

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

s.butterfill@warwick.ac.uk & corrado.sinigaglia@unimi.it

'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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**Cue Stimulus**



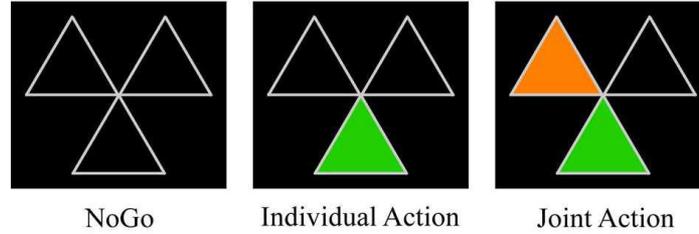
200 ms



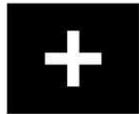
1000 ms



*Kourtis et al., subm.*



### Cue Stimulus



200 ms

A horizontal double-headed arrow indicating a duration of 200 ms, positioned below the cue stimulus.

1000 ms

A horizontal double-headed arrow indicating a duration of 1000 ms, extending from the start of the trial to the cue stimulus.

1000 ms

A horizontal double-headed arrow indicating a duration of 1000 ms, extending from the cue stimulus to the end of the trial.

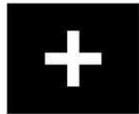
**Foreperiod  
No Action**

*Kourtis et al., subm.*



**Cue Stimulus**

**Imperative Stimulus**



200 ms

