



# **Intention and Motor Representation in Joint Action**

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premise:

Reciprocal agent-neutral motor representation  
enables joint action

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“the social relation between individuals modulates  
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--- Kourtis, Sebanz & Knoblich (2010, pp. 1, 4)



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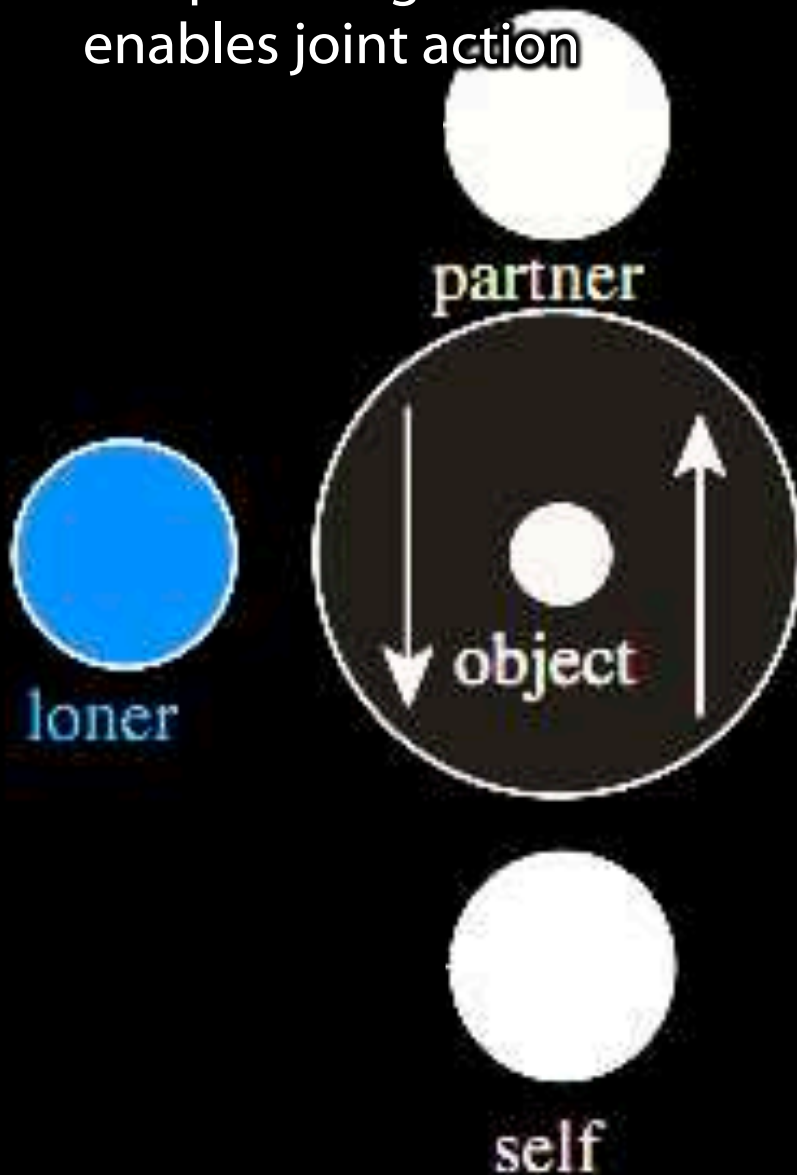
“motor activation during action anticipation  
depends on the ... relation between the actor and  
the observer ... Simulation of another person's  
action, as reflected in the activation of motor  
cortices, gets stronger the more the other is  
perceived as an interaction partner.”

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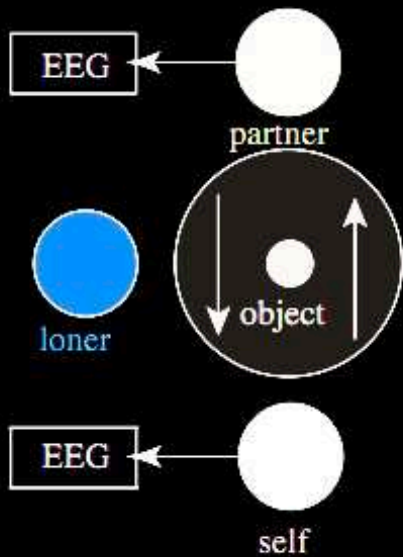
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(a)



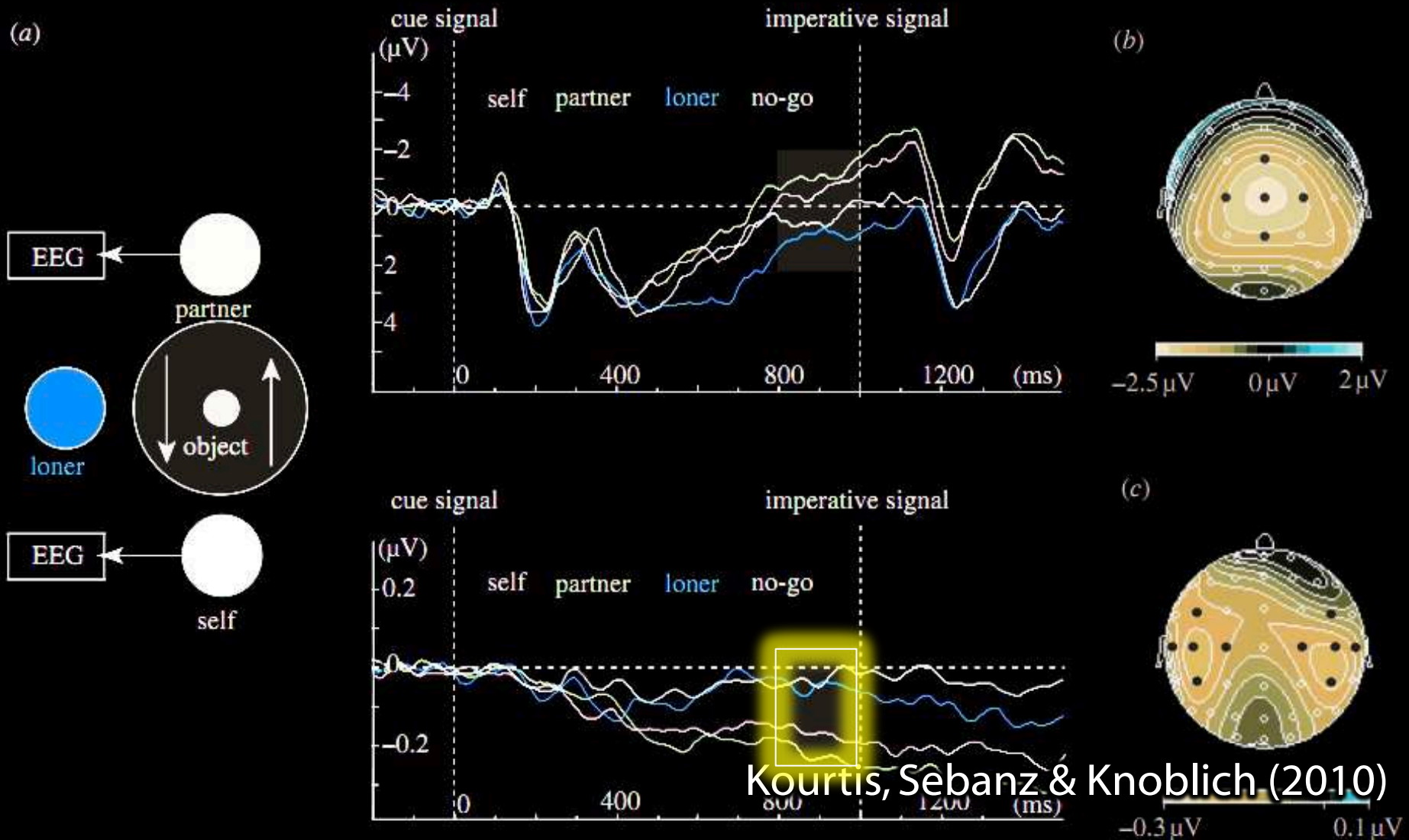
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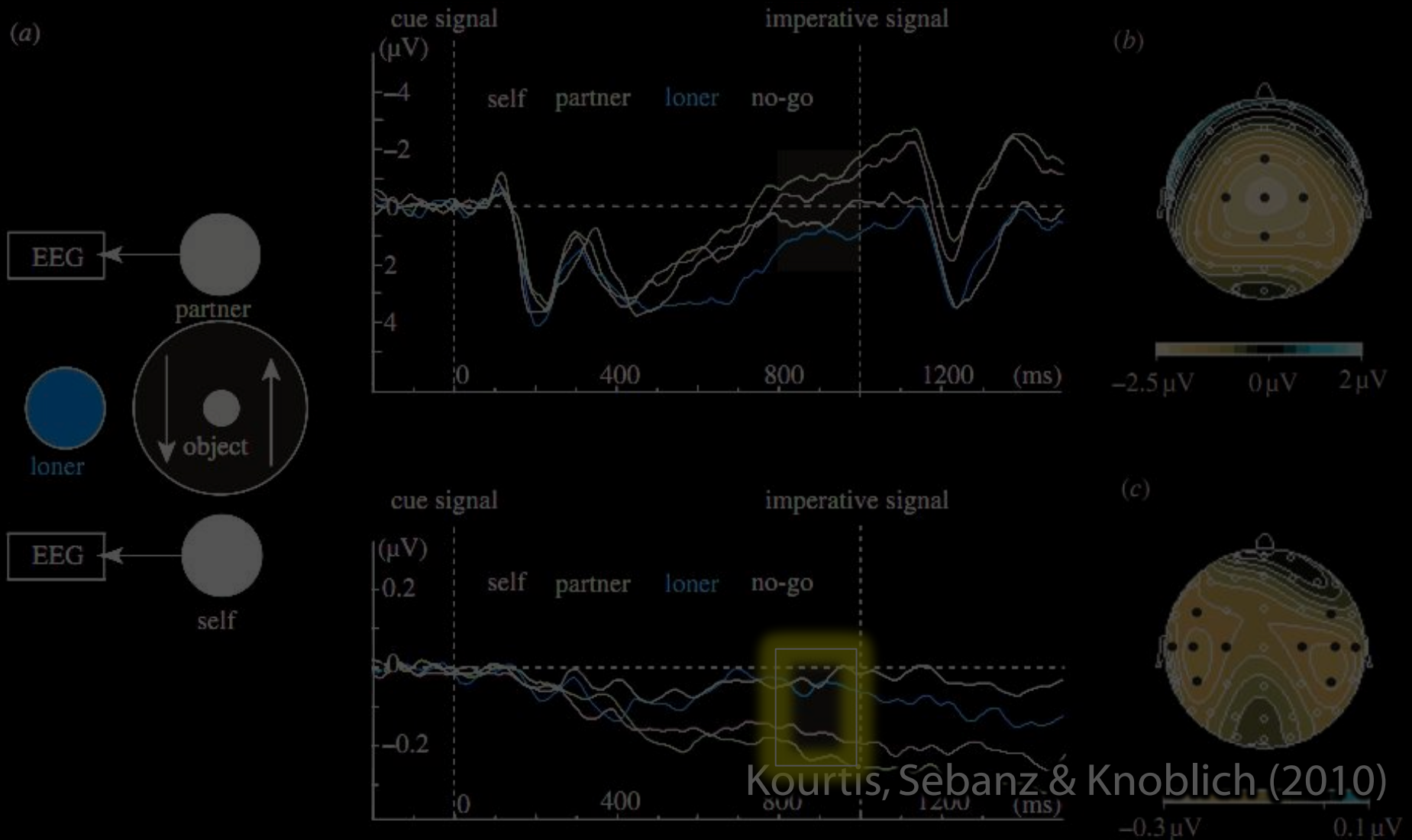




