



Joint Action and the Emergence of Mindreading

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A black and white photograph of two young children standing side-by-side against a black background. The child on the left is in the foreground, wearing a light-colored patterned shirt under dark overalls, looking down and smiling. The child on the right is slightly behind, wearing a dark patterned sweater, looking towards the camera and smiling.

challenge

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

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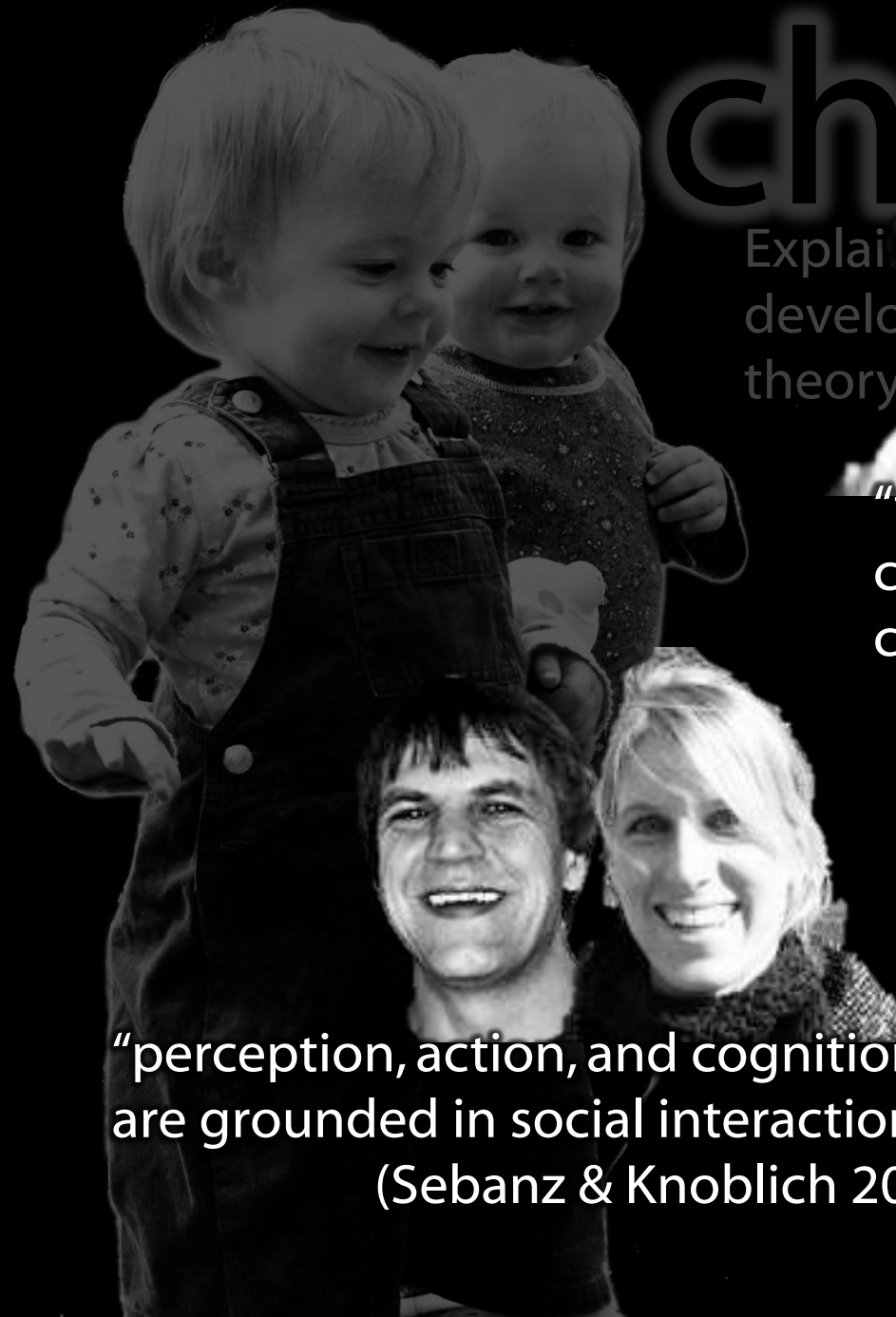
challenge

Explain the evolution of human cognition or development in terms of theory of mind



"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)



A black and white photograph of two young children. The child in the foreground is a toddler with short, light-colored hair, wearing a patterned long-sleeved shirt under dark denim overalls. They are looking down and to the right with a slight smile. Behind them is another child, slightly taller, wearing a dark, patterned sweater, looking towards the camera with a smile. The background is dark and out of focus.

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

conjecture

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



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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 cube on a large
trampoline together

(Warneken, Chen & Tomasello 2006)

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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A black and white photograph of two young children. The child in the foreground is a toddler with light hair, wearing dark overalls over a light-colored patterned shirt, looking down and smiling. The child behind them is a younger toddler, also with light hair, wearing a dark patterned shirt, looking towards the camera and smiling. They are standing against a dark background.

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first objection

Sophisticated forms of theory of mind cognition emerge before joint action

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;
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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

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(b) scarce cognitive resources

- attention
- working memory

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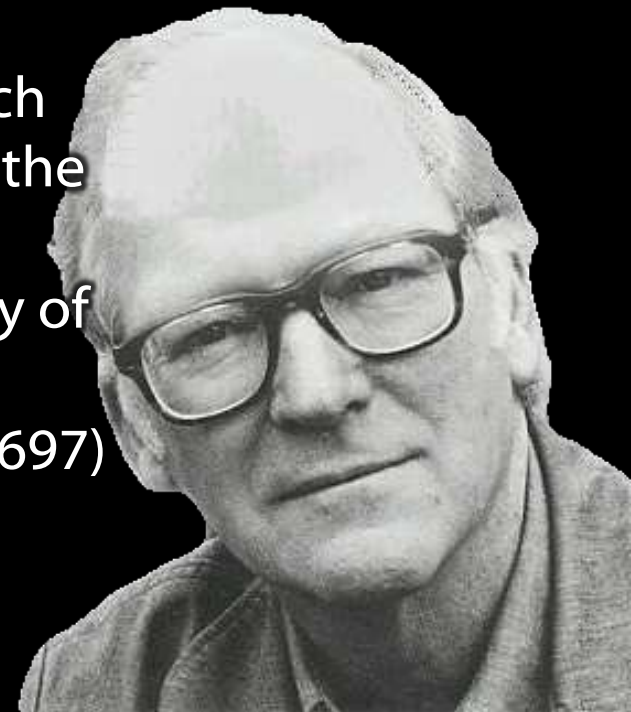
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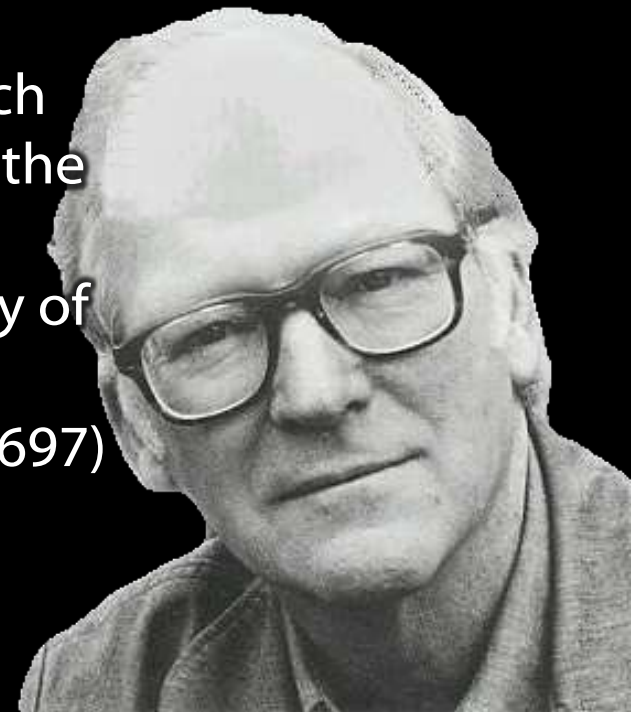
“We are stuck with our two main ways of describing and explaining things, one which treats objects and events as mindless, and the other which treats objects and events as having propositional attitudes. I see no way of bridging the gap”

