



Intention and Motor Representation in Joint Action

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'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)

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premise:

Reciprocal agent-neutral motor representation
enables some joint actions

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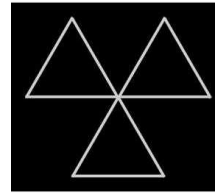
Kourtis et al., subm.



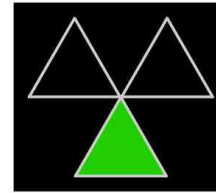
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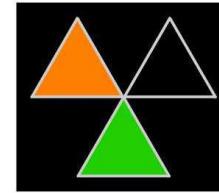
Kourtis et al., subm.



NoGo



Individual Action



Joint Action

Cue Stimulus



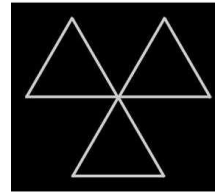
200 ms



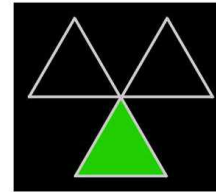
1000 ms



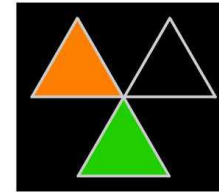
Kourtis et al., subm.



NoGo

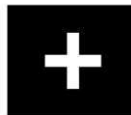


Individual Action



Joint Action

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200 ms



1000 ms

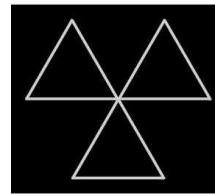


1000 ms

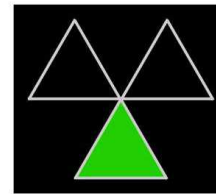


Foreperiod
No Action

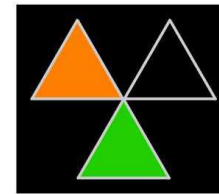
Kourtis et al., subm.



NoGo



Individual Action



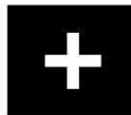
Joint Action

Cue Stimulus

Imperative Stimulus



200 ms



200 ms



1000 ms

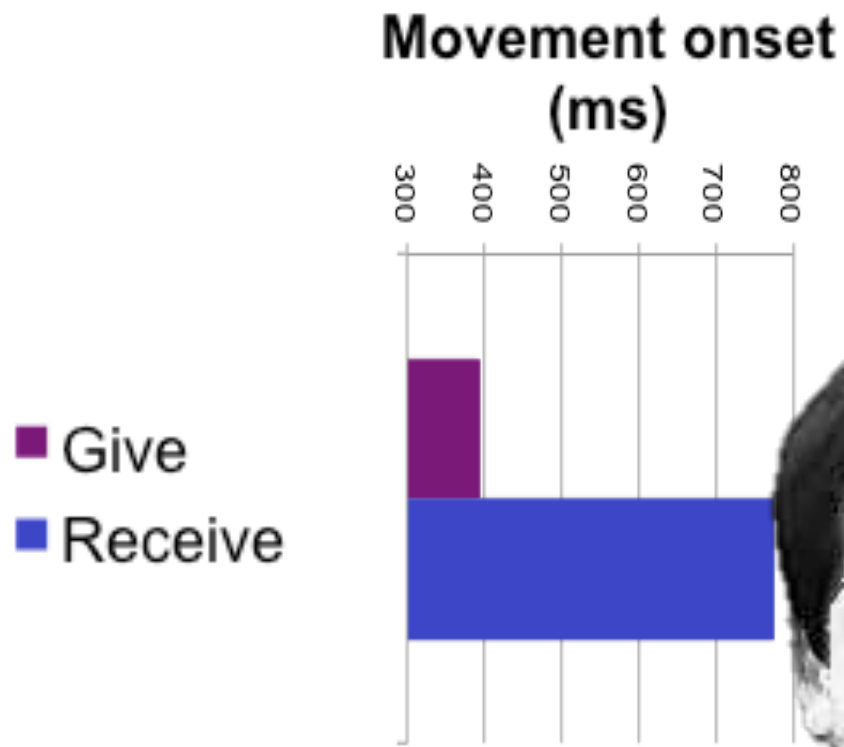
1000 ms

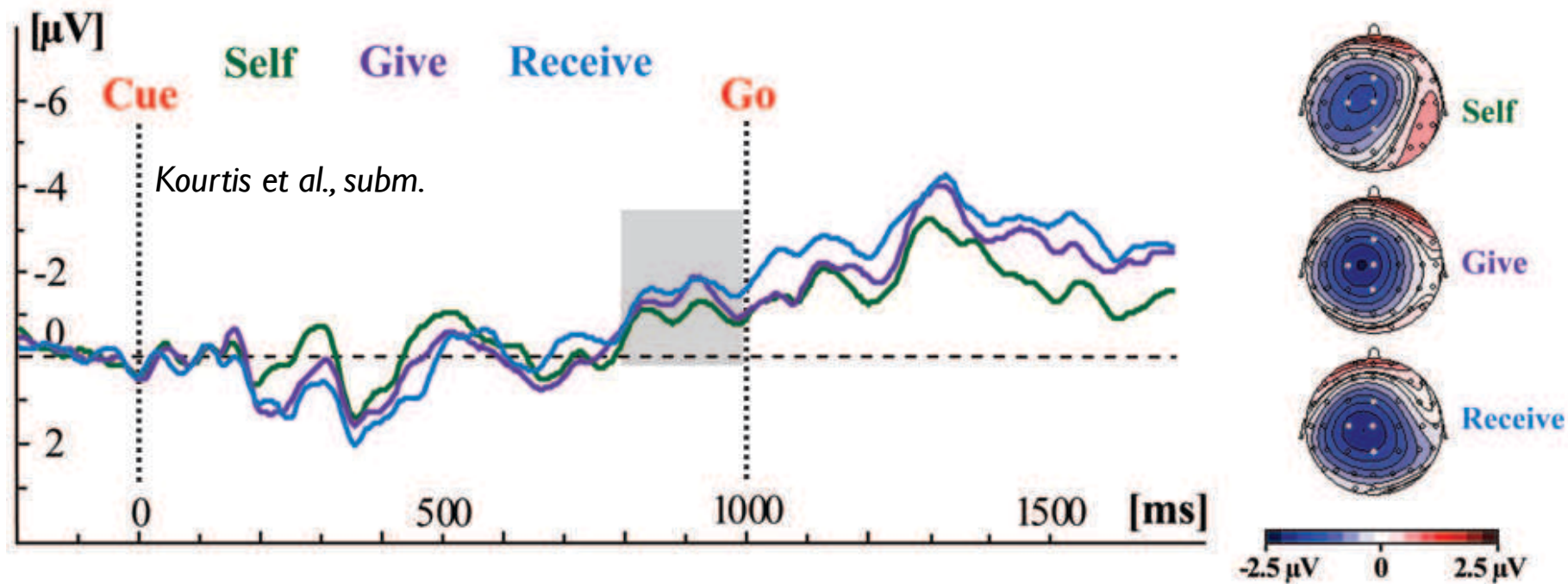
**Foreperiod
No Action**

Response



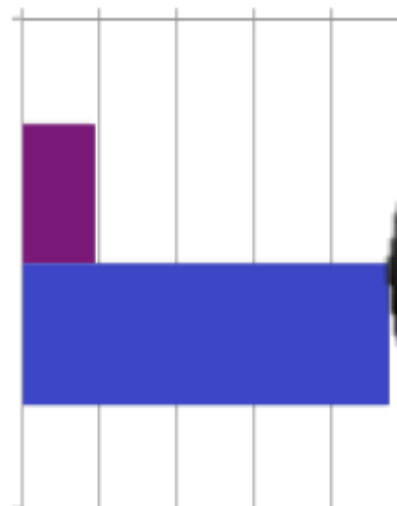
Kourtis et al., subm.