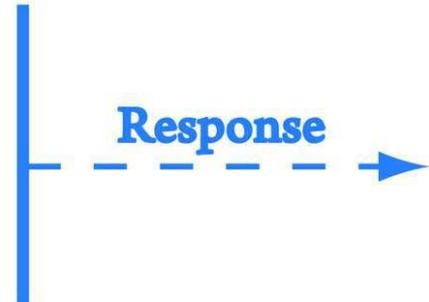
200 ms

1000 ms

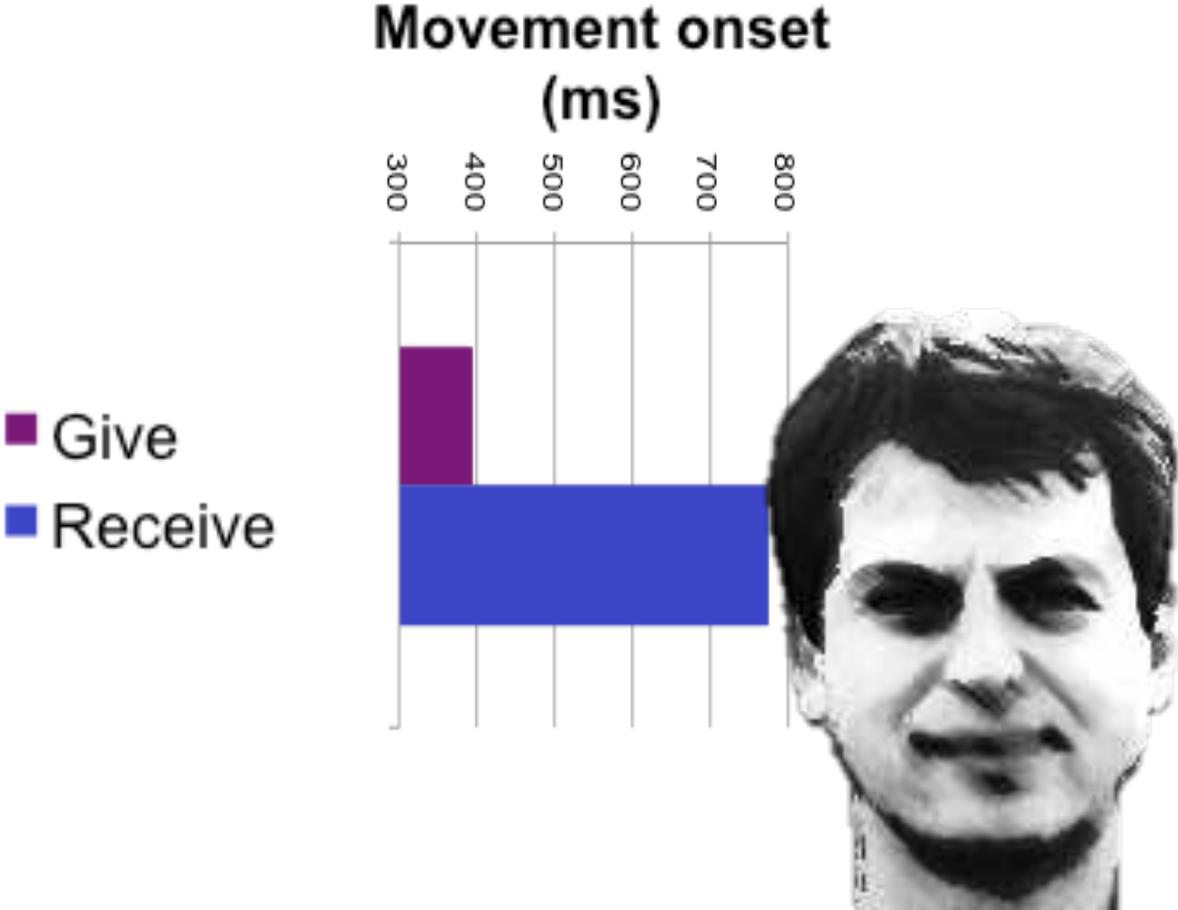
1000 ms

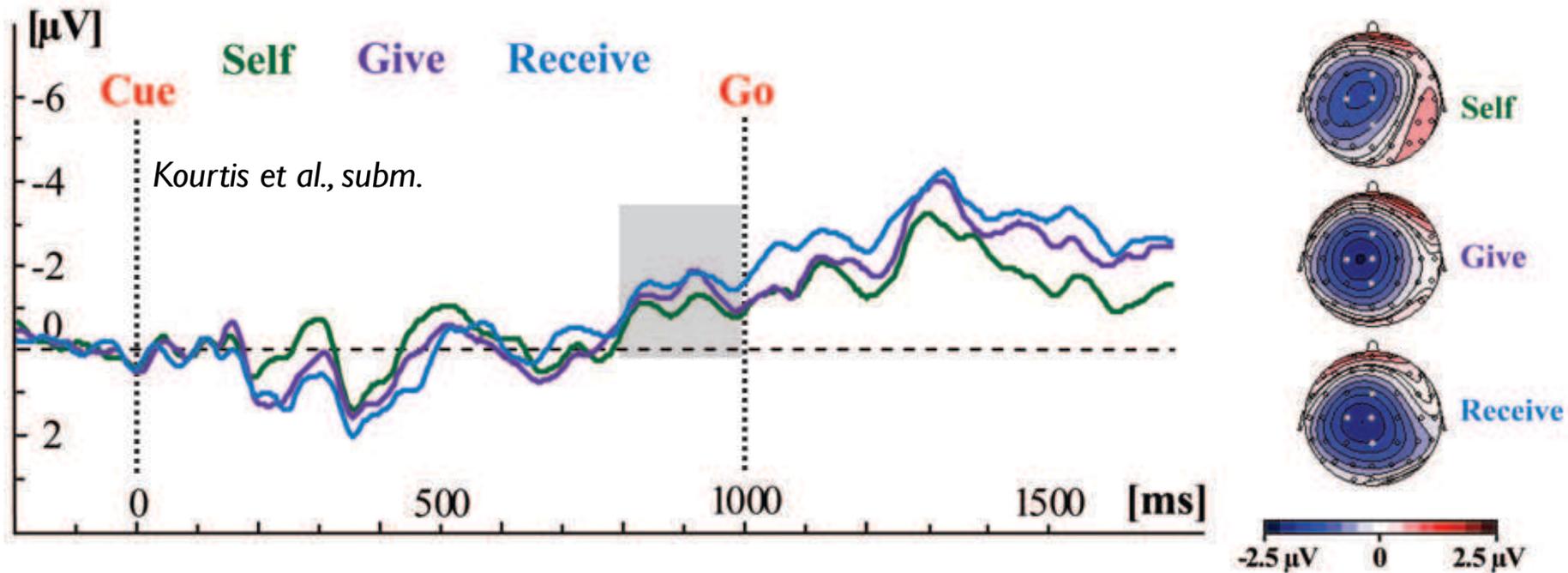
**Foreperiod  
No Action**

**Response**



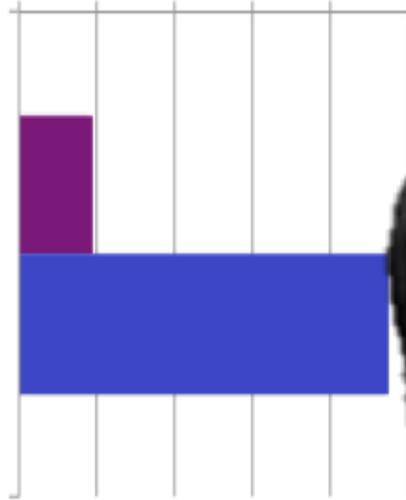
*Kourtis et al., subm.*





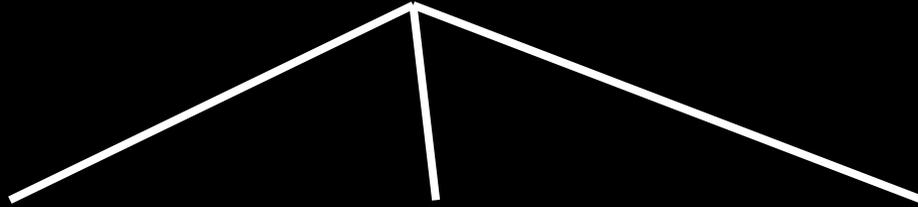
■ Give

■ Receive

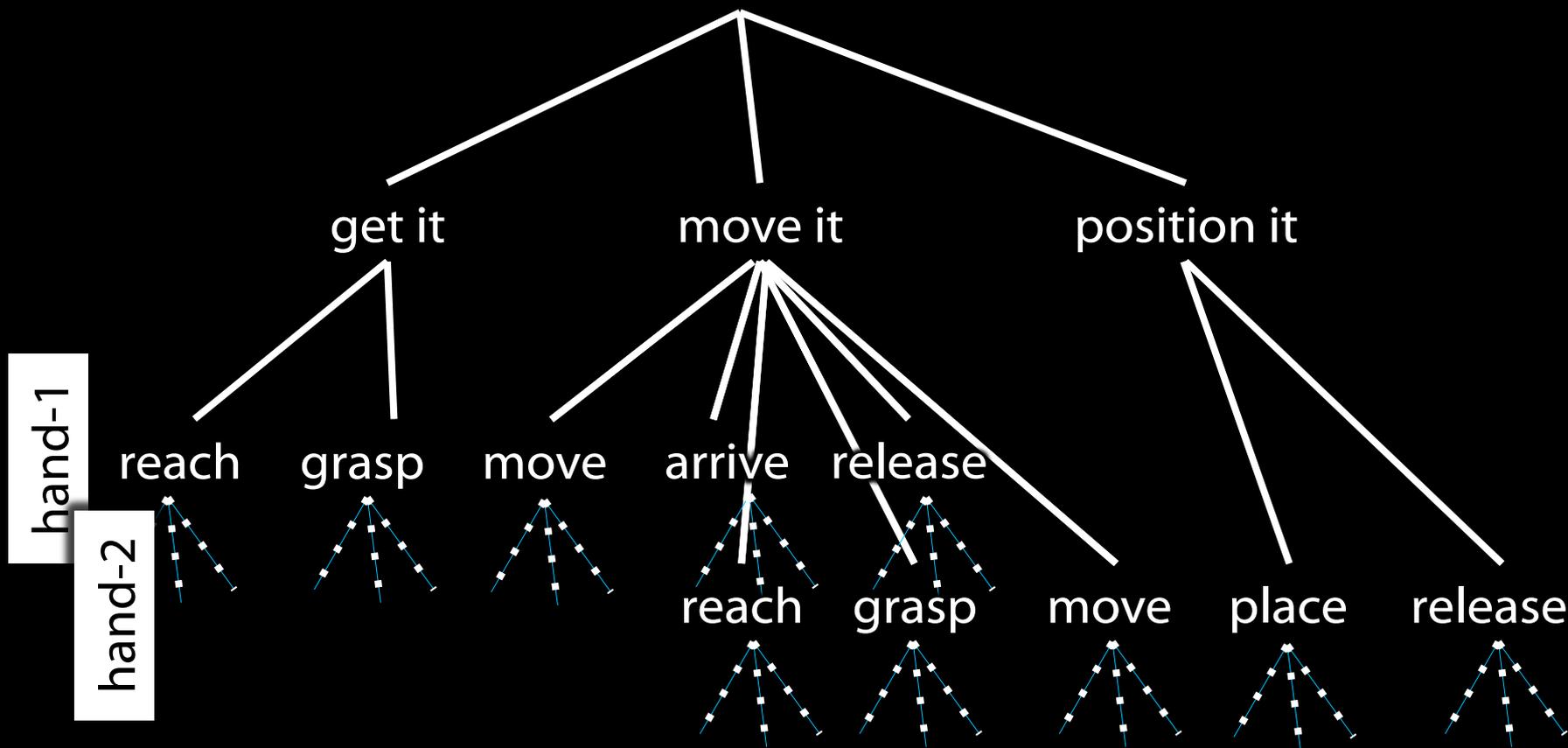


How could reciprocal agent-neutral motor representation ever enable any joint action?