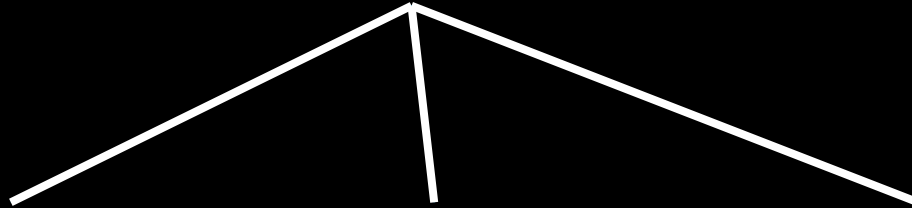
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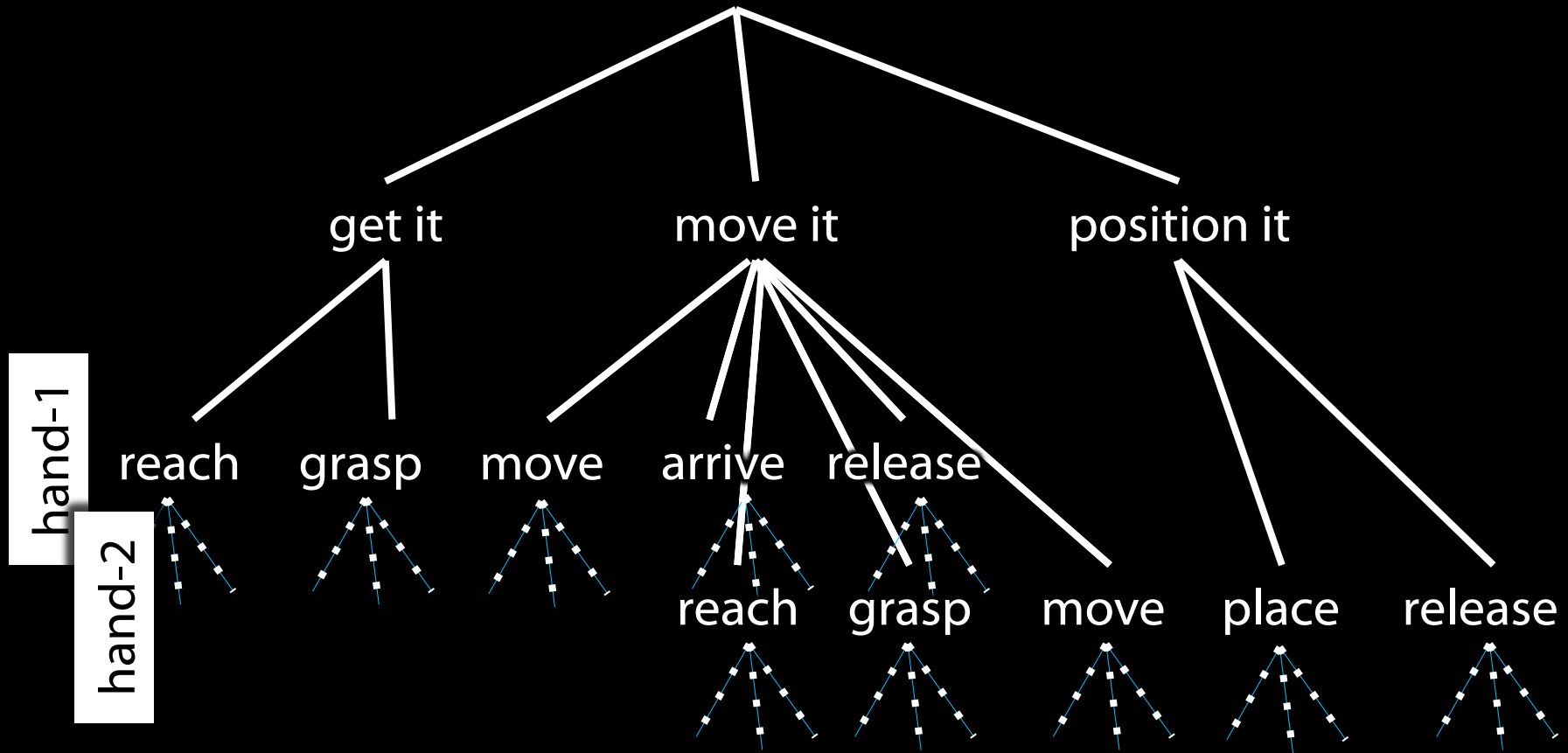
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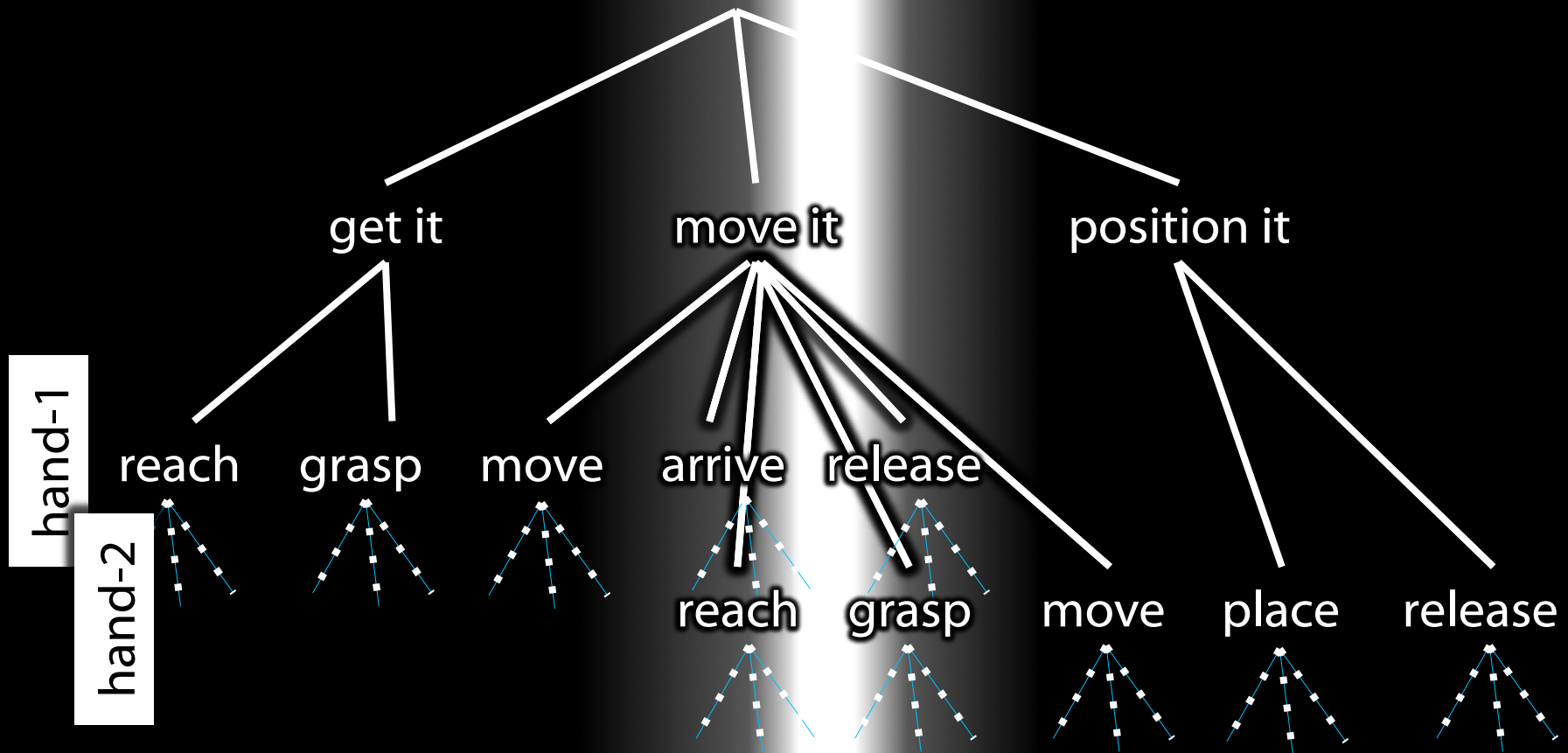
Move it from there to here