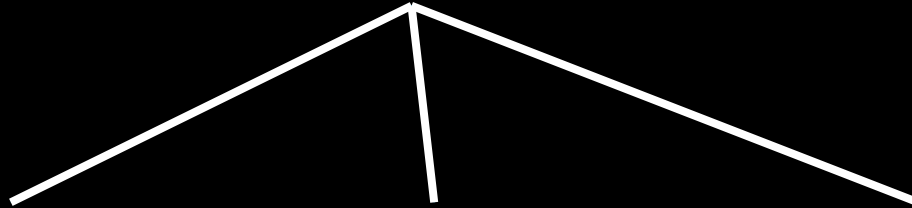
■ Give

■ Receive

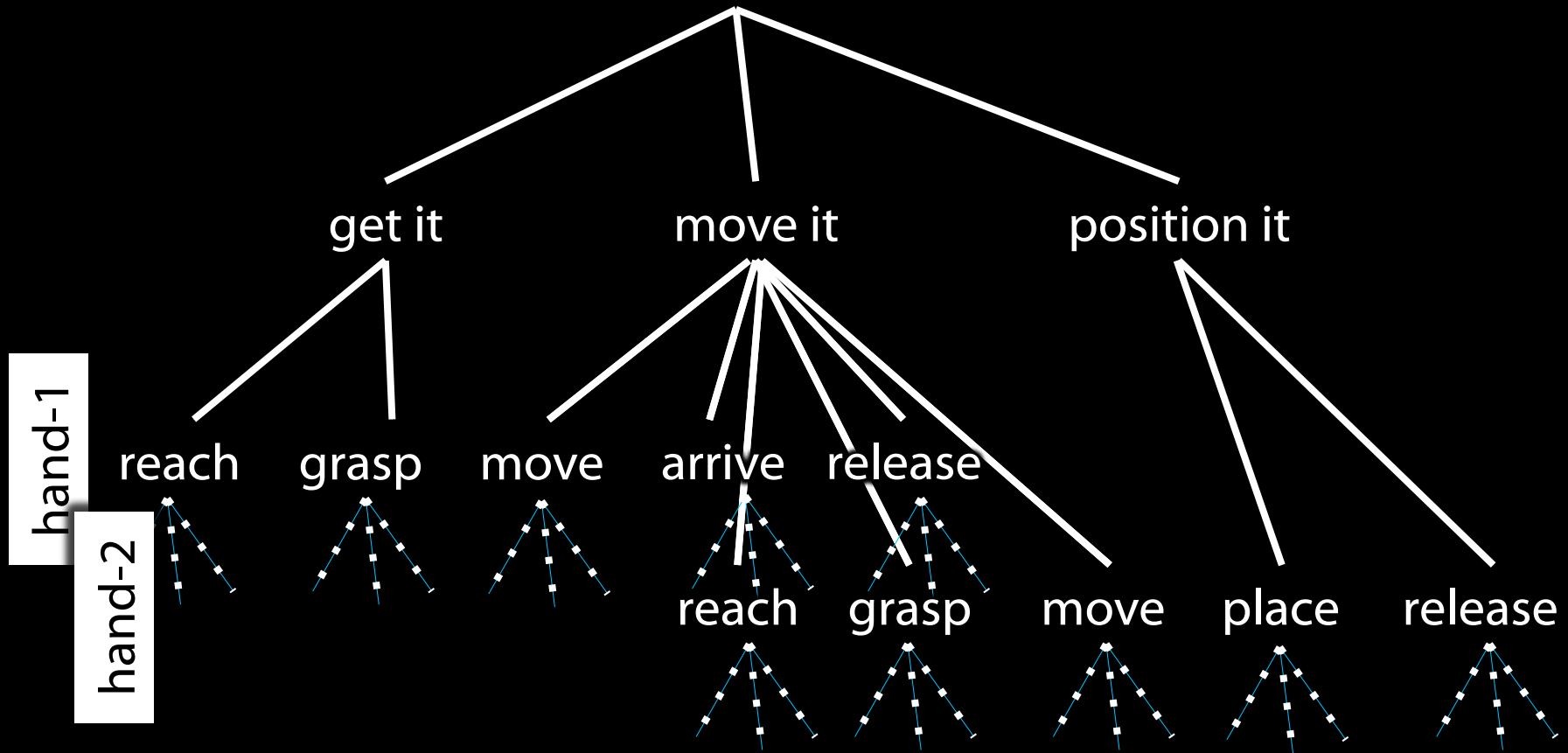


How could reciprocal agent-neutral motor representation ever enable any joint action?

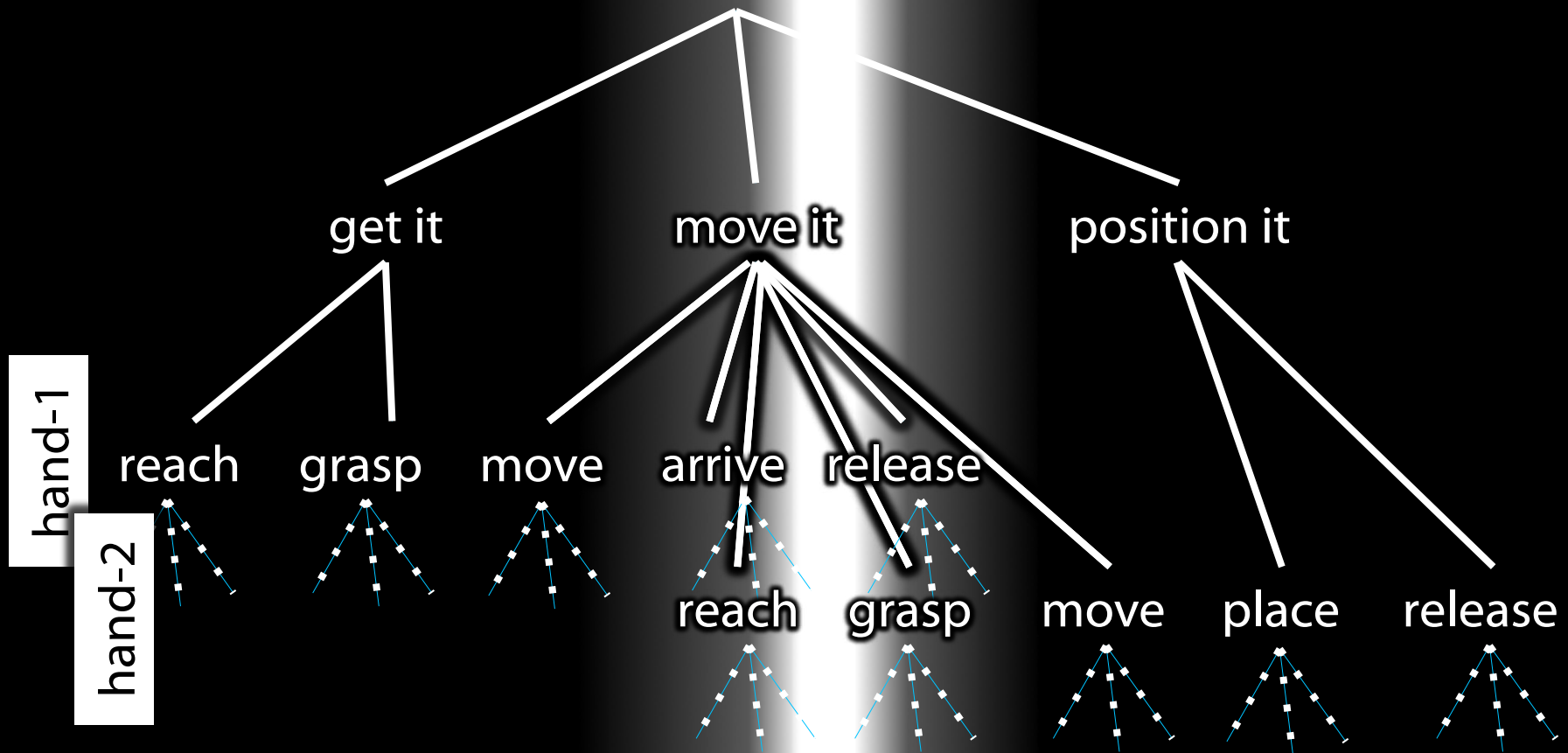
Move it from there to here



Move it from there to here



Move it from there to here



Move it from there to here

joint action:
same goal

get it

move it

position it

reach

grasp

move

arrive

release

reach

grasp

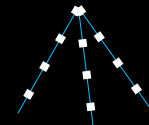
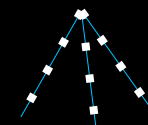
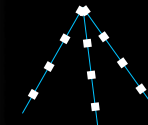
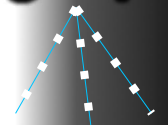
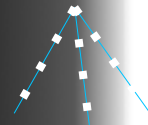
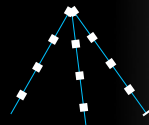
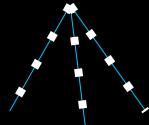
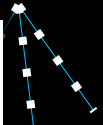
move

place

release

hand-1

hand-2



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joint action:
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get it