(Davidson 2003:697)



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Propositional attitude

Relational attitude

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e.g. believes that ...

e.g. intends that ...

e.g. knows that ...

Relational attitude

e.g. excited by ...

e.g. encountered ...

e.g. wants apple juice

Propositional attitude

e.g. believes that ...

e.g. intends that ...

e.g. knows that ...

arbitrarily nestable
contents

uncodifiably complex
effects on action

permit mistakes about
identity and existence

Relational attitude

e.g. excited by ...

e.g. encountered ...

e.g. wants apple juice

no contents

parameter-setting
effects on action

enable tracking
limited range of true
and false beliefs



challenge

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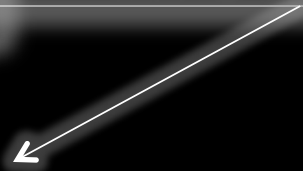
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~~first objection~~

Sophisticated theory of mind cognition emerges before joint action

joint action (ability
to share goals)

minimal theory of
mind cognition



[other stuff]



sophisticated theory of
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2nd objection

Joint action presupposes sophisticated theory of mind cognition

shared intention

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

(Gilbert 2006, p. 5)

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[shared] intention.'

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

(Tomasello 2008, p. 181)

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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)

“the partners ... have to be aware that they are
pursuing a joint goal, which both jointly intend”

(Wareneken, Graefenhain & Tomasello 2011)

What is shared intention?

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What is shared intention?

Functional characterisation

Substantial account



What is shared intention?

Functional characterisation

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

Substantial account



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Functional characterisation

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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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Intentions about intentions



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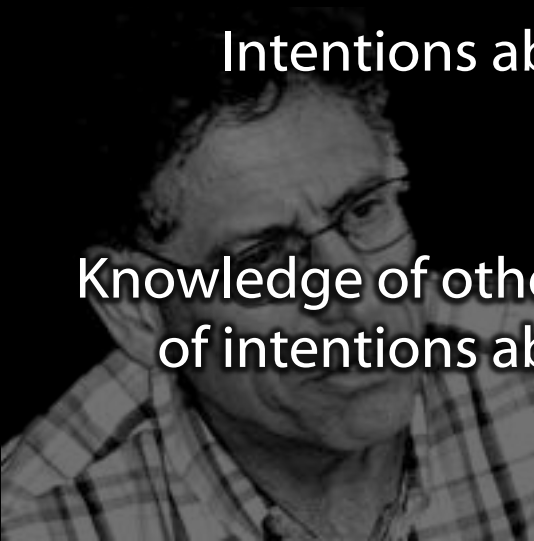
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Intentions about intentions

Knowledge of others' knowledge
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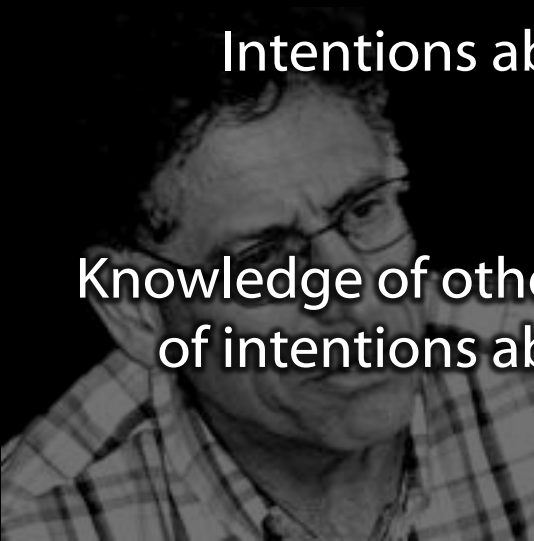
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‘shared intentional agency
consists, at bottom, in
interconnected planning
agency of the participants.’

(Bratman 2011, p. 11)

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1. All (significant) joint actions require shared intention.

2. Shared intention requires sophisticated theory of mind cognition.

Therefore:

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(not why)