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

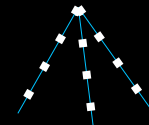
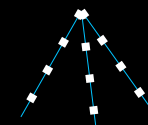
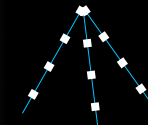
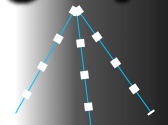
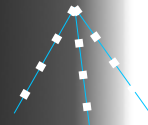
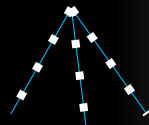
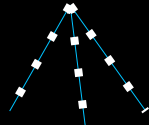
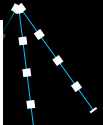
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place

release

hand-1

hand-2



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similar timing  
problem

hand-1

hand-2





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joint action:  
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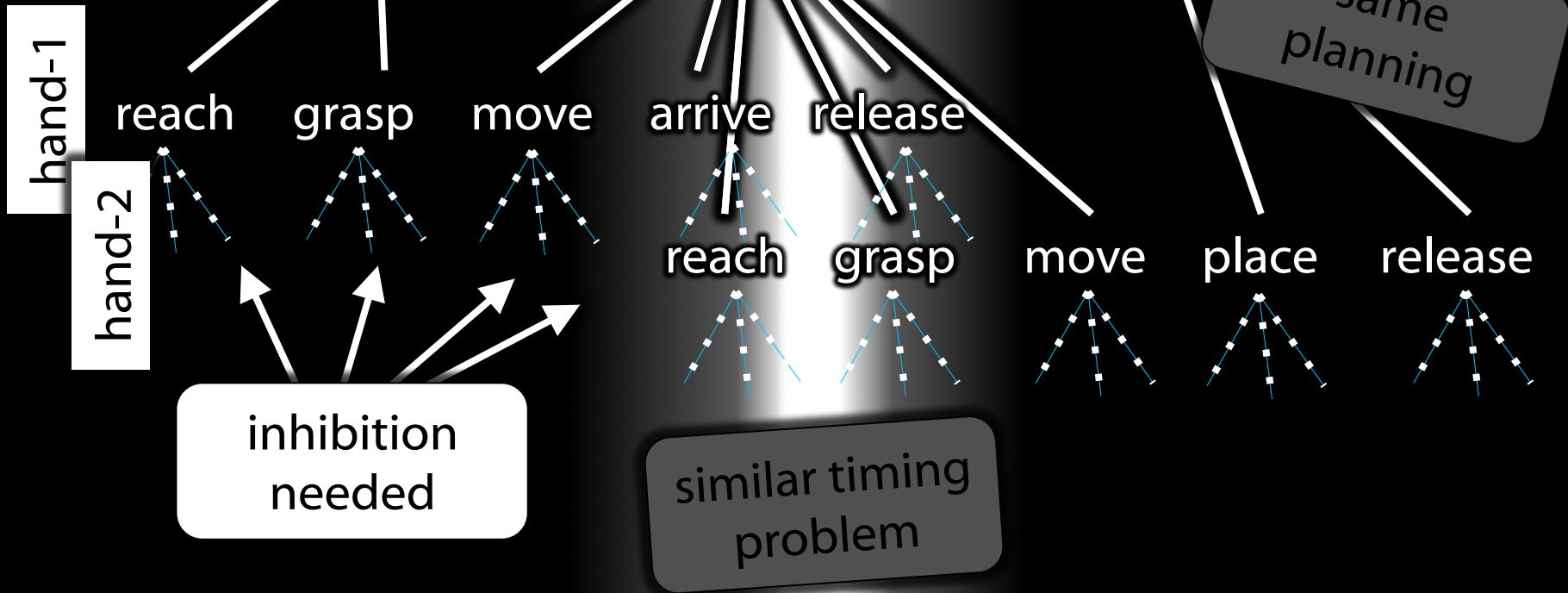
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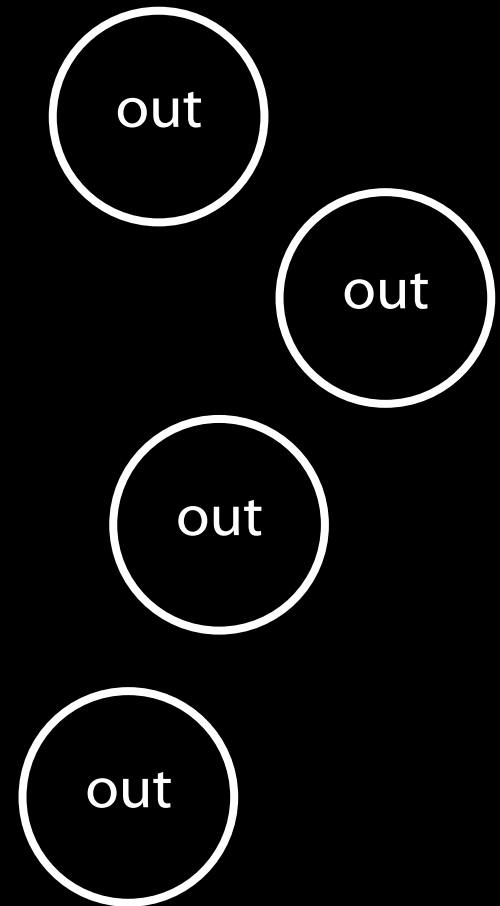
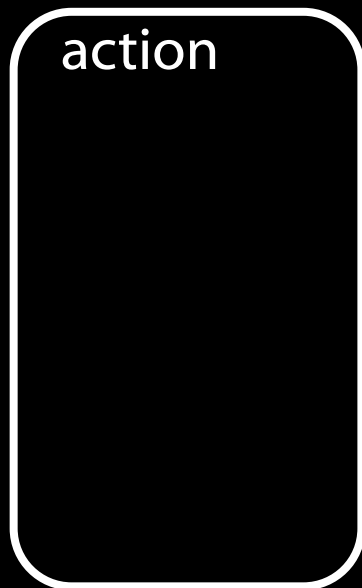
release

inhibition  
needed

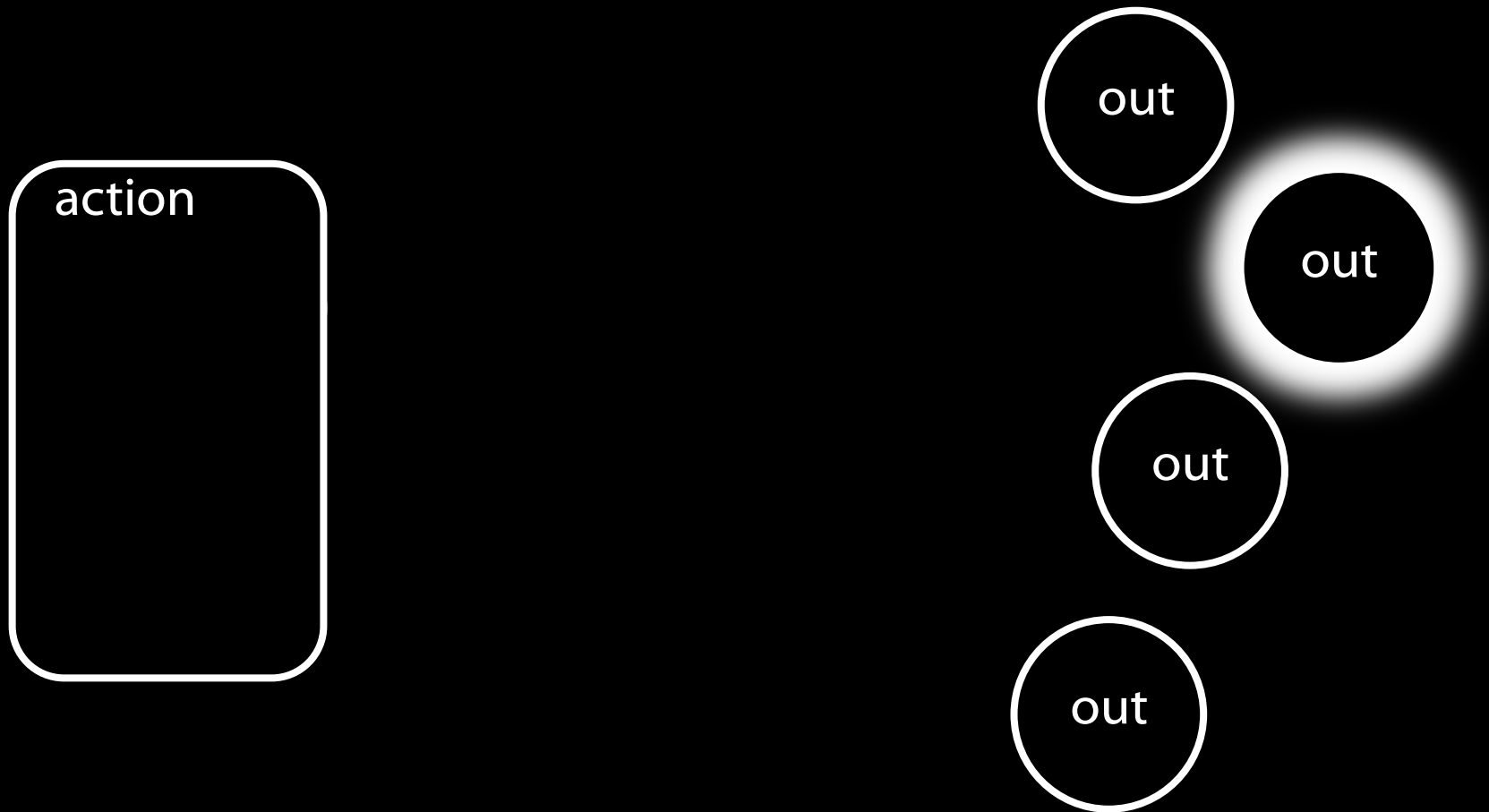
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problem