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position it

reach

grasp

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move

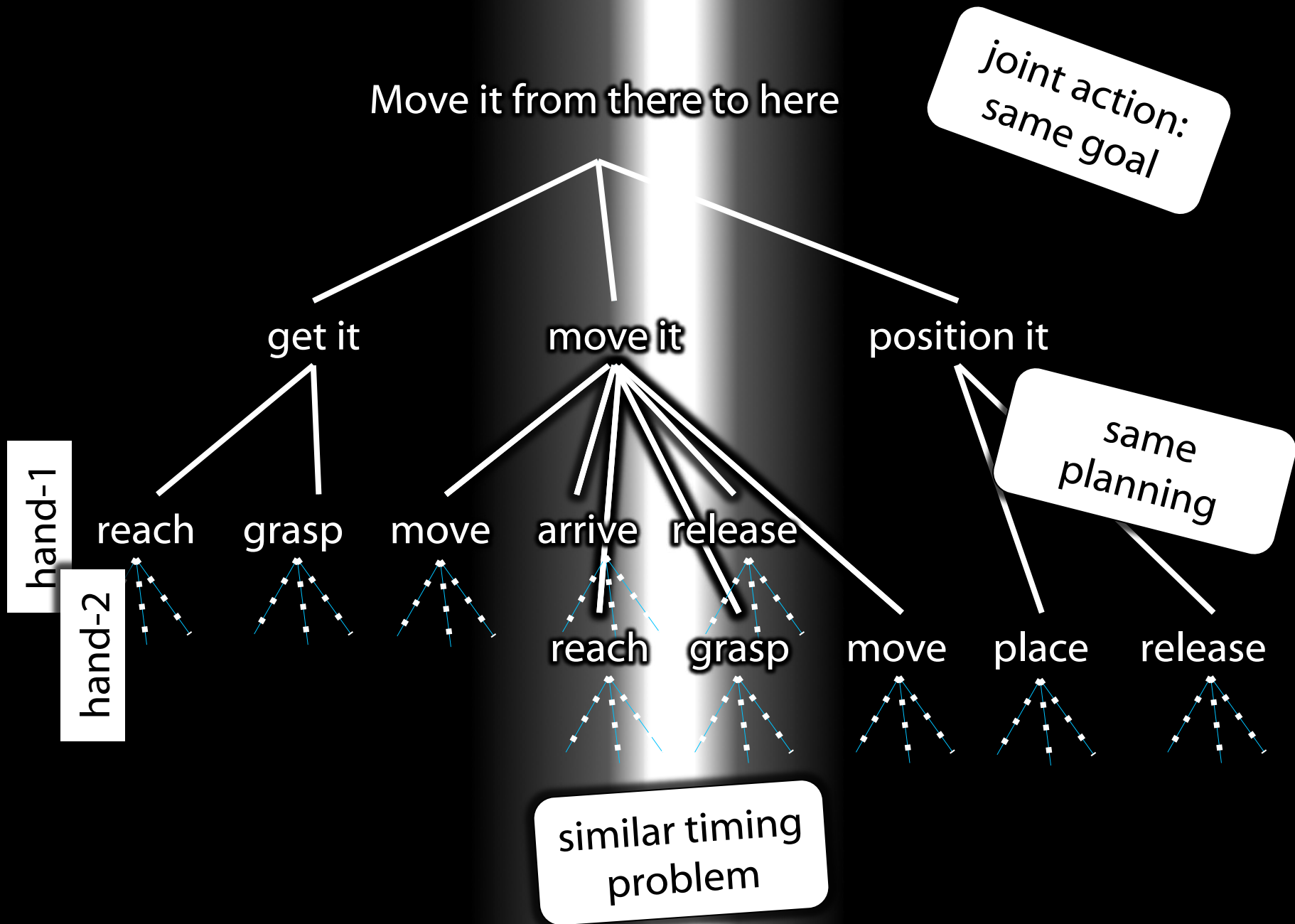
place

release

similar timing
problem

hand-1

hand-2



Move it from there to here

joint action:
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position it

same
planning

hand-1

hand-2

reach

grasp

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grasp

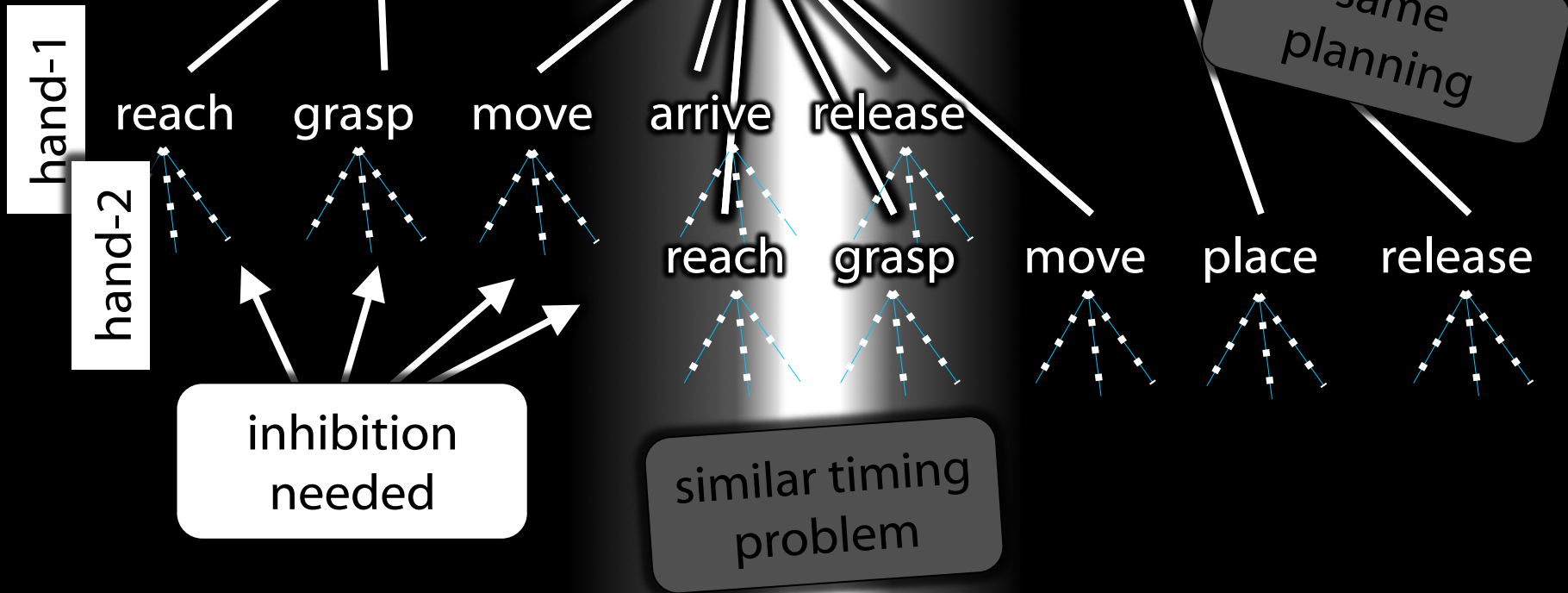
move

place

release

inhibition
needed

similar timing
problem



premise:

Reciprocal agent-neutral motor representation
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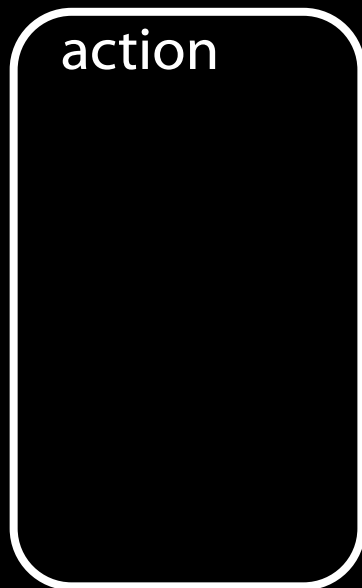
question:

Does reciprocal agent-
neutral motor
representation also play a
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joint action is? [Yes]

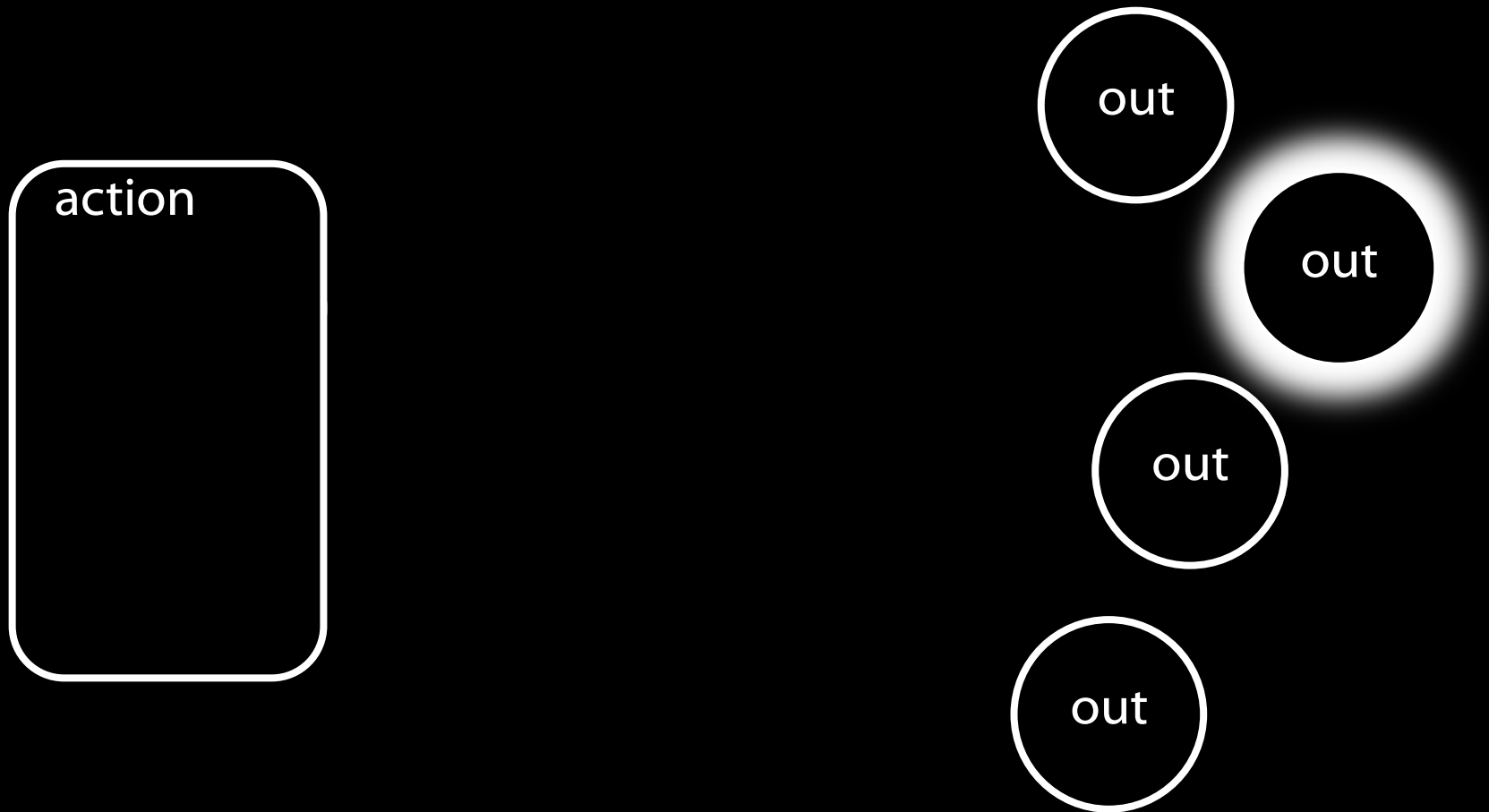
challenge:

How could social motor
representation and
shared intention
harmoniously contribute
to joint action?

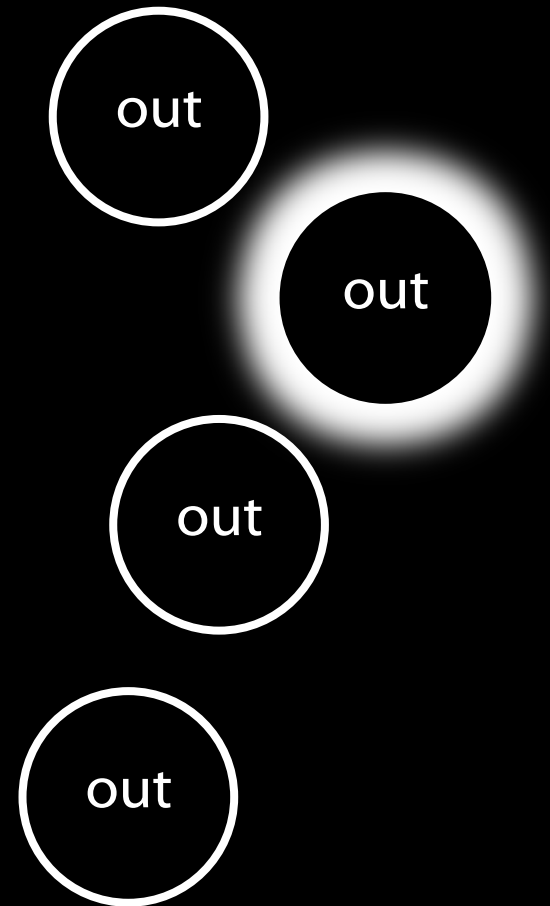
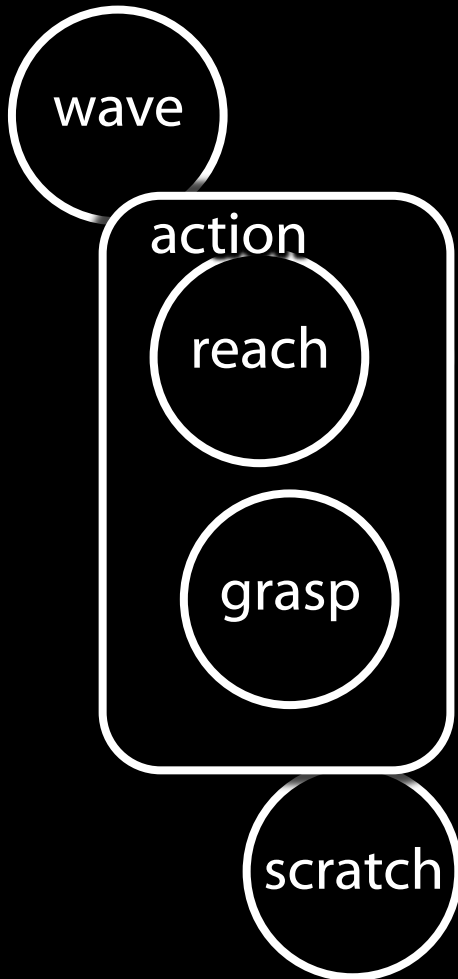
What is the relation between a purposive action and the outcome or outcomes to which it is directed?