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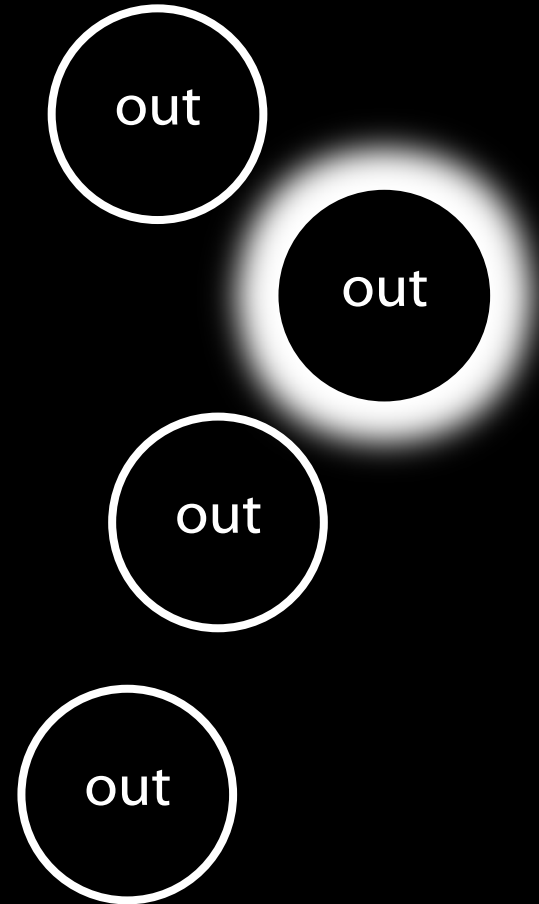
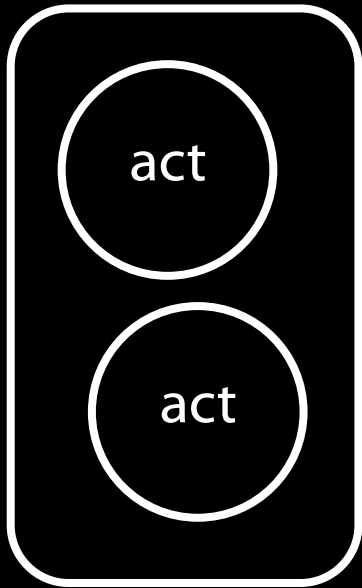
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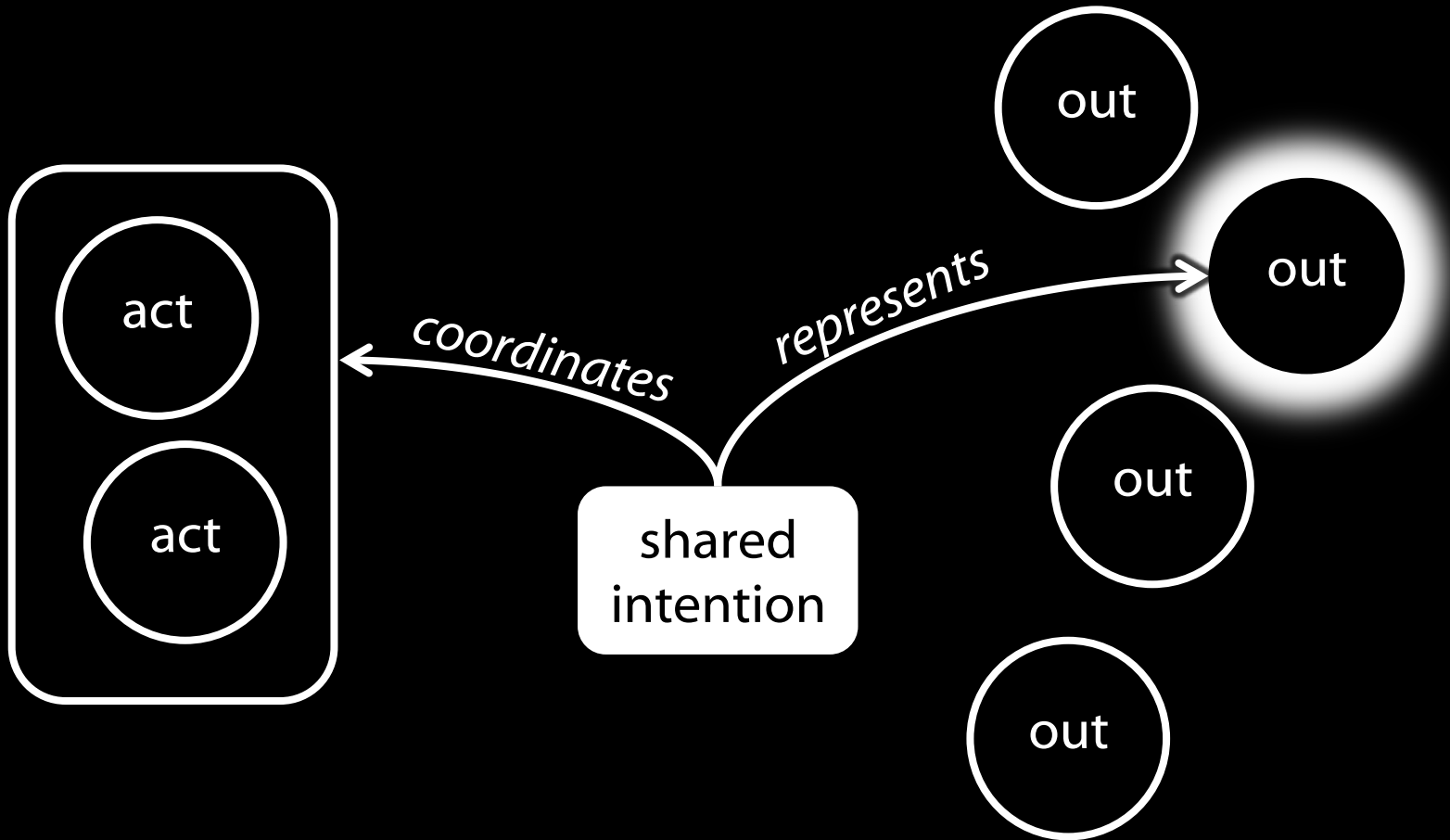
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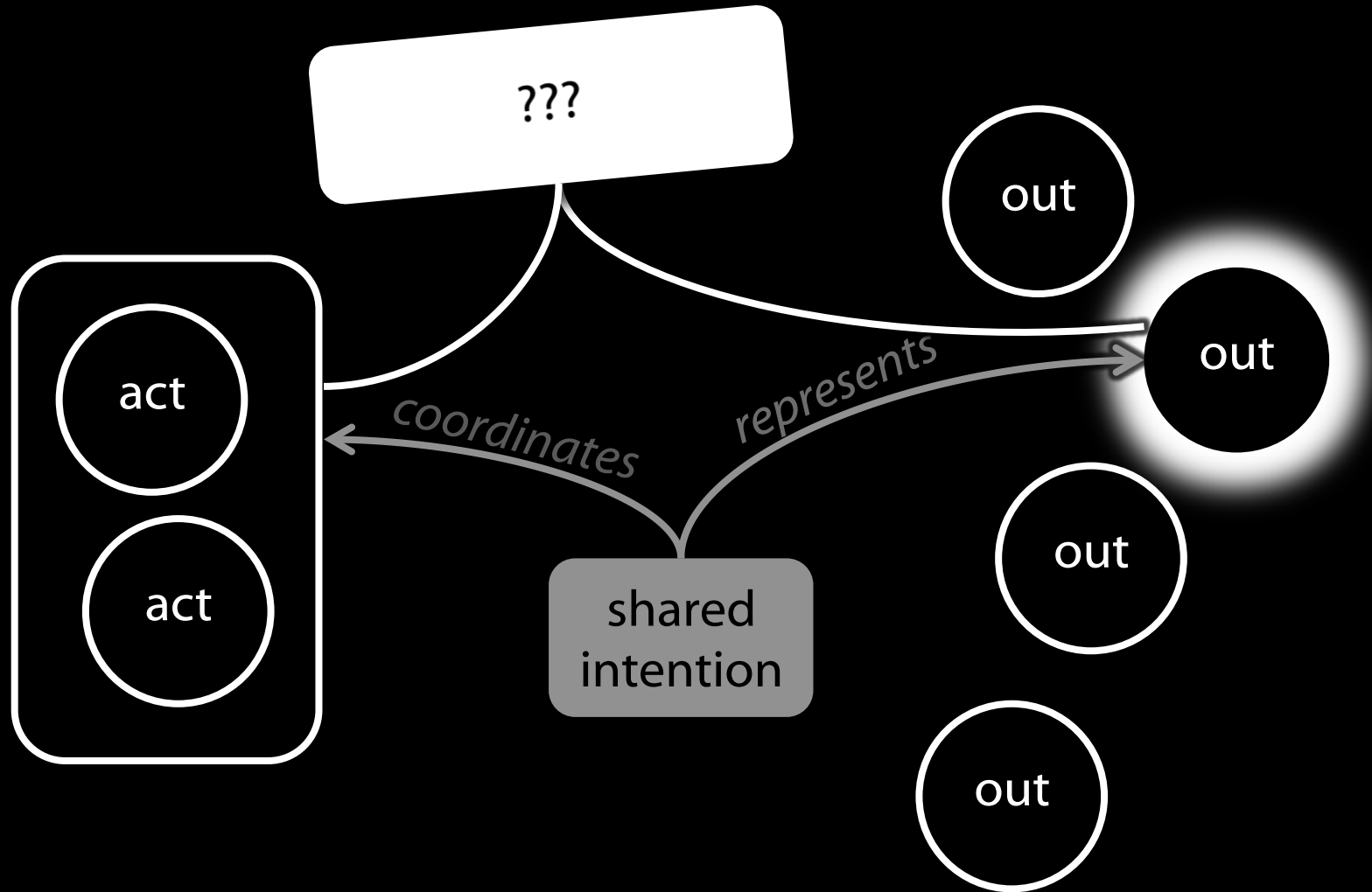
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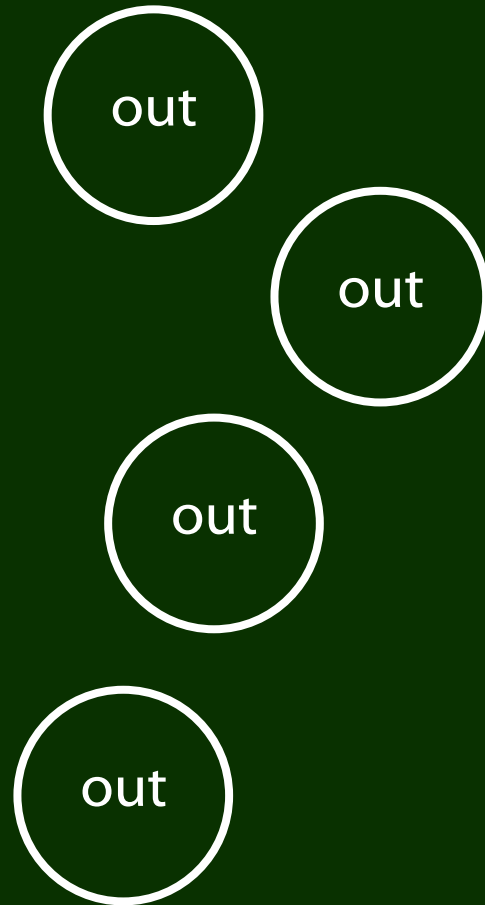