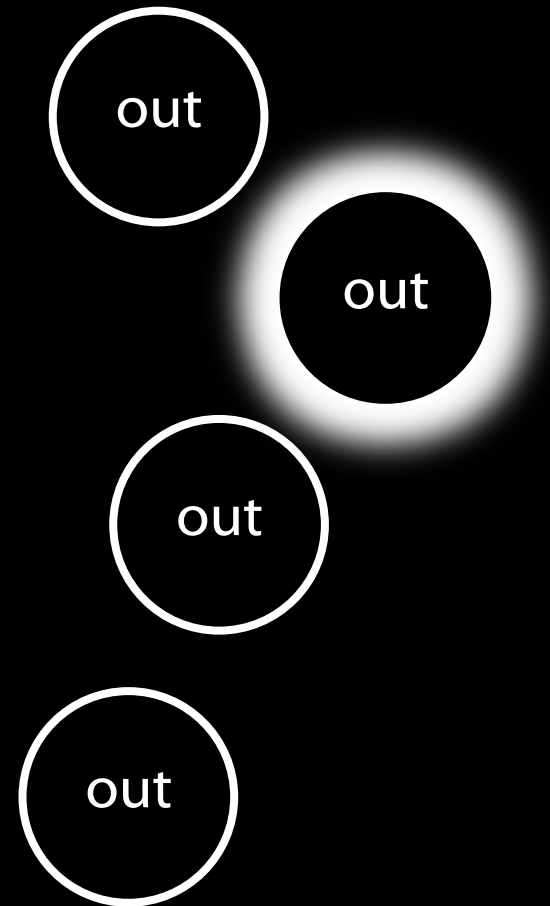
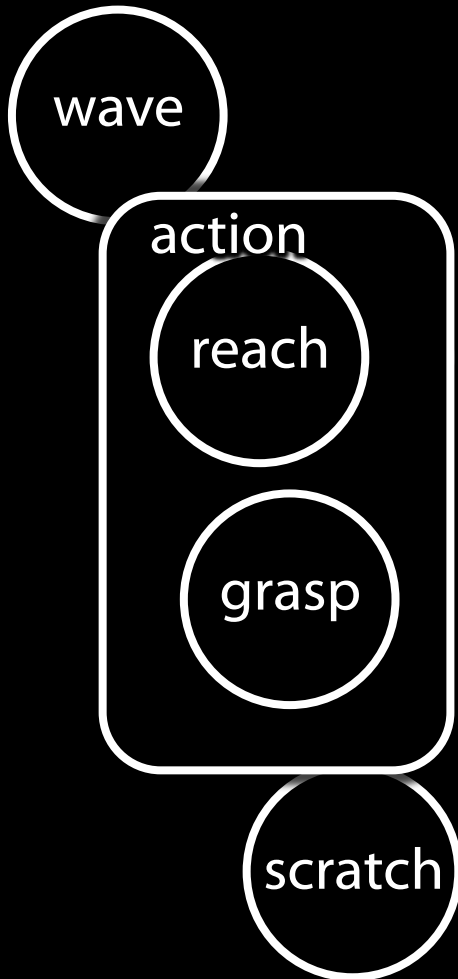
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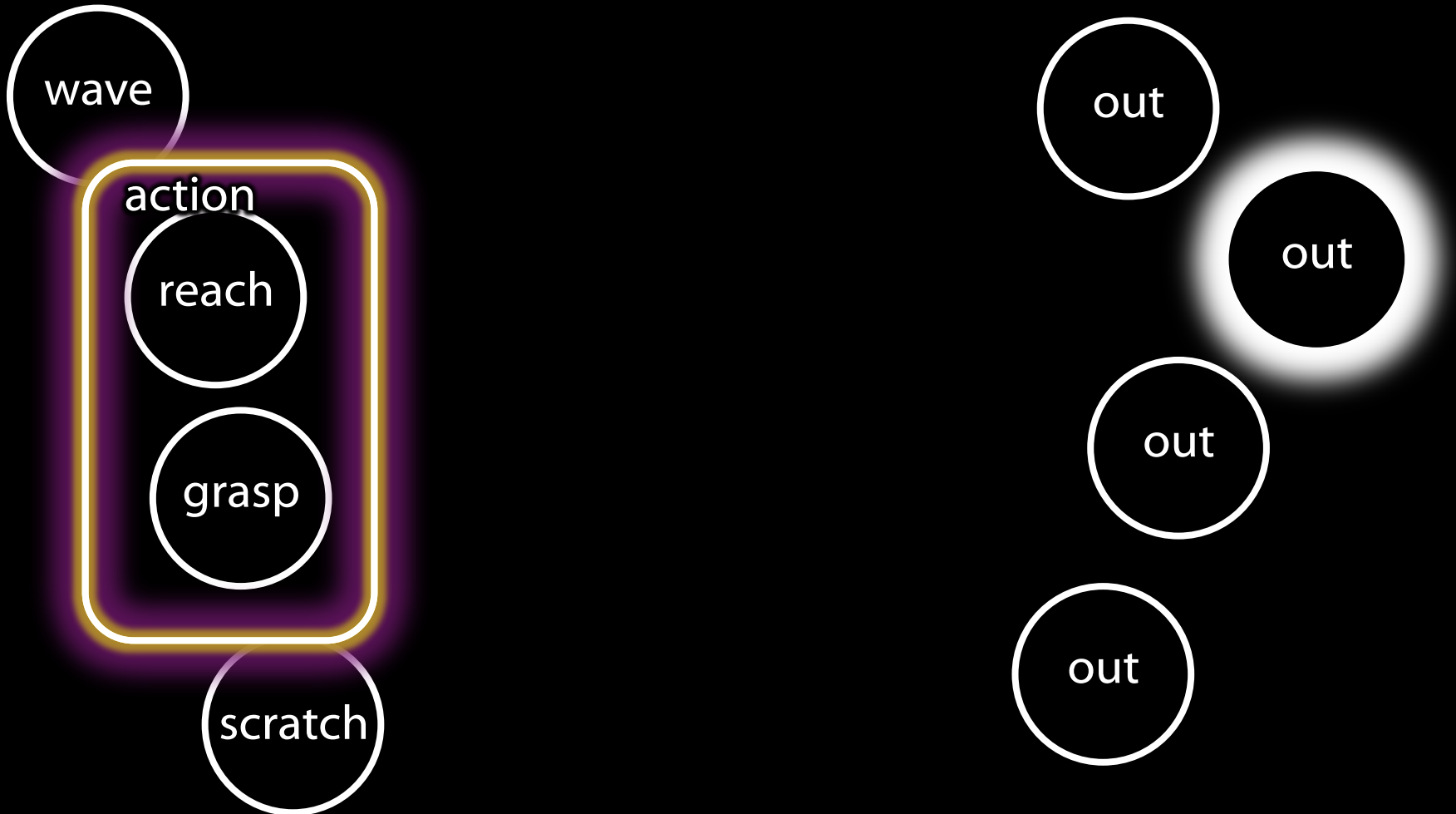
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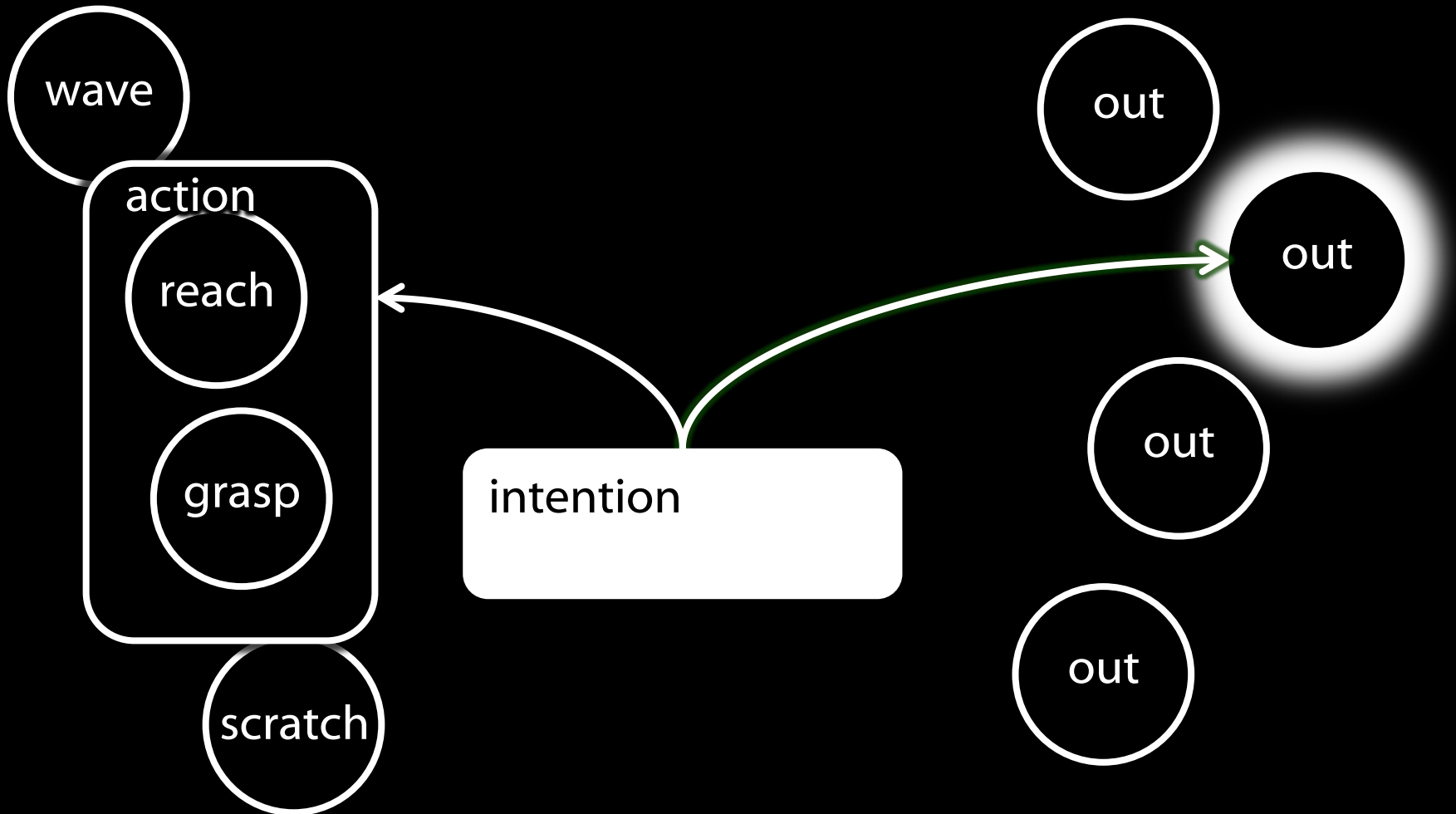
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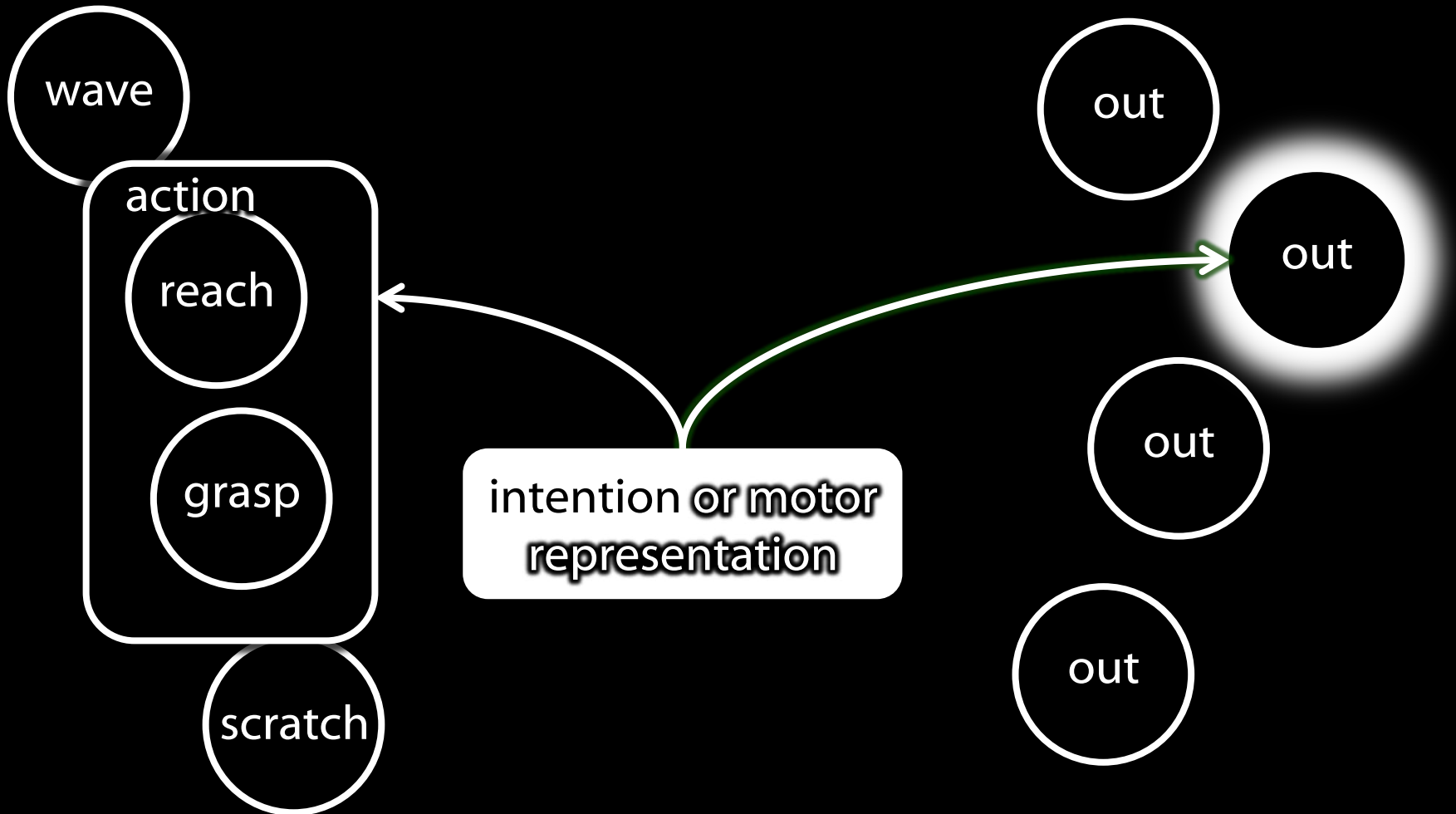
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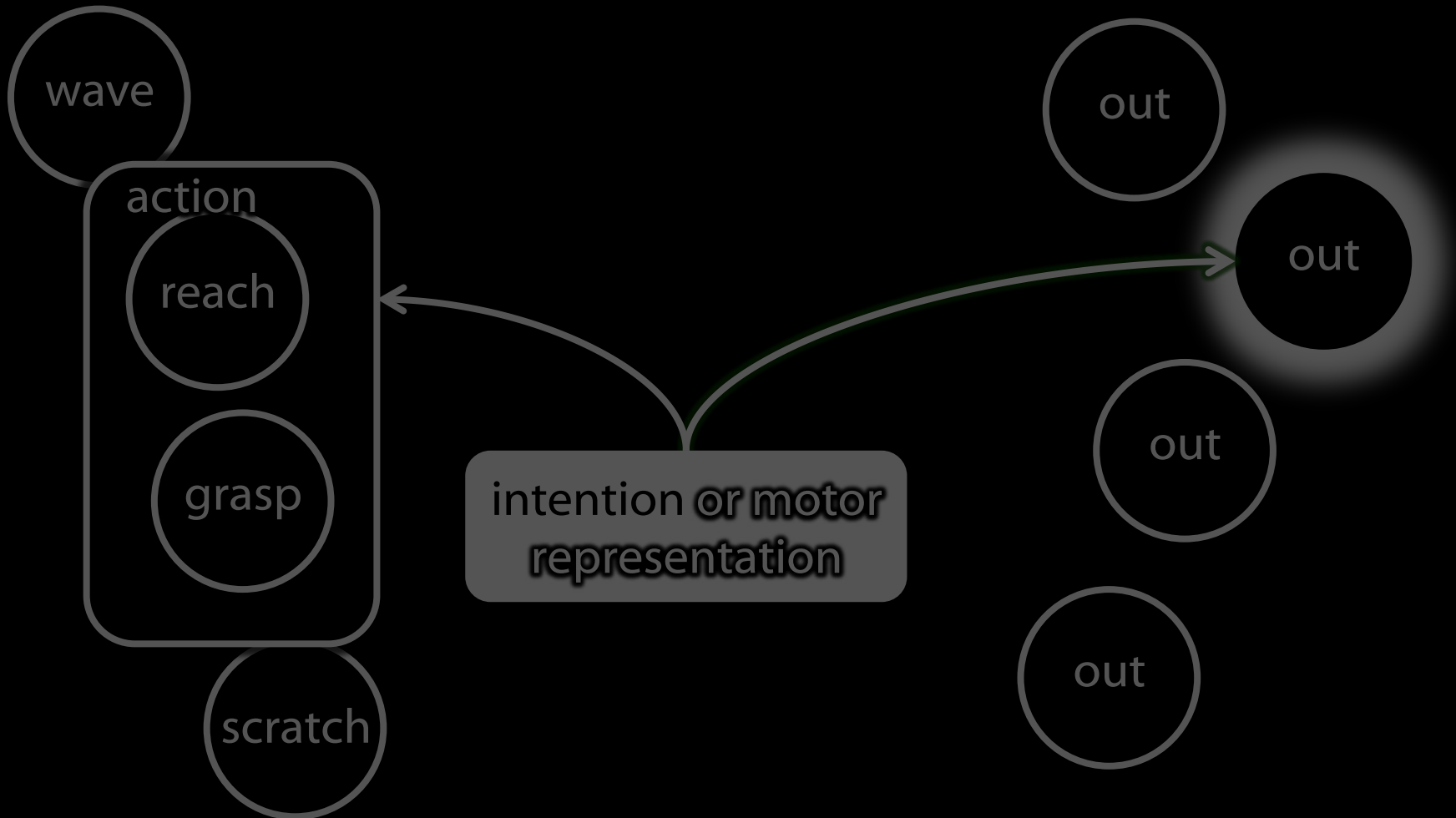
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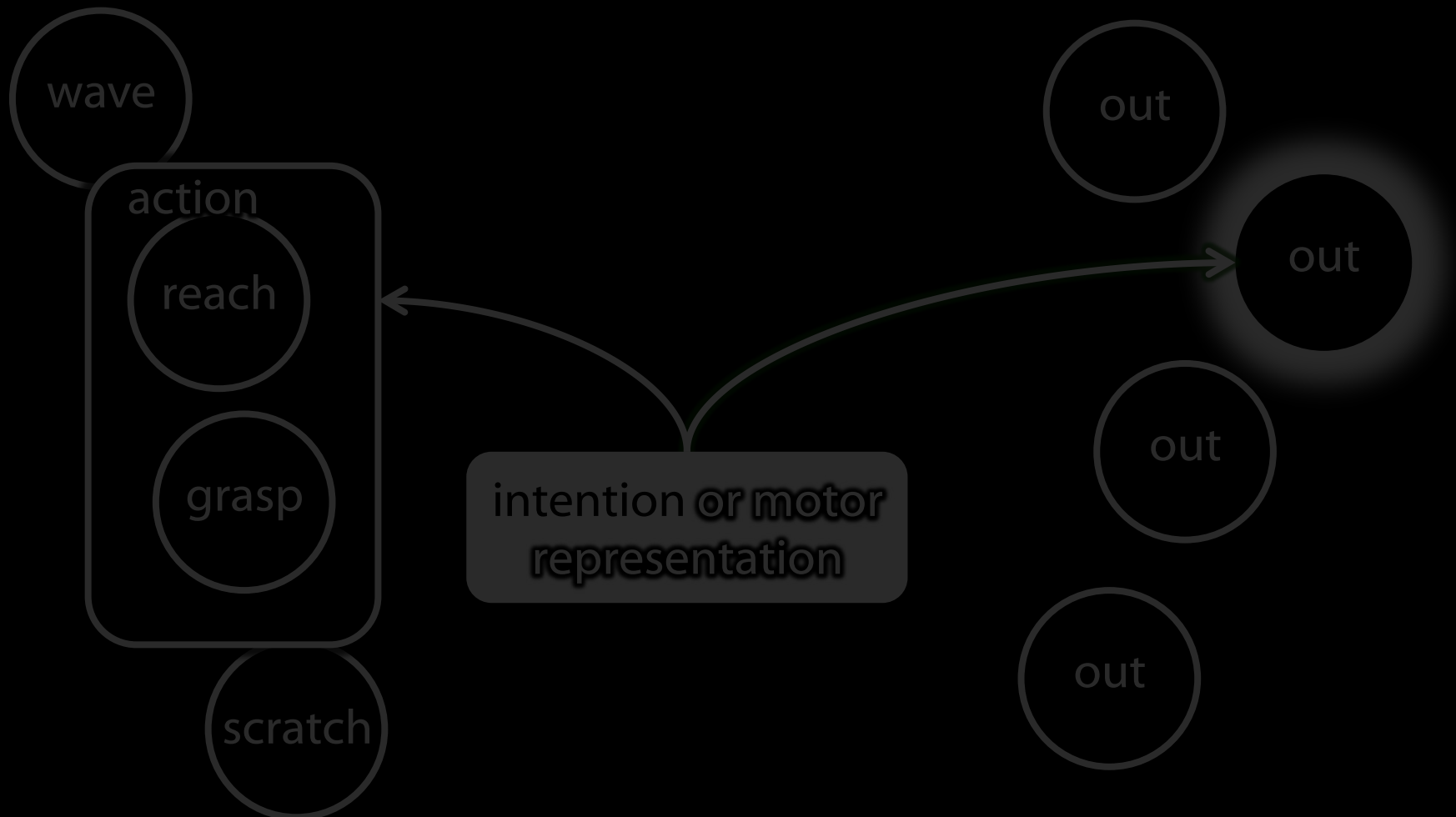