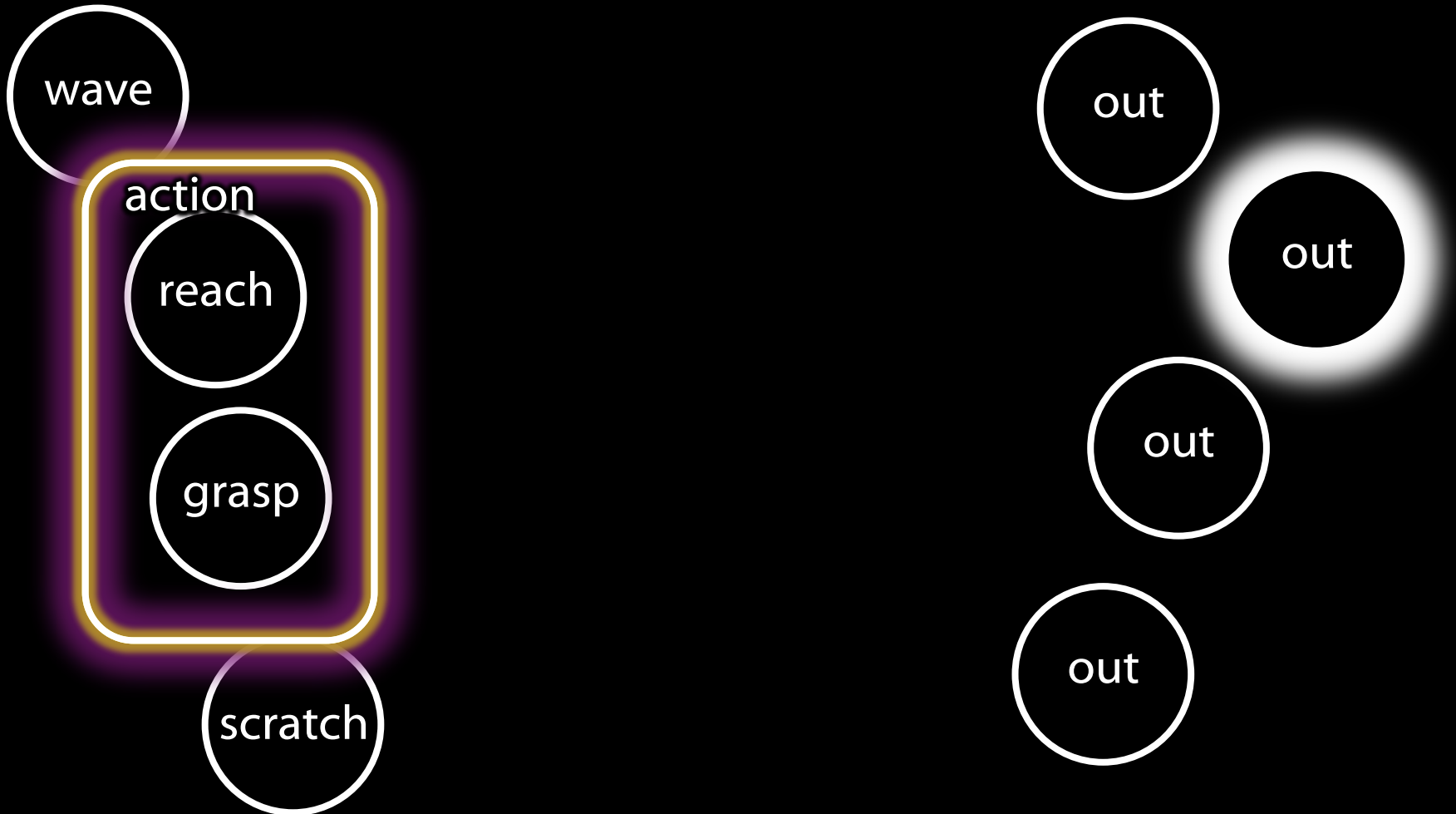
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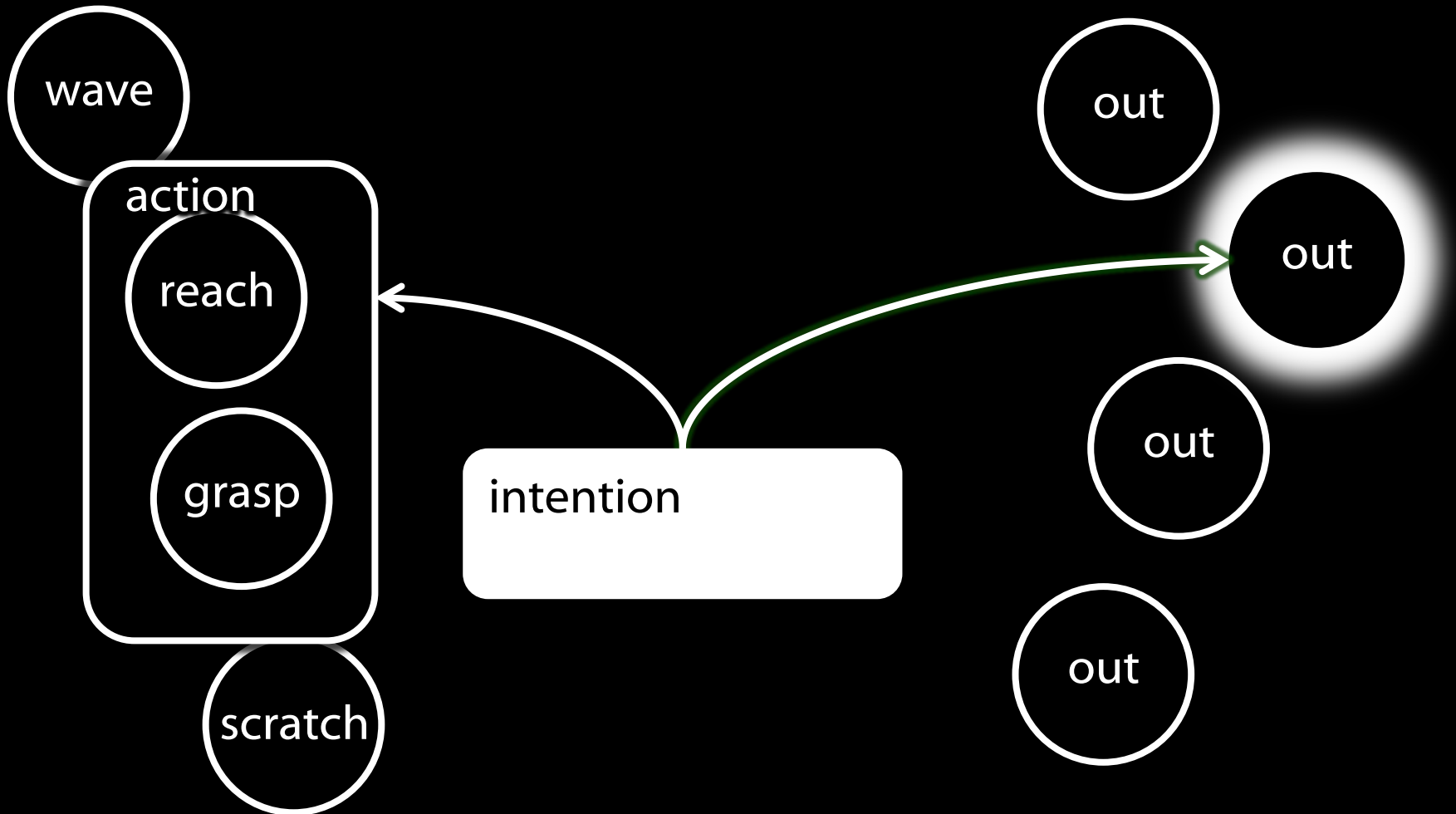
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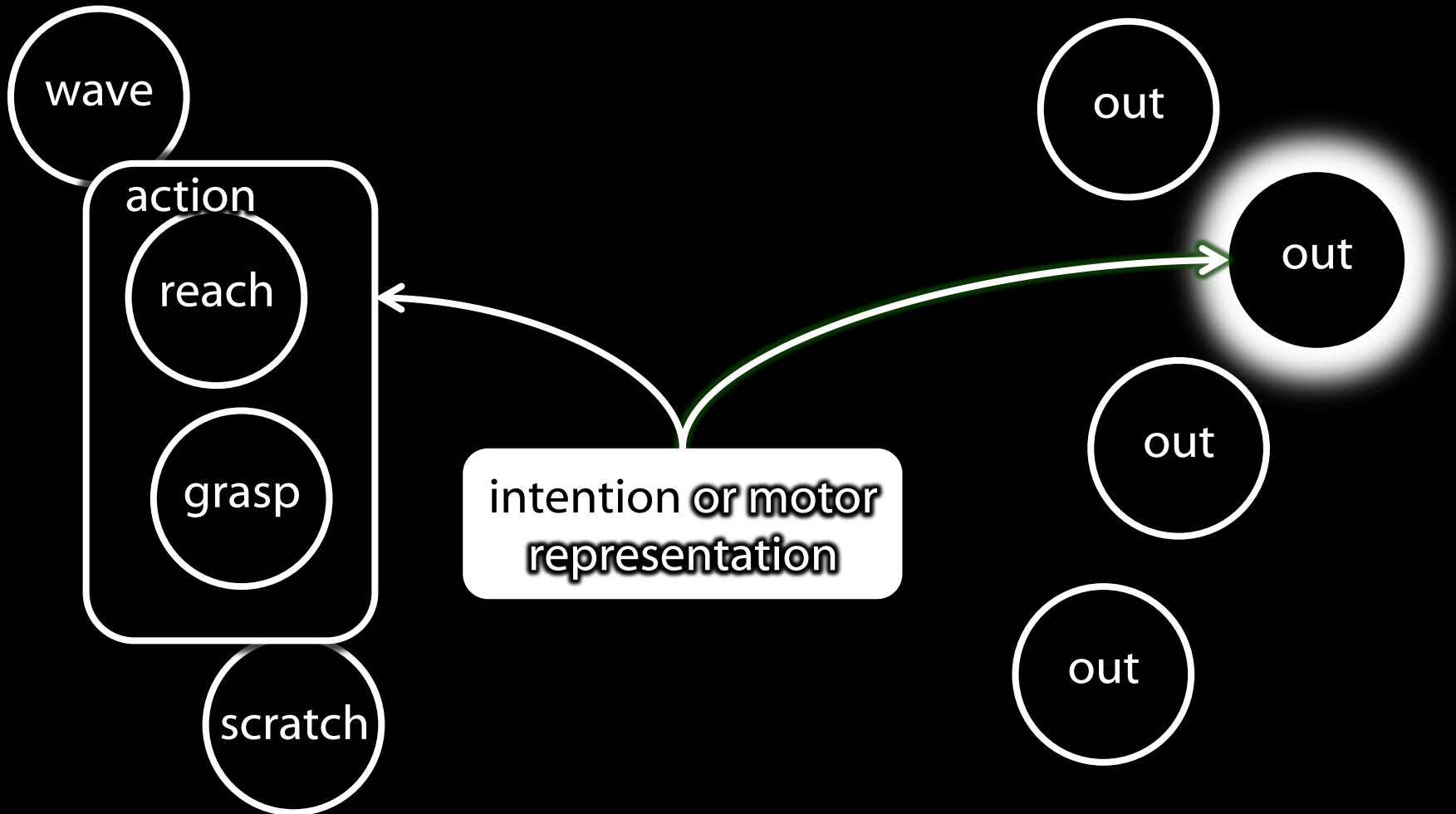
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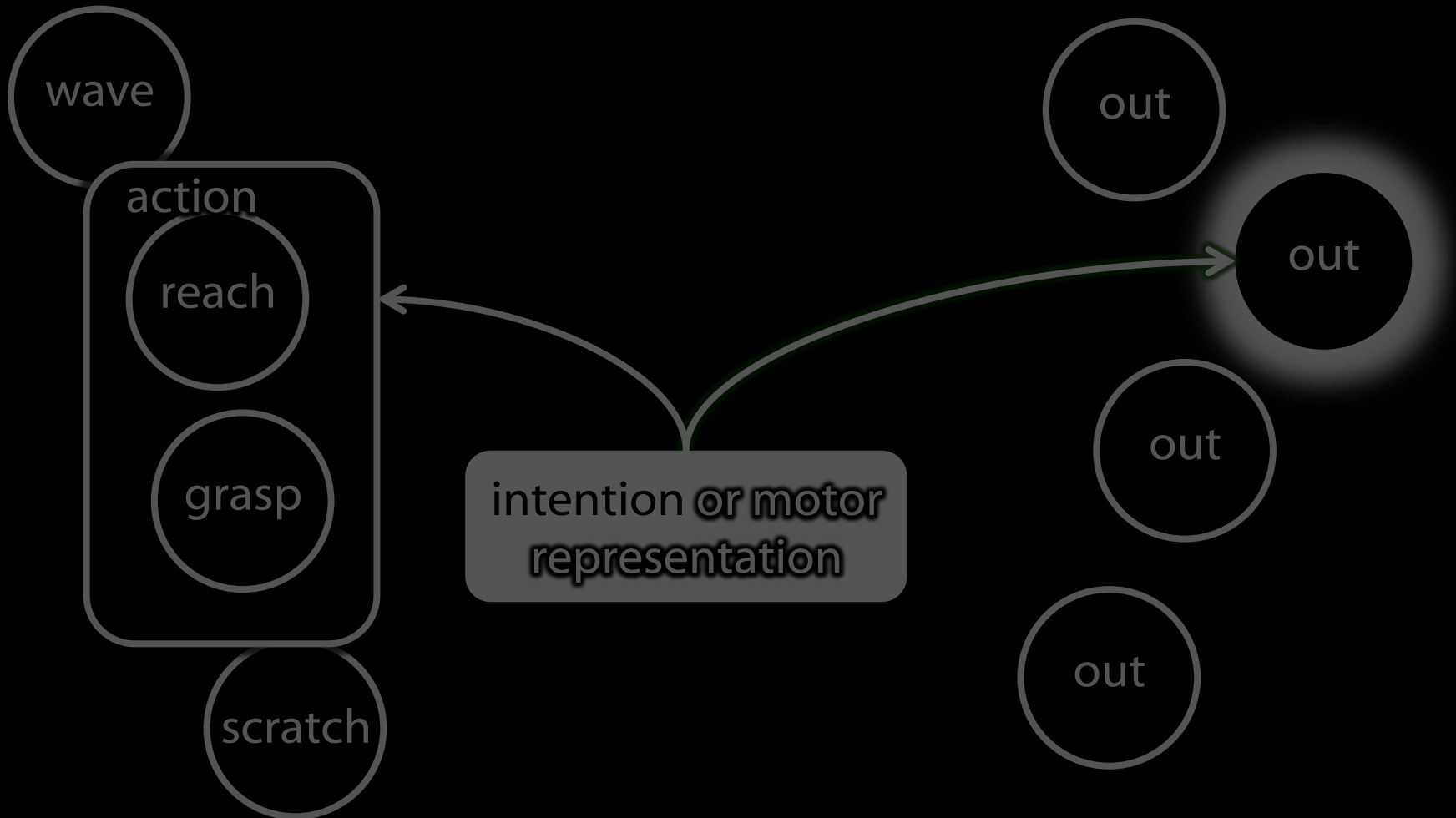
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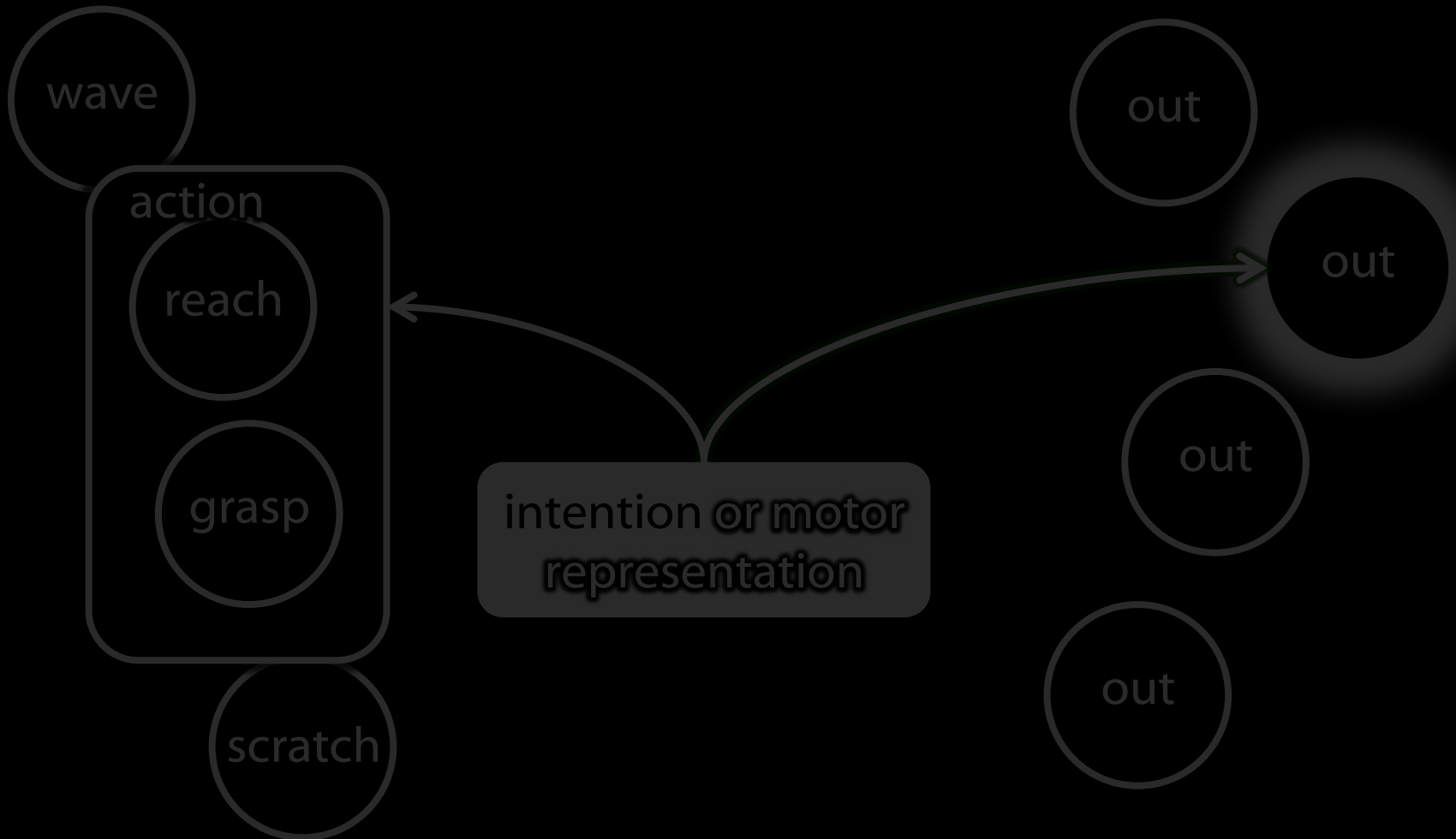