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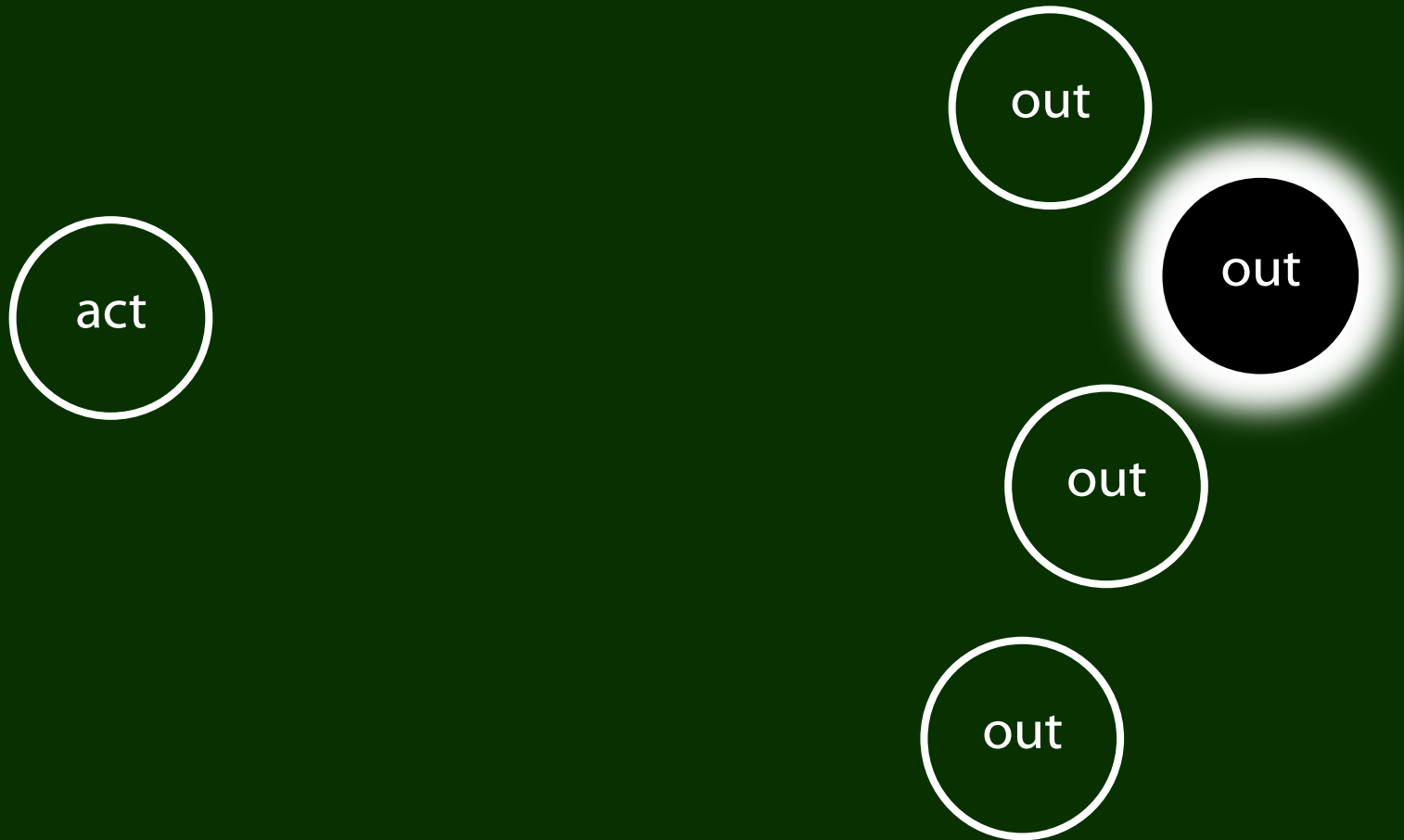


