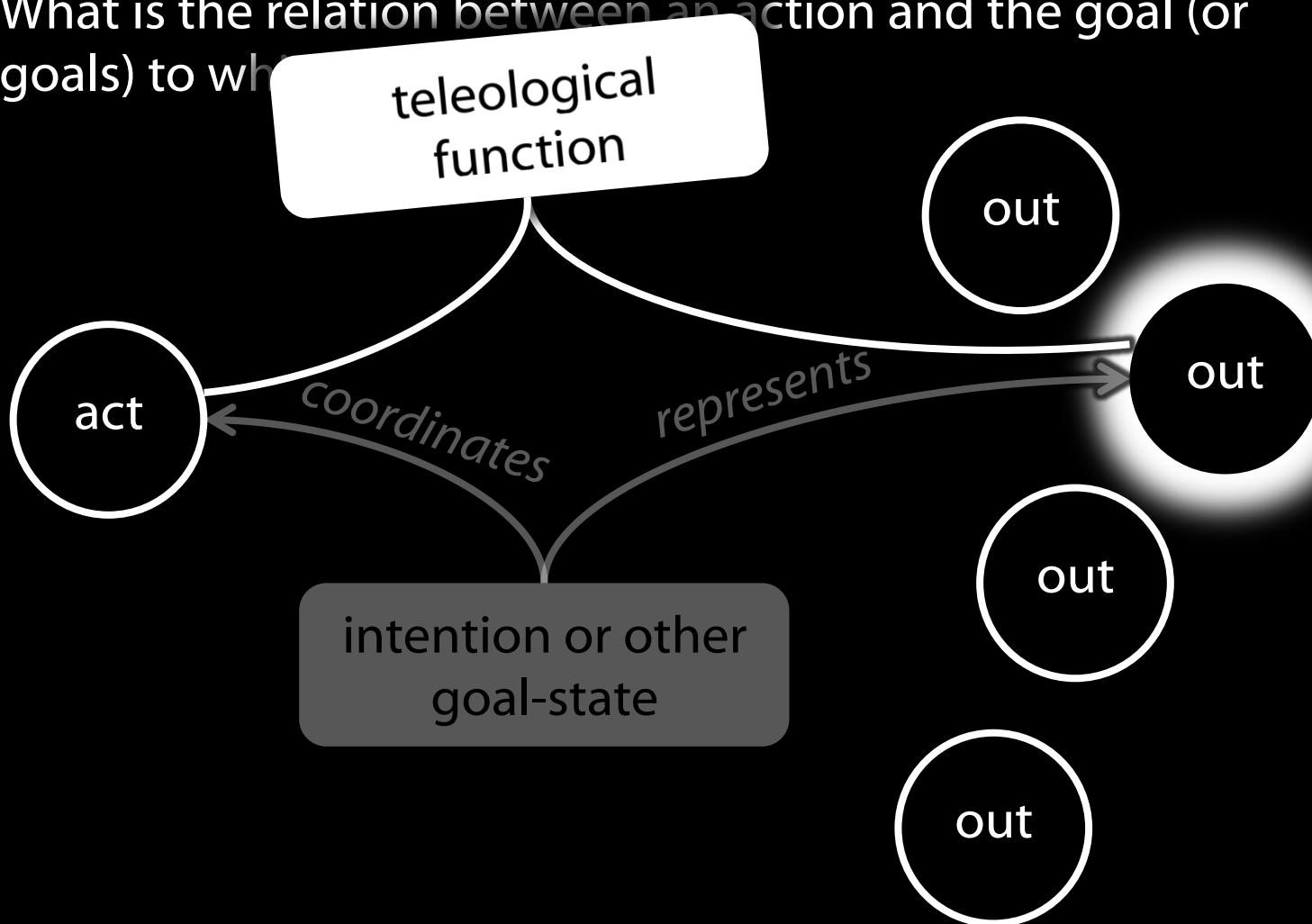
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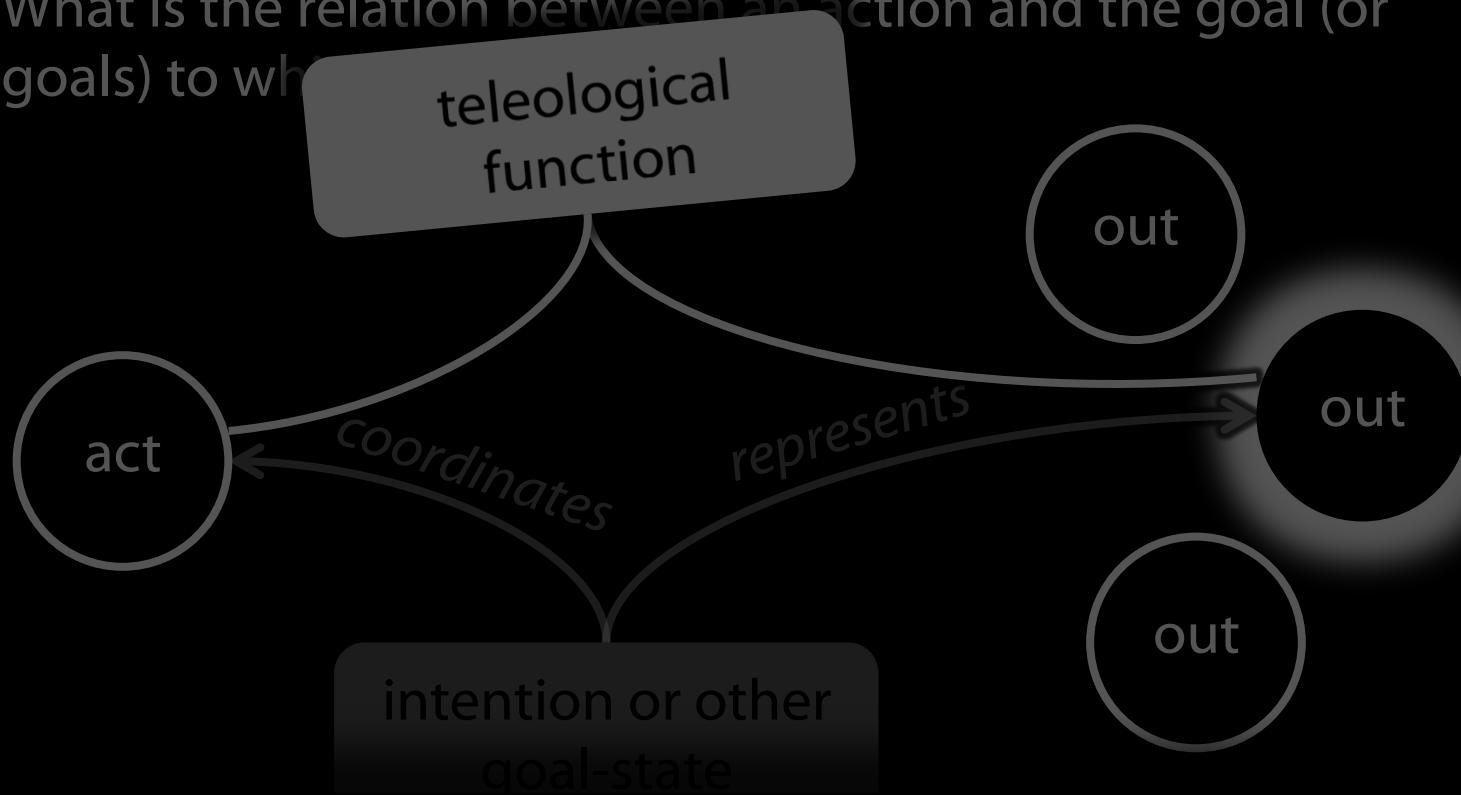