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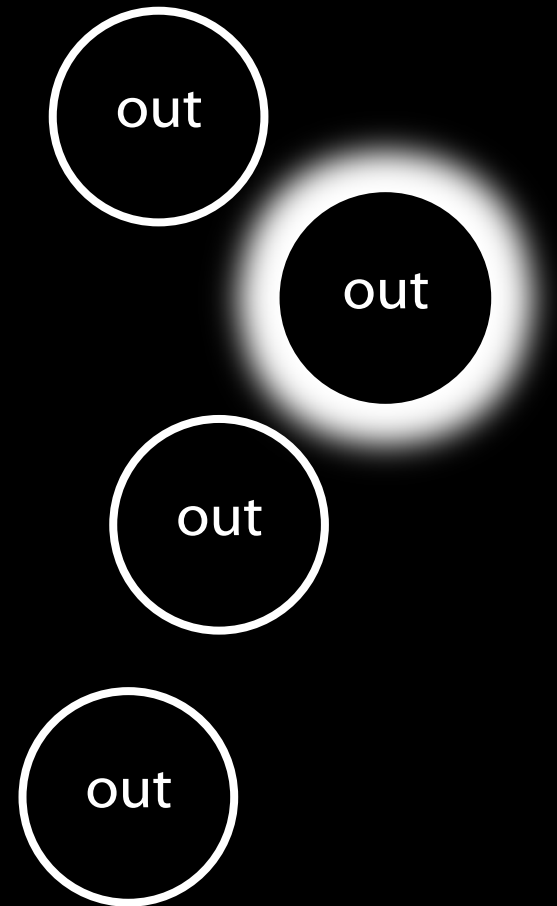
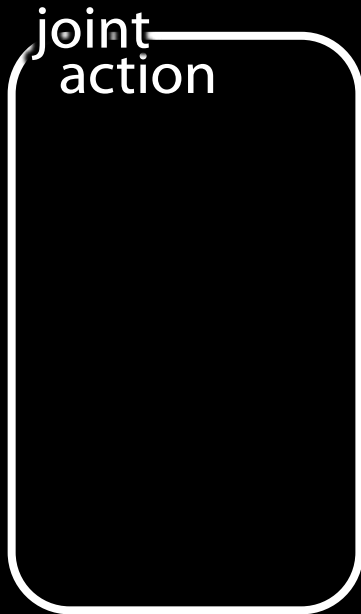
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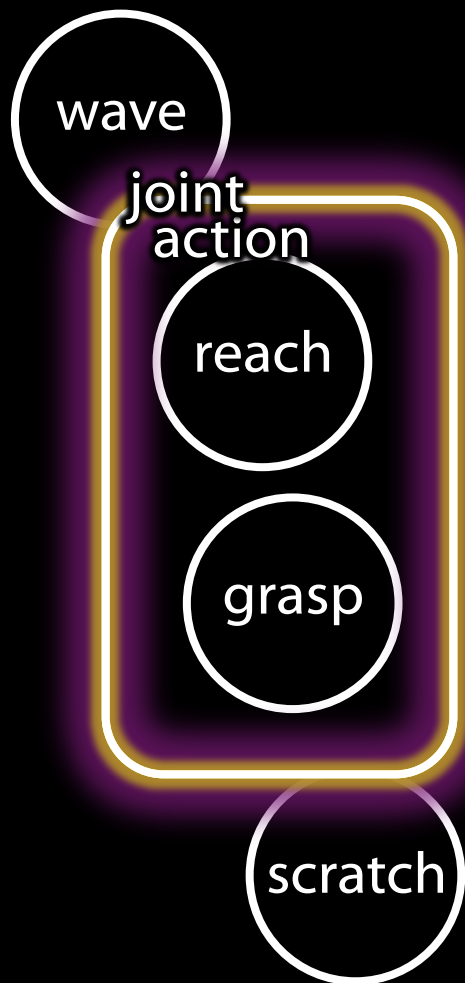
What is the relation between a purposive^{joint} action and the outcome or outcomes to which it is directed?