Detour
Goals are not intentions

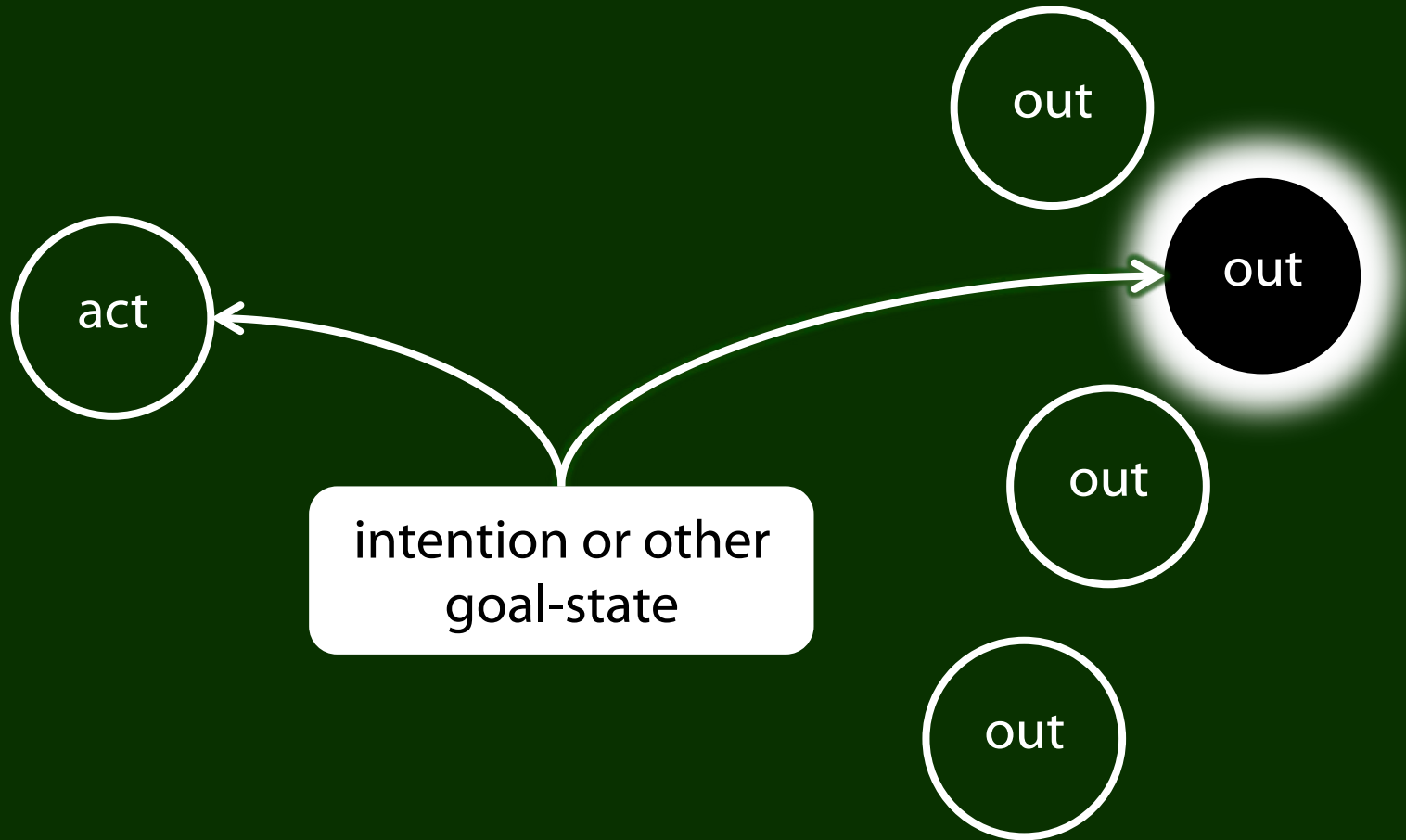
What is the relation between an action and the goal (or goals) to which it is directed?