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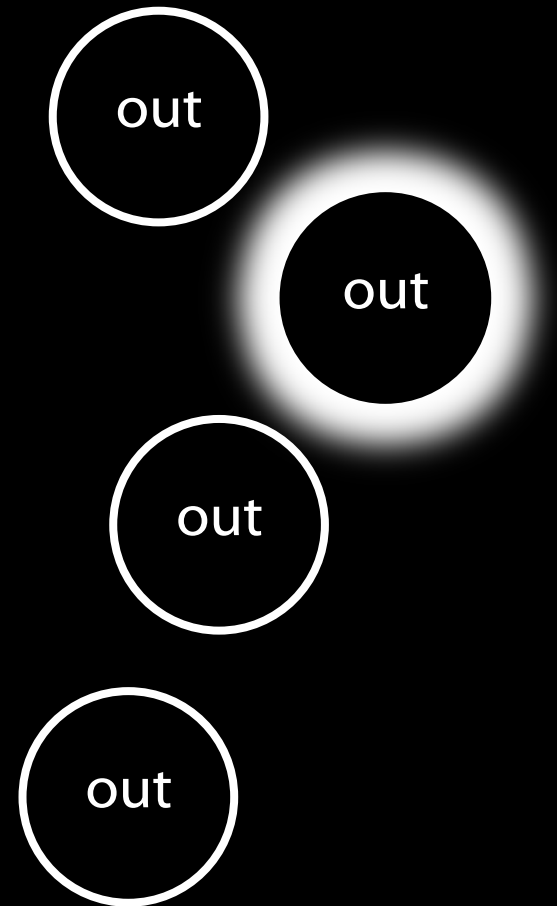
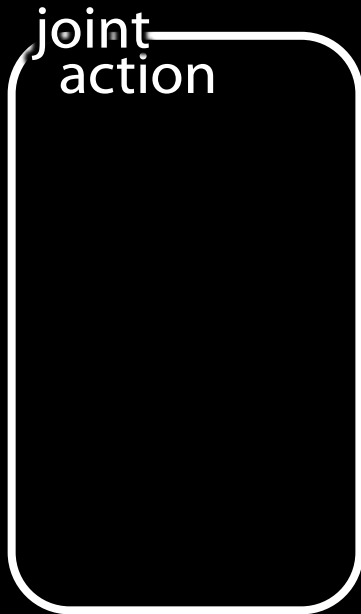