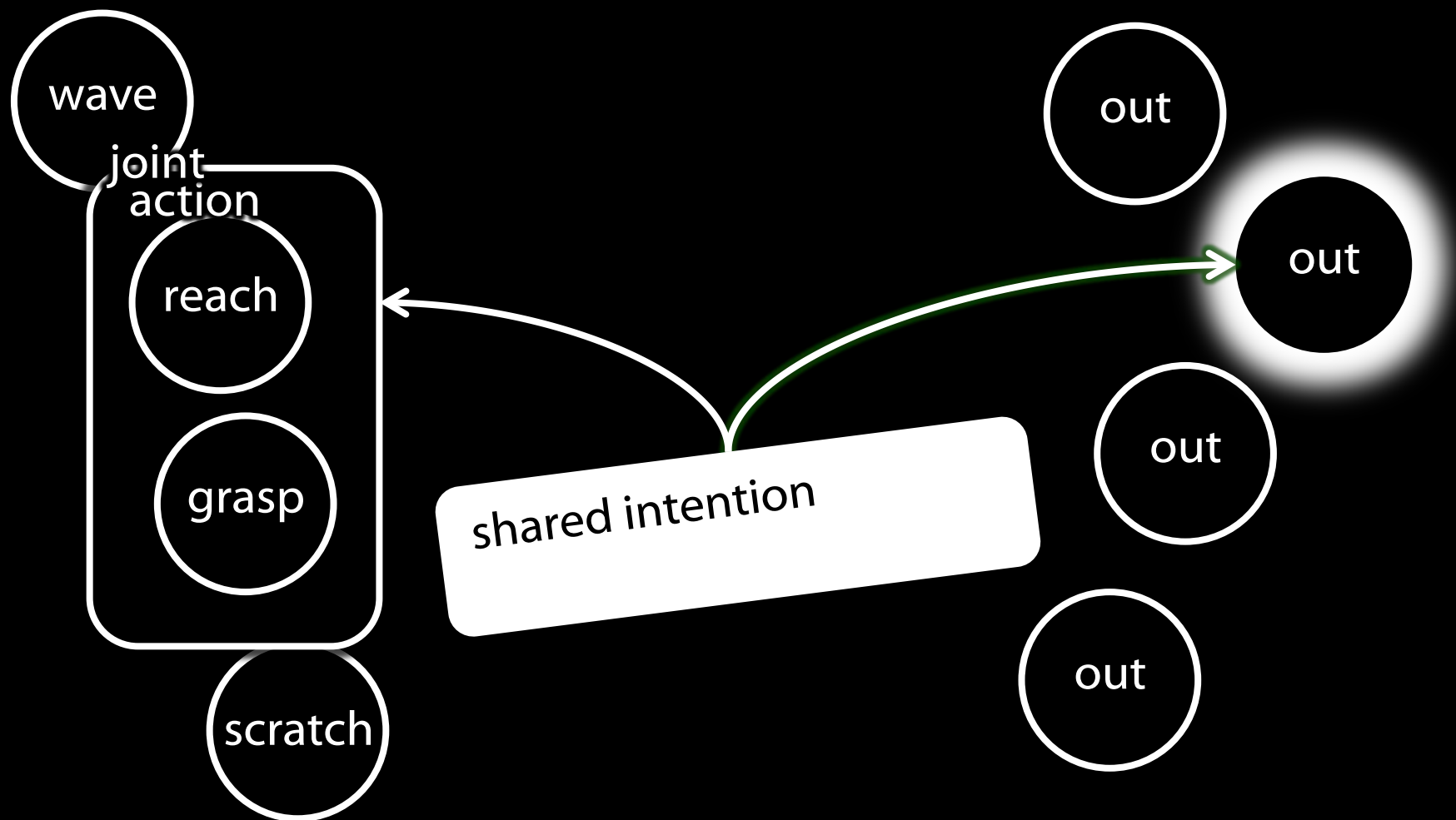
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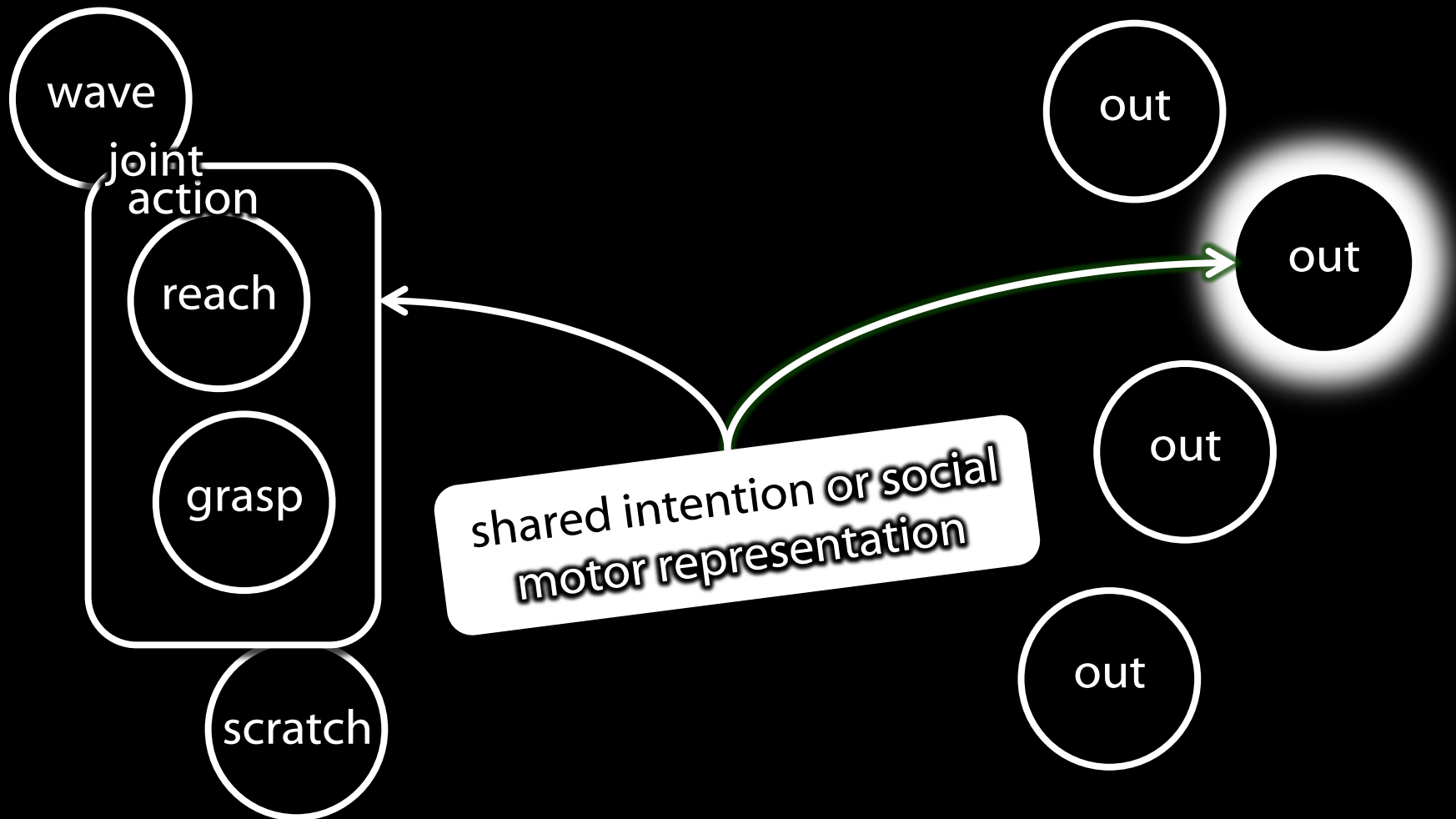
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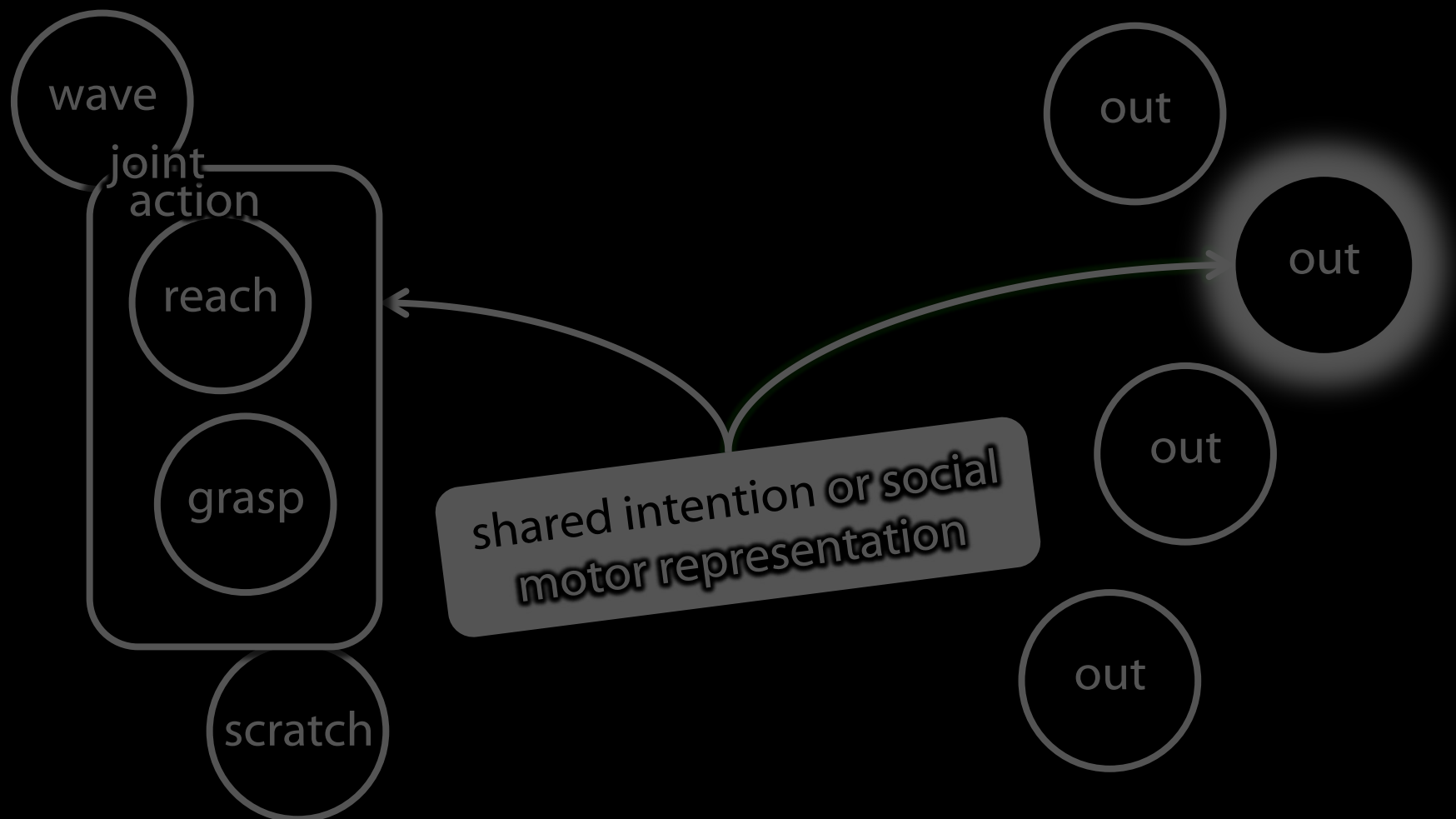
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Sufficient conditions