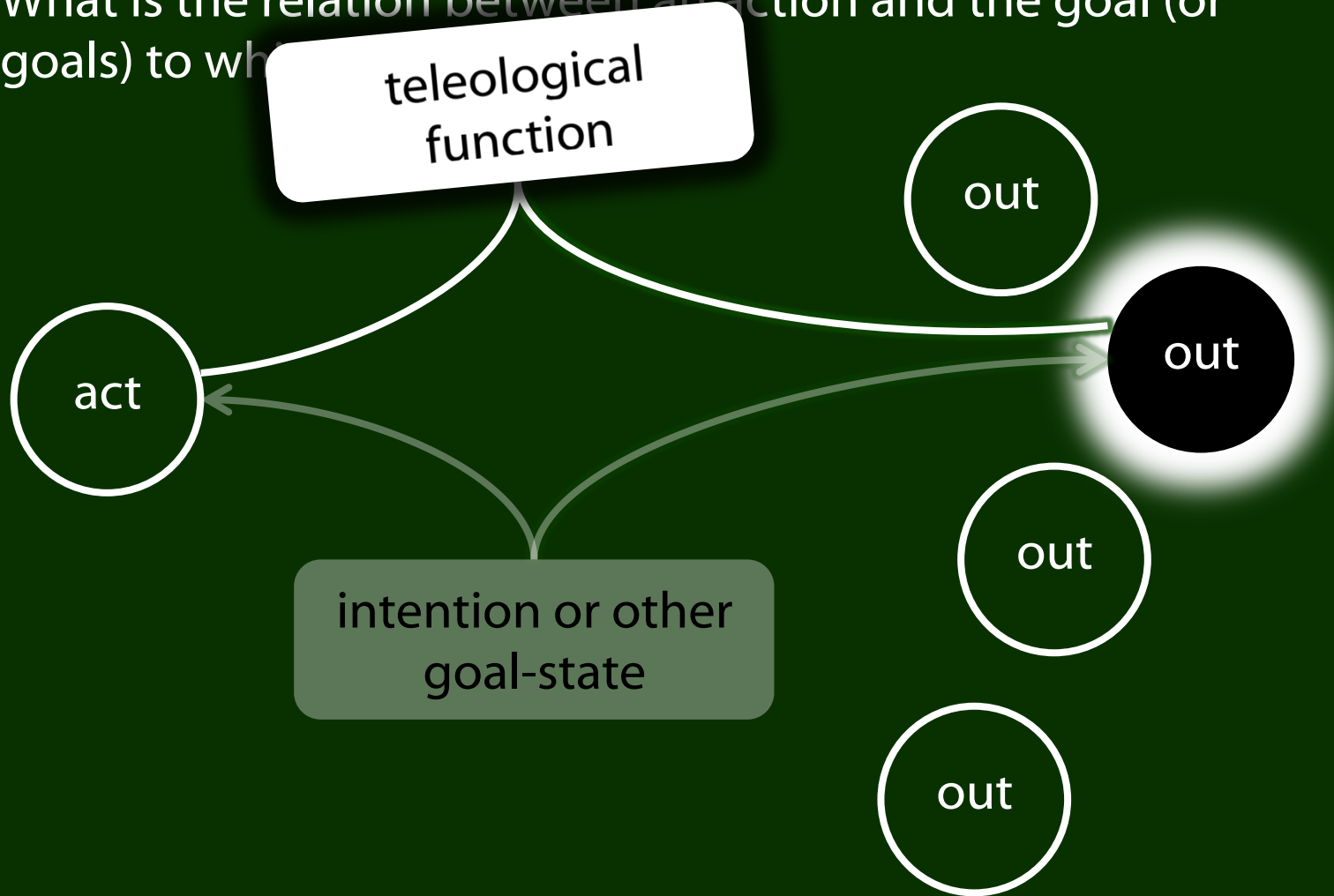
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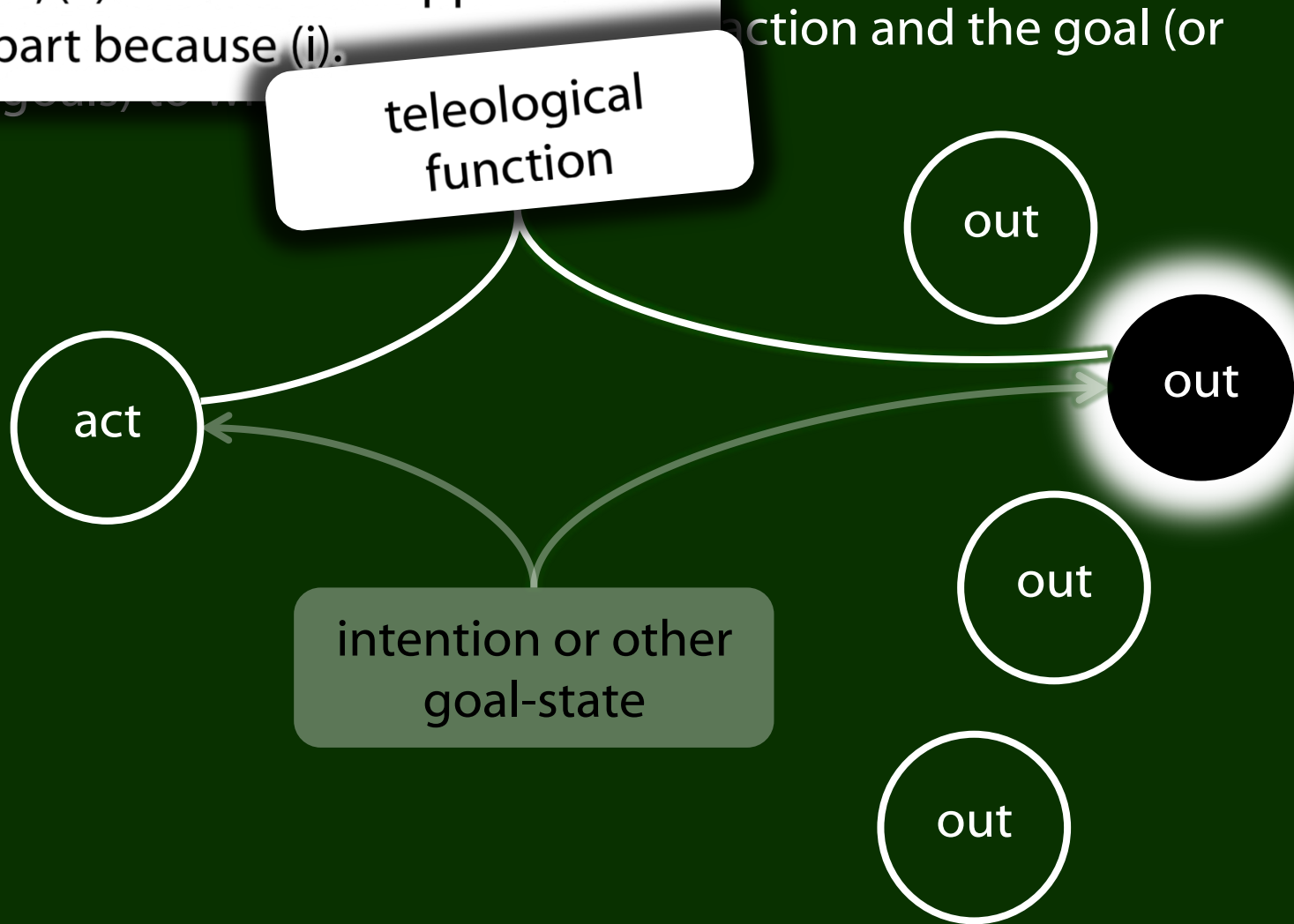
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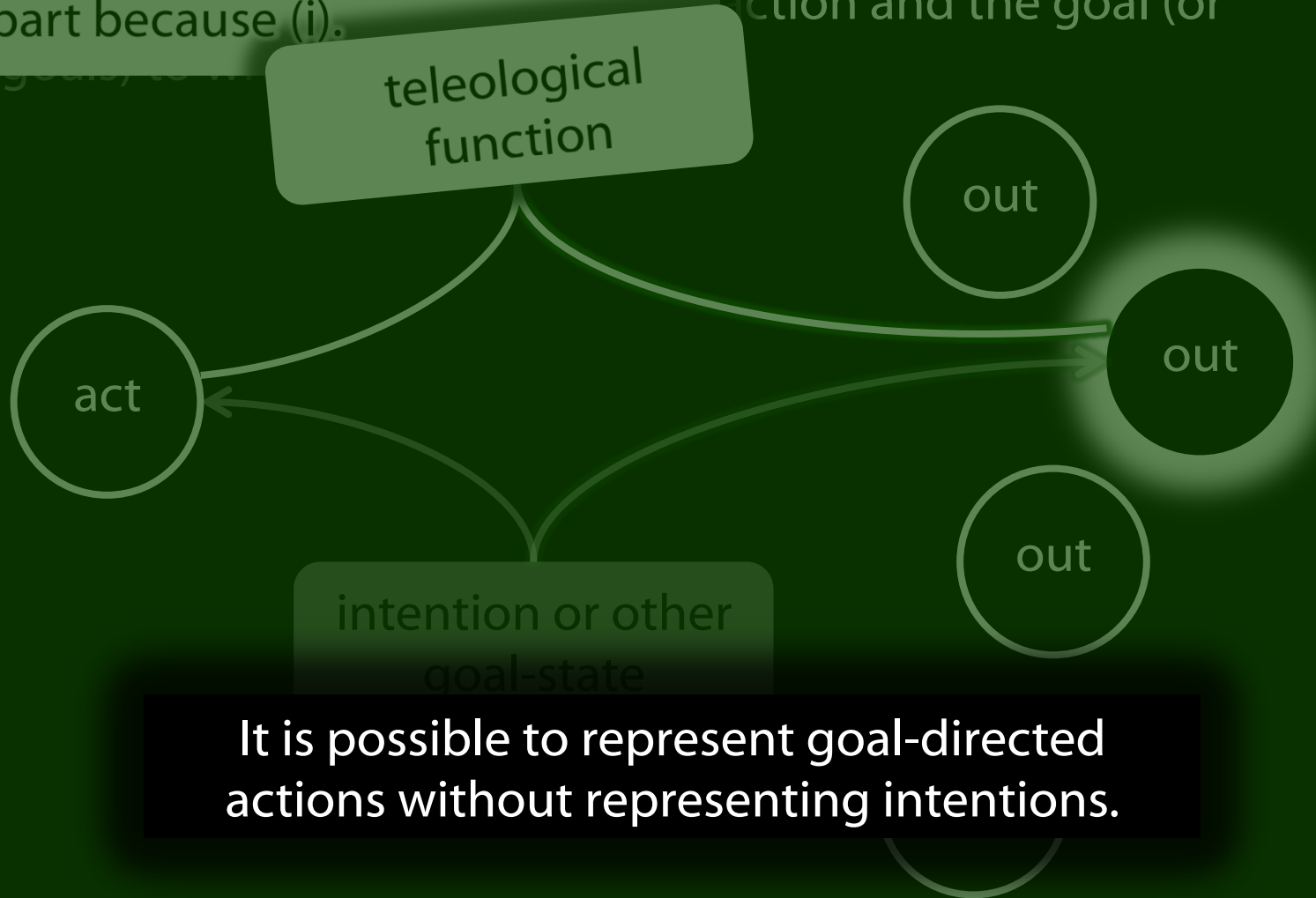
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(i) in the past, actions of this type have caused outcomes of this type; (ii) this action happens now in part because (i).