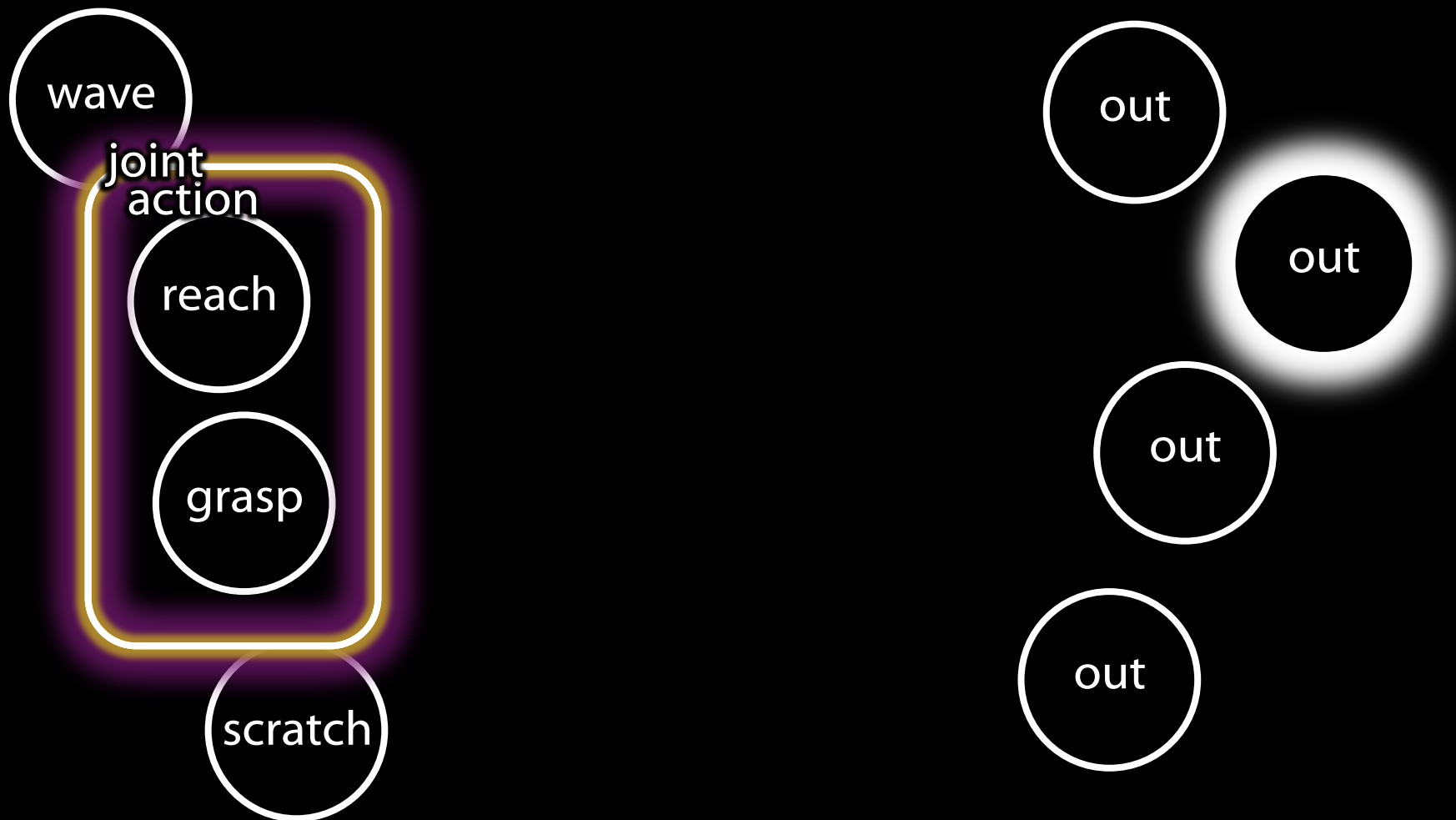
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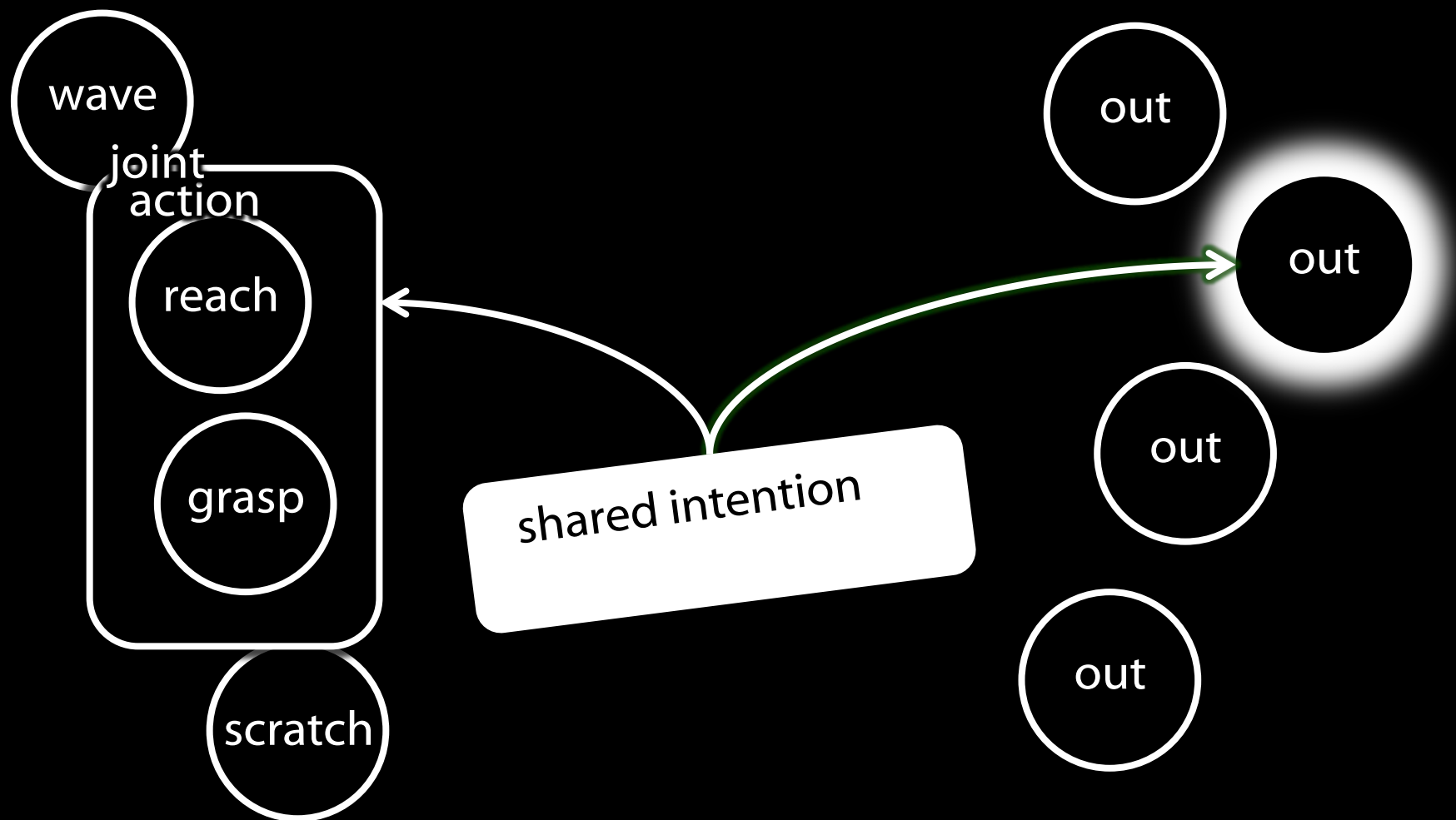
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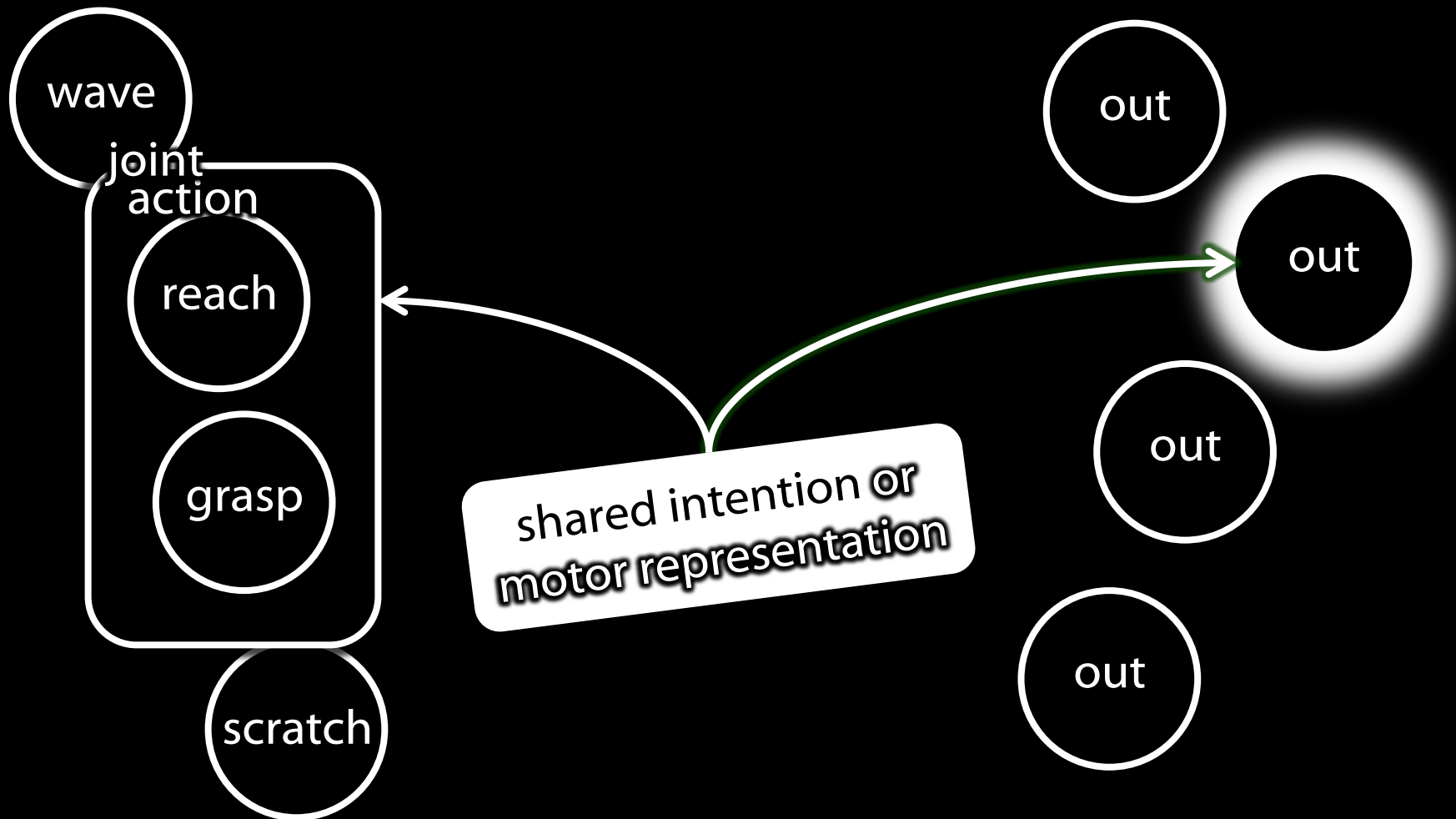
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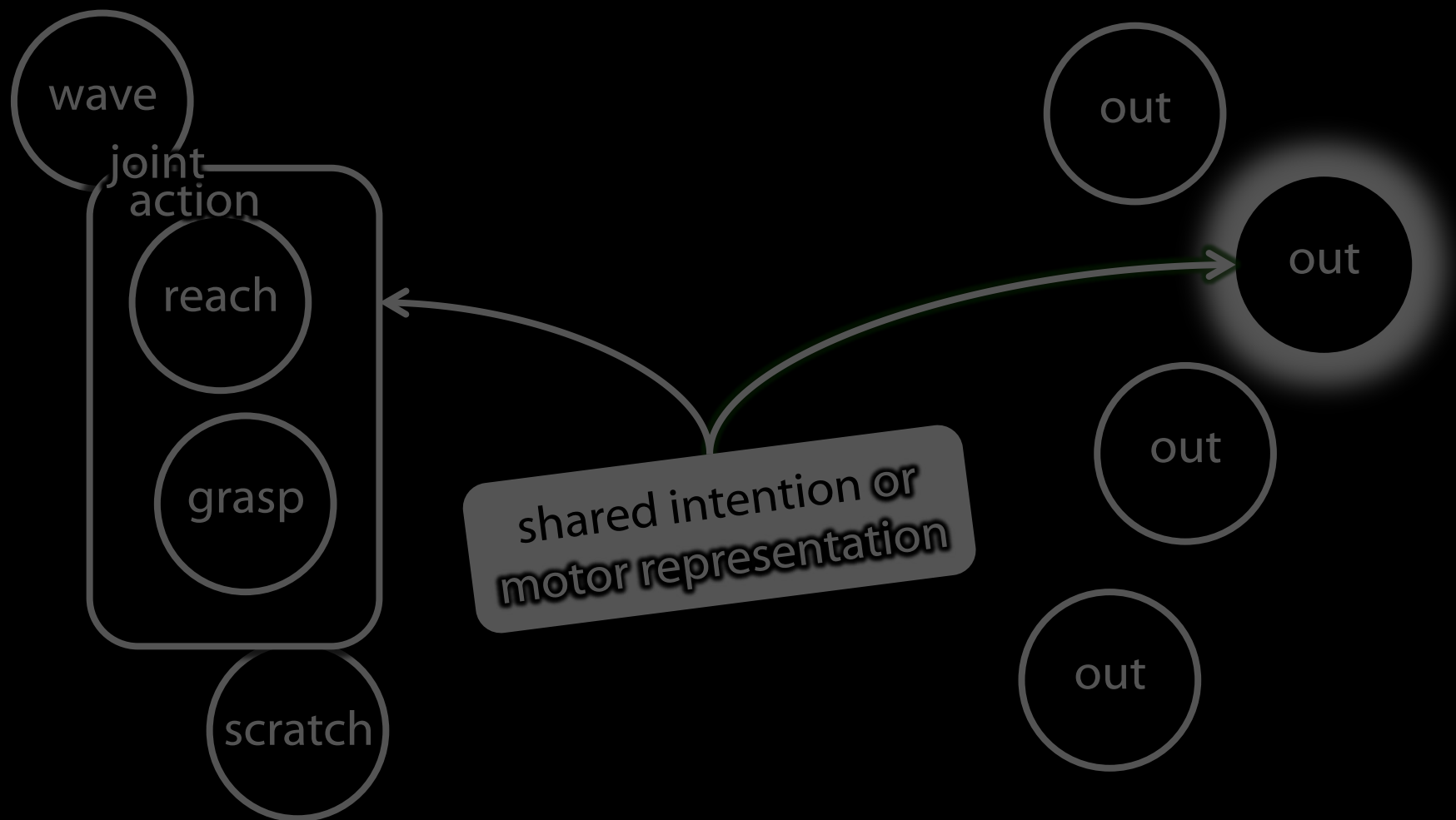
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## Sufficient conditions