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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premise:

Reciprocal agent-neutral motor representation
enables some joint actions

question:

Does reciprocal agent-
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role in explaining what
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challenge:

How could social motor
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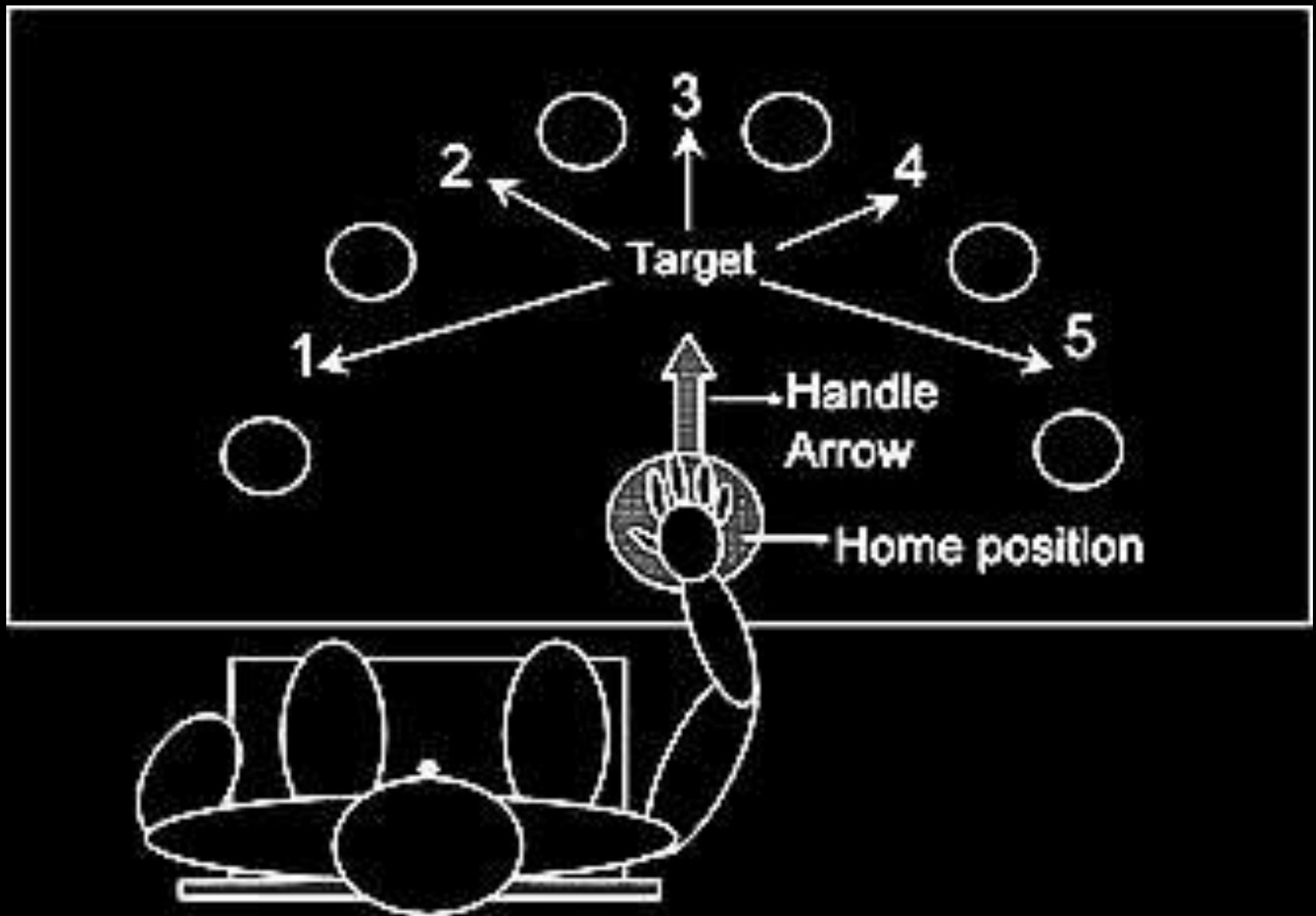
reciprocal agent-neutral
motor representation
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‘the key property of joint action lies in its internal
component [...] in the participants’ having a
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(Alonso 2009, pp.444-5)

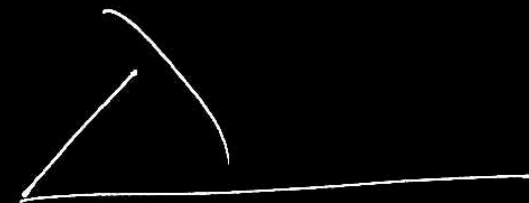
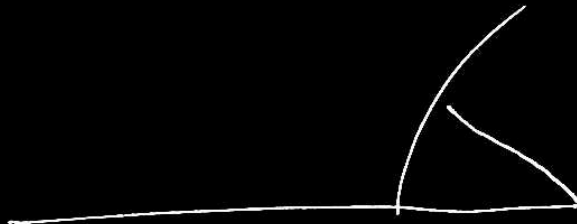
What are intentions for?



(Zhang and Rosenbaum 2007)



(big
reward)



↑
ONE
WAY



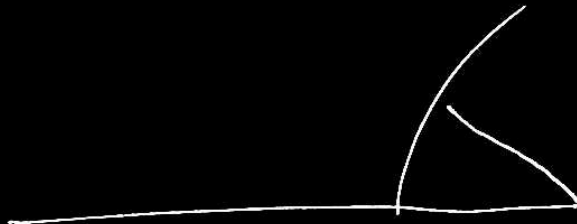
x

start here

shared
What are intentions for?
人



(big
reward)



↑
ONE
WAY



x

start here

moving an object together

(Kourtis et al 2010)

tidying up the toys together

(Behne et al 2005)

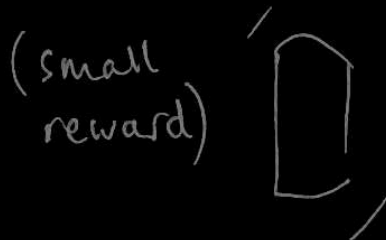
cooperatively pulling
handles in sequence to
make a dog-puppet sing

(Brownell et al 2006)

bouncing a cube on a large
trampoline together

(Tomasello & Carpenter 2007)

pretending to row a boat
together



ONE
WA-

X

start here

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< different content >



< different content >

< different format >

Head southeast on Rue Cujas toward Rue Victor Cousin. Turn right onto Rue Saint-Jacques...



Take RER B and get out at the Luxembourg station, from there it's less than 5 minutes walk.



Head southeast on Rue
Cujas toward Rue
Victor Cousin. Turn
right onto Rue Saint-
Jacques. ...



Only representations with a common format can be inferentially integrated.


Any two intentions can be inferentially integrated in practical reasoning.

My intention that I visit Paris on Friday is a propositional attitude.

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My intention that I visit Paris on Friday is a propositional attitude.



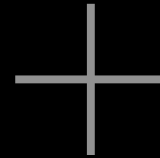
All intentions are propositional attitudes.

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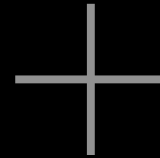
No motor representations are propositional attitudes.

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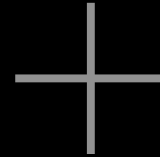
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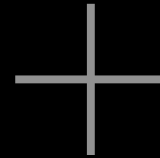
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No motor representations are intentions

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motor representation
= shared intention?