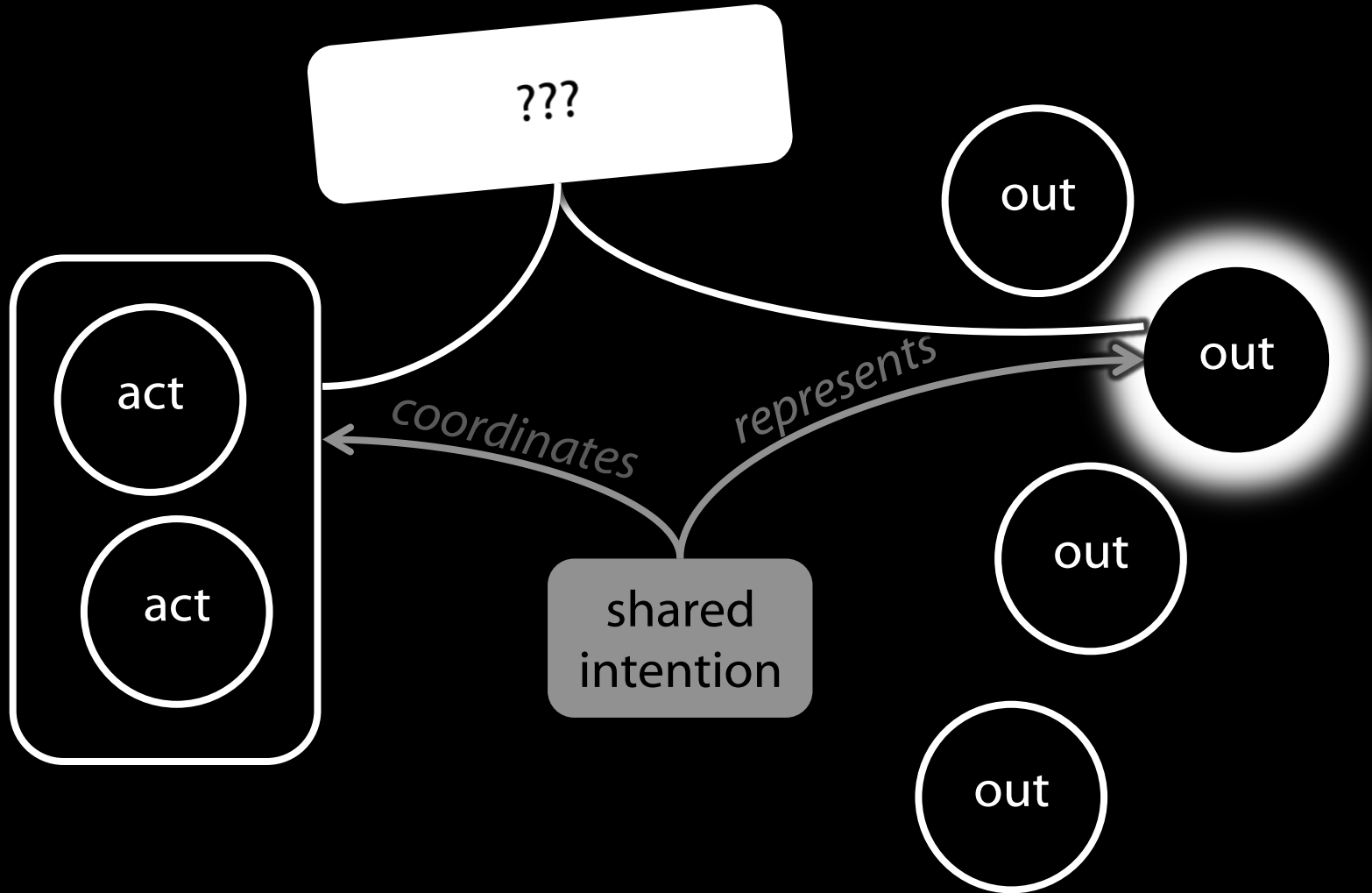
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It is possible to represent goal-directed actions without representing intentions.

End Detour

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Joint

Not joint

Joint

Jack and Sue walk
together

Not joint

Jack and Sue walk
alongside each other

(Gilbert 1990)

Joint

Jack and Sue walk
together

We collectively perform a
dance by running to a
shelter at the same time

Not joint

Jack and Sue walk
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(Gilbert 1990)

We each individually run
to a shelter at the same
time (in response to a
sudden shower).

(Searle 1990, 92)

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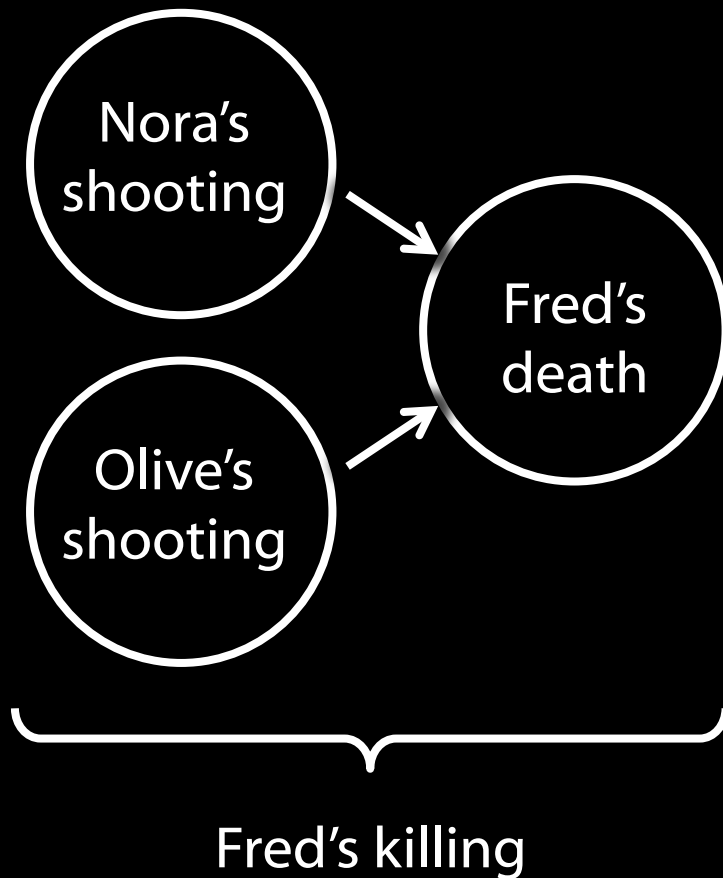
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- (a) it is a distributive goal;
- (b) the actions are coordinated; and
- (c) coordination of this type would normally facilitate occurrences of outcomes of this type.