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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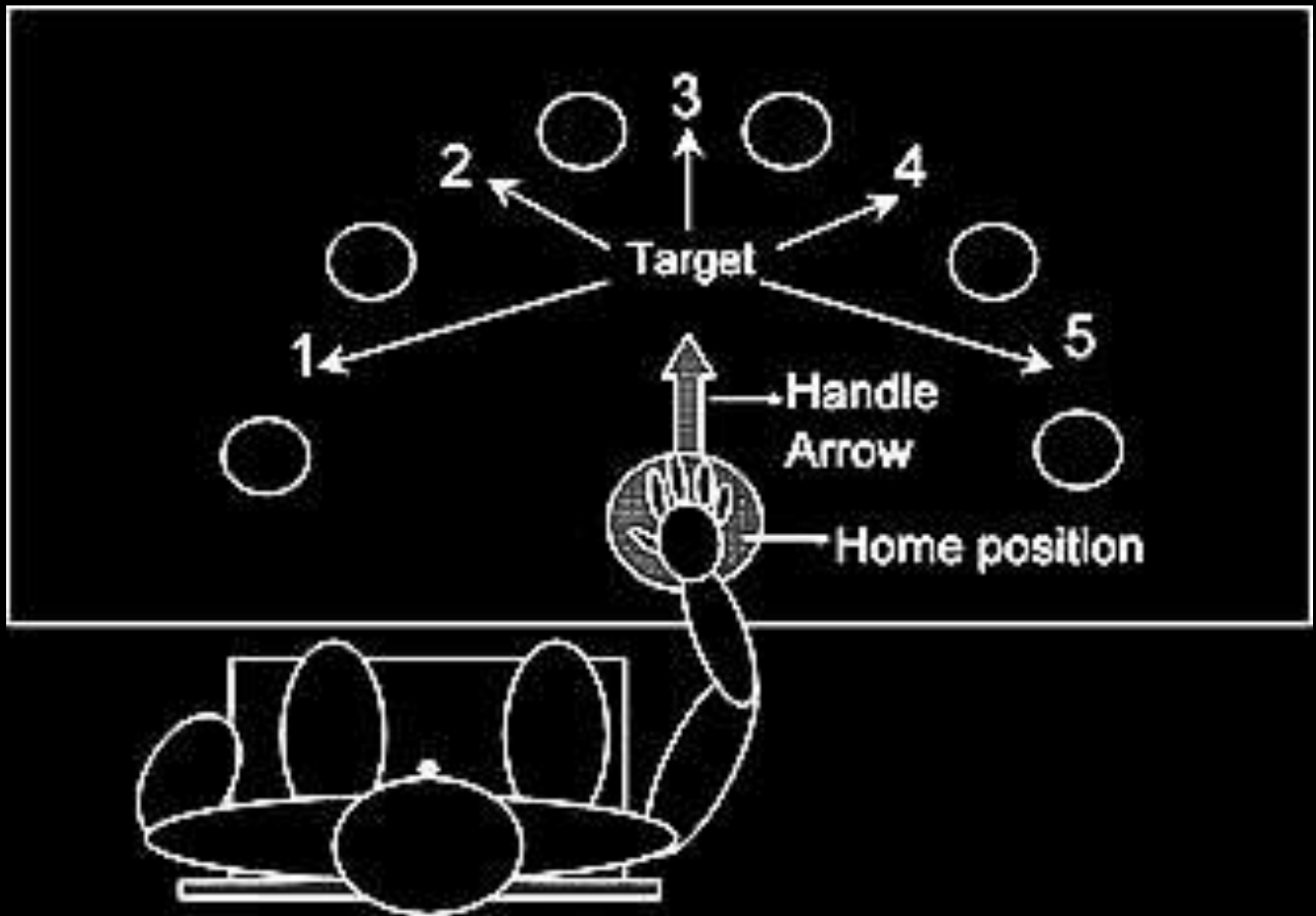
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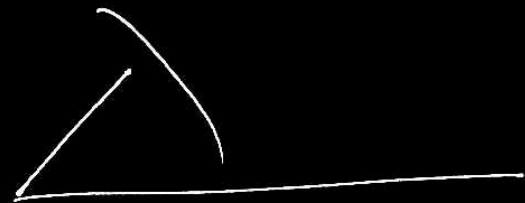
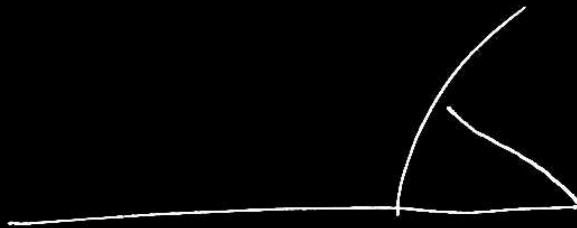
What are intentions for?