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The Interface Problem

The Interface Problem

Some joint actions involve
both shared intention and
reciprocal agent-neutral
motor representation

The Interface Problem

Reciprocal agent-neutral
motor representations:

i. represent outcomes;

ii. ground the
purposiveness of some
joint actions

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The Interface Problem

Reciprocal agent-neutral
motor representations:

- i. represent outcomes;
- ii. ground the
purposiveness of some
joint actions

Two outcomes, A and B,
match in a particular context
just if, in that context, either
the occurrence of A would
normally constitute or cause,
at least partially, the
occurrence of B or vice versa.

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The Interface Problem: How are non-accidental matches possible?

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The Interface Problem: How are non-accidental matches possible?

Reciprocal agent-neutral
motor representations:

i. represent outcomes;

ii. ground the
purposiveness of some
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iii. differ in format from
(the constituent attitudes
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Two outcomes, A and B, *match* in a particular context just if, in that context, either the occurrence of A would normally constitute or cause, at least partially, the occurrence of B or vice versa.

Some ~~joint~~ actions involve both ~~shared~~ intention and ~~reciprocal agent-neutral~~ motor representation

Head southeast on Rue
Cujas toward Rue
Victor Cousin. Turn
right onto Rue Saint-
Jacques. ...



Follow *that* route

=



?

Follow *that* route

=



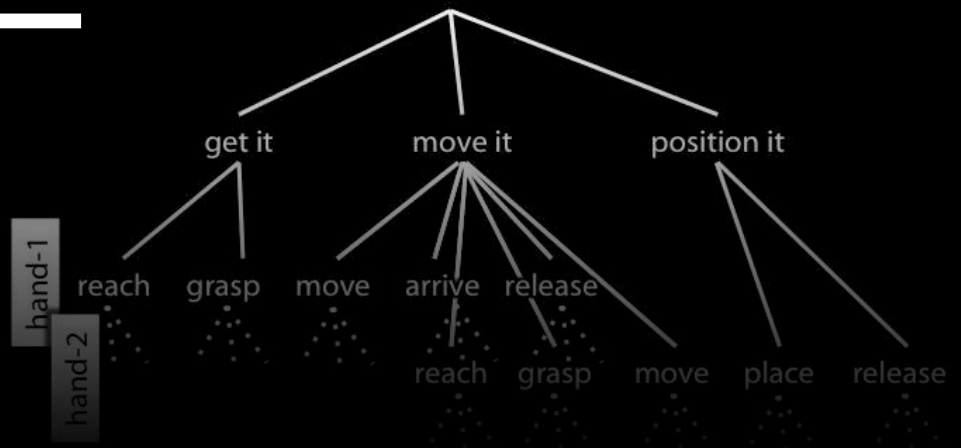
?

Do that

=

Move it from there to here

?



The Interface Problem: How are non-accidental matches possible?

~~Reciprocal agent-neutral~~
motor representations:

- i. represent outcomes;
- ii. ground the purposiveness of some joint actions; and
- iii. differ in format from (the constituent attitudes of) shared intentions.

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premise:

Reciprocal agent-neutral motor representation
enables some joint actions

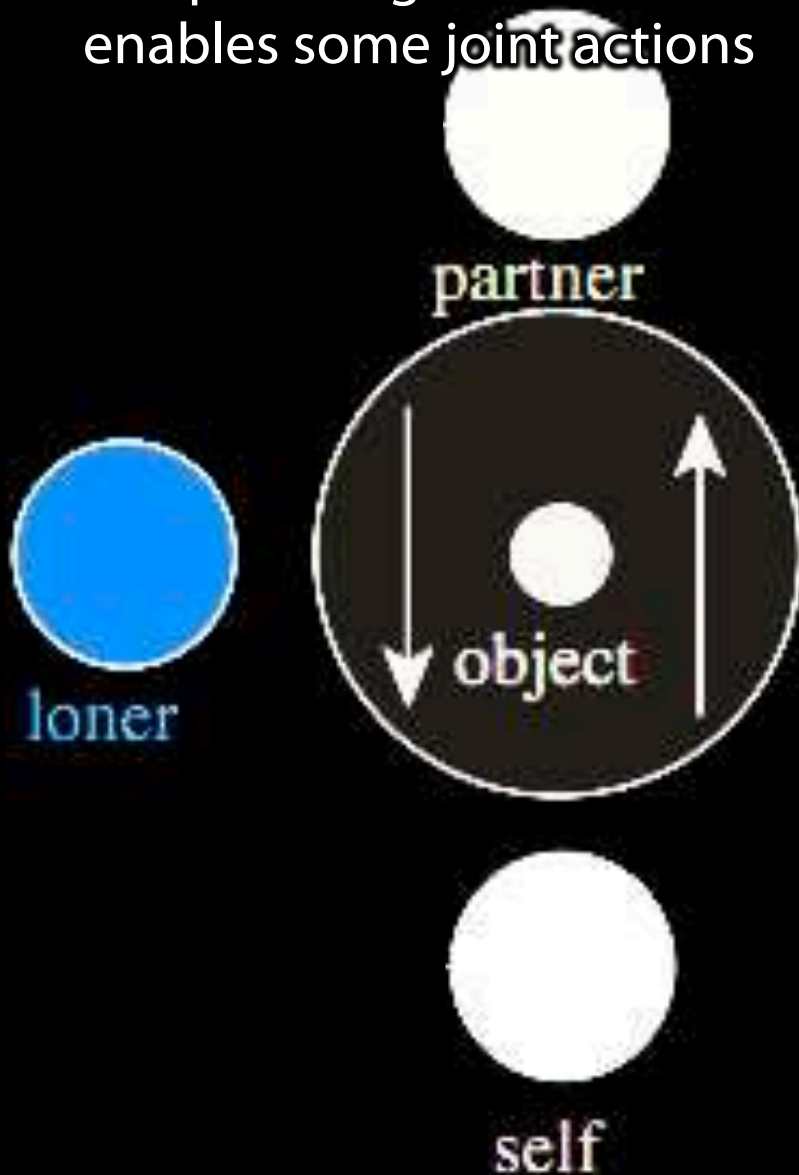
“Simulation of another person’s action, as reflected
in the activation of motor cortices, gets stronger the
more the other is perceived as an interaction
partner.”

--- Kourti, Sebanz & Knoblich (2010, p. 4)



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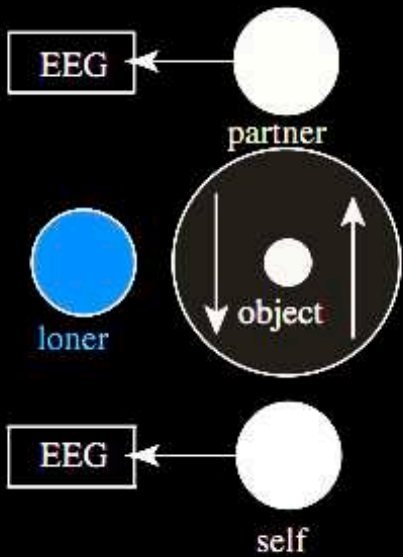
Kourtis, Sebanz & Knoblich (2010)

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(a)

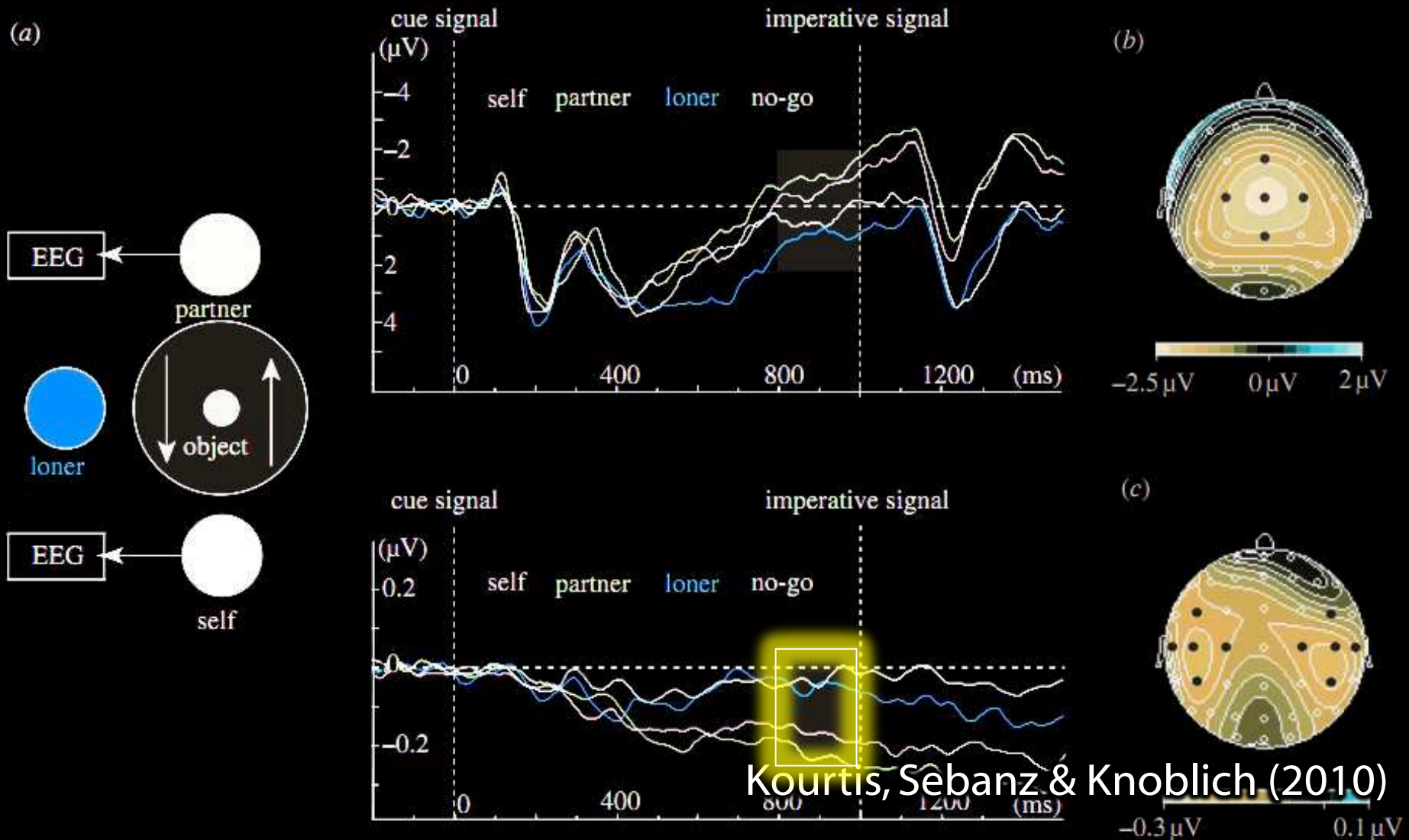


Kourtis, Sebanz & Knoblich (2010)

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