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“It ... seems useful to draw a distinction between elementary or thin forms of joint action common to humans and other social mammals and sophisticated or thick forms of joint action, perhaps unique to the human species.”

(Pacherie & Dokic 2006, 110)

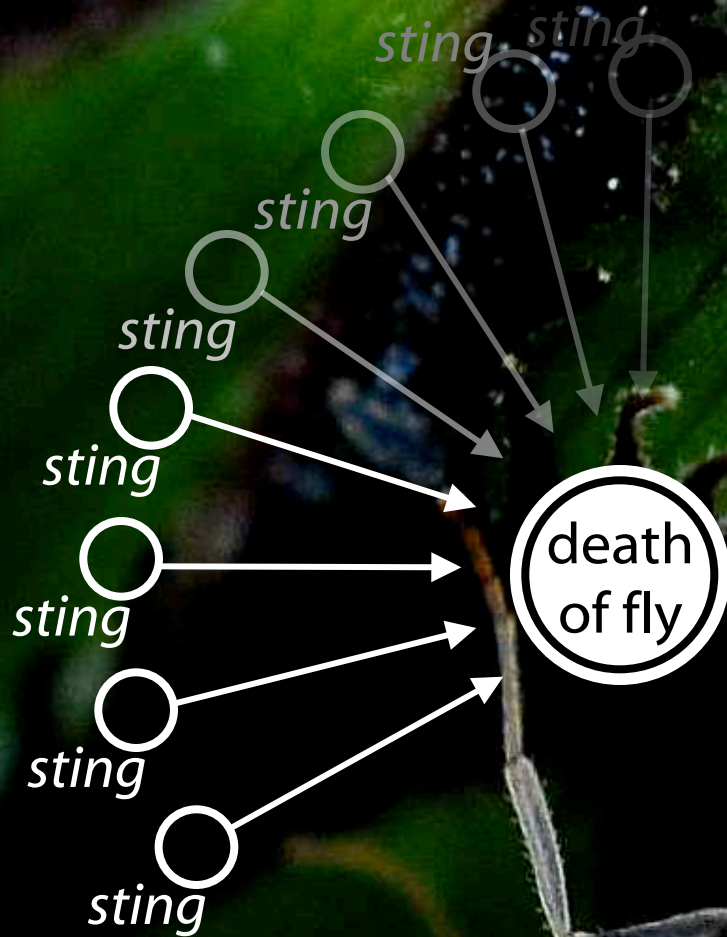
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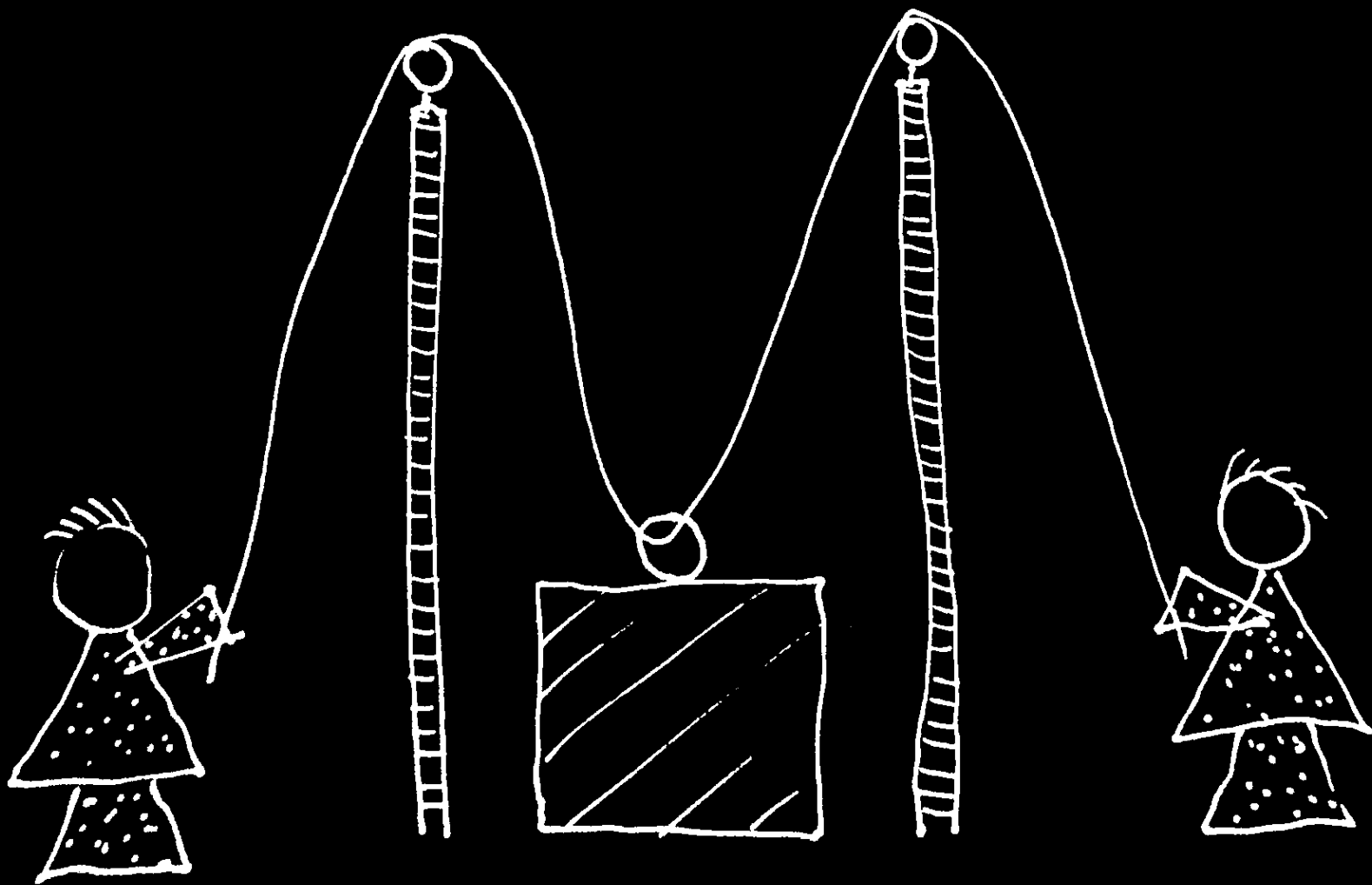
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Each agent most wants and expects the goal to occur as a common effect of all their goal-directed actions.

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G is a distributive goal: it is an outcome to which each agent's actions are individually directed and it is possible that: all actions succeed relative to this outcome.

G is a shared goal

G is a collective goal

(a) it is a distributive goal;

(b) the actions are coordinated; and

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

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etc...

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challenge

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

conjecture

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

2nd objection

Joint action presupposes sophisticated theory of mind cognition



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3rd objection

But how does it work?

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



source: Hare & Tomasello (2004)

“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)

failed reach



point



source: Hare & Tomasello (2004)

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3rd objection

But how does it work?

joint action (ability
to share goals)

minimal theory of
mind cognition

understanding
communicative intent

other stuff

communication by
language

other stuff

sophisticated theory of
mind cognition