(Zhang and Rosenbaum 2007)



(big  
reward)



↑  
ONE  
WAY



x

start here

moving an object together

(Kourtis et al 2010)

tidying up the toys together

(Behne et al 2005)

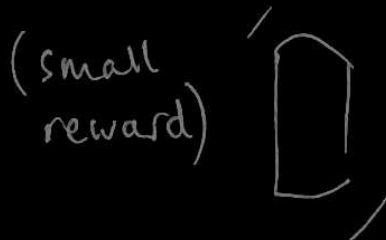
cooperatively pulling  
handles in sequence to  
make a dog-puppet sing

(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



'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  
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(Alonso 2009, pp. 444-5)

'Shared intentionality is the foundation upon which  
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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  
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We collectively perform a  
dance by running to a  
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Jack and Sue walk  
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We each individually run  
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(Searle 1990, 92)

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Jack and Sue walk  
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We collectively perform a  
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We lift a sofa together.

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We each individually  
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In what respects do reciprocal agent-neutral motor representations differ from shared intentions?

< different content >



# < different format >

[illegible]

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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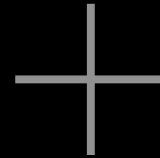
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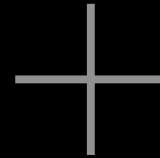


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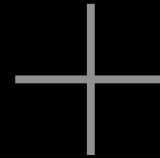
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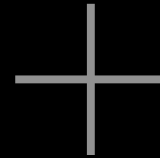
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Some joint actions involve  
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Reciprocal agent-neutral  
motor representations:

i. represent outcomes;

ii. ground the  
purposiveness of some  
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## The Interface Problem

Reciprocal agent-neutral motor representations:

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

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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