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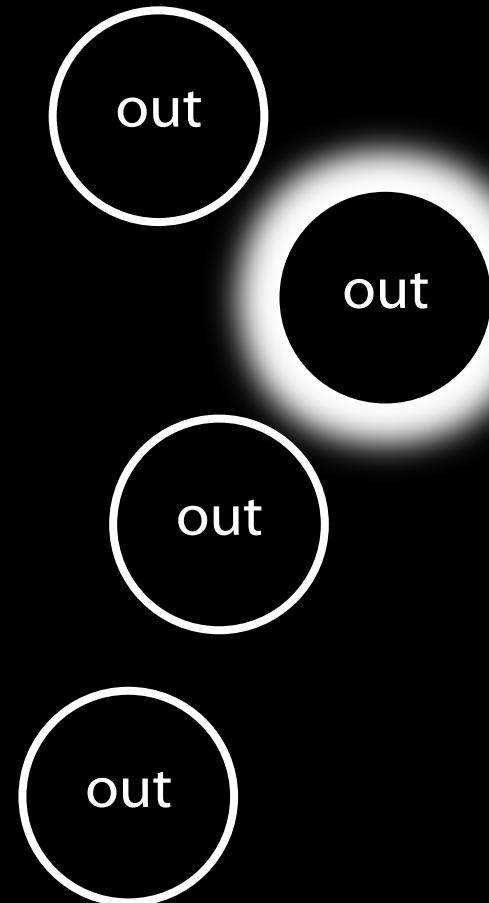
What is the relation between an action and the goal (or goals) to which it is related?



What is the relation between an action and the goal (or goals) to which it contributes?



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



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







“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.”

(Davidson 2003:697)



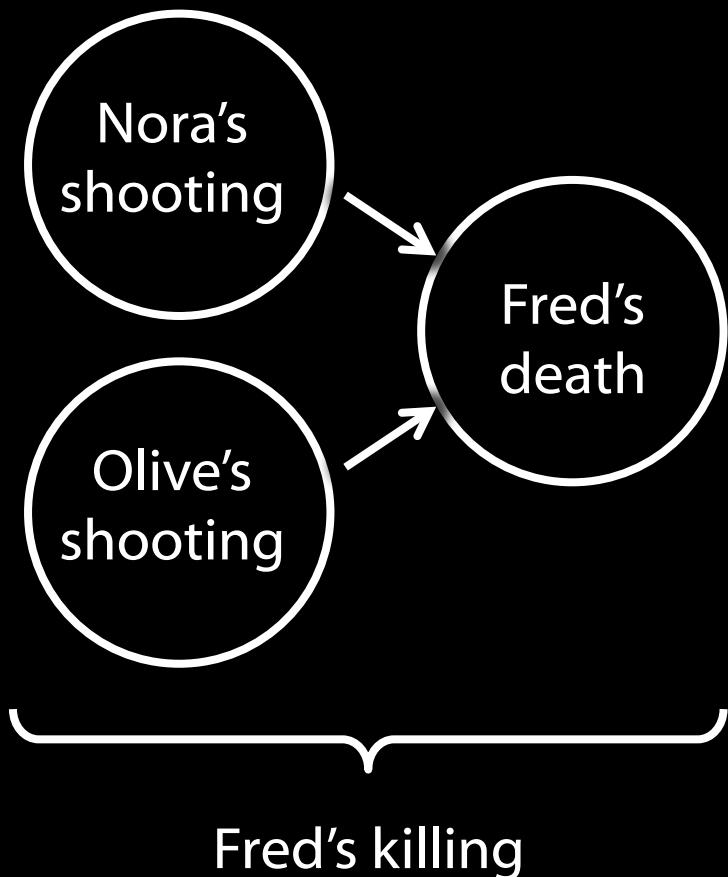
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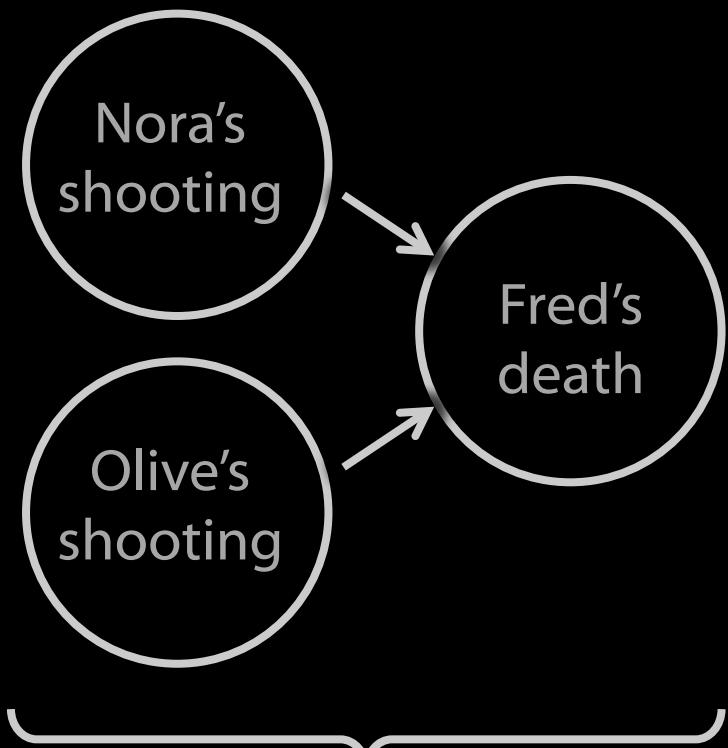


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Grounding

events $D_1, \dots D_n$ ground E, if:

$D_1, \dots D_n$ and E occur;

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

every event that is a proper part of E but is not a part of any of $D_1, \dots D_n$ nor of any event consisting only in some or all of $D_1, \dots D_n$ is caused by some or all of $D_1, \dots D_n$.

Agency

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

(Adapted from Pietroski 1998)