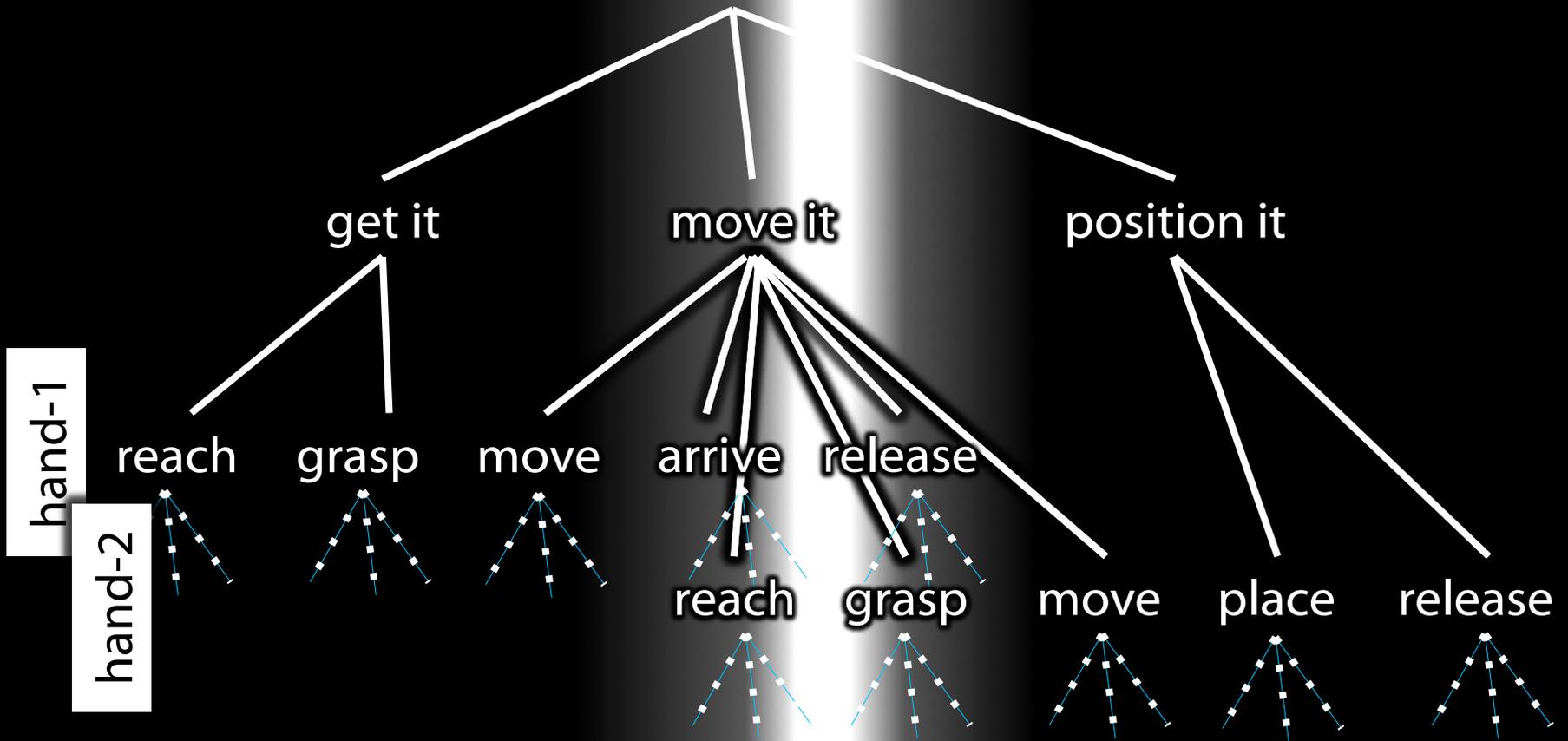
Move it from there to here



Move it from there to here

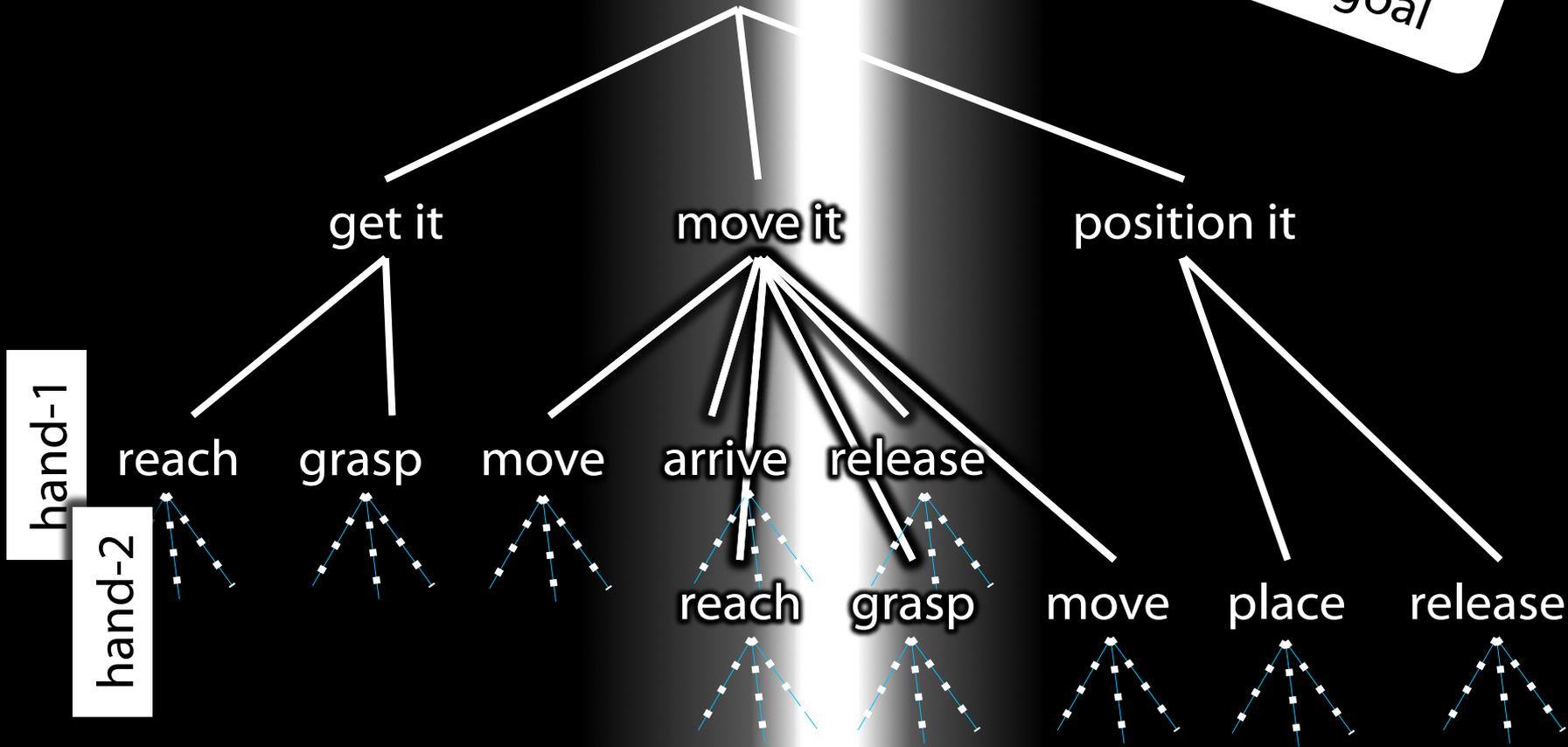


Move it from there to here



Move it from there to here

joint action:  
same goal



Move it from there to here

joint action:  
same goal

get it

move it

position it

hand-1

hand-2

reach

grasp

move

arrive

release

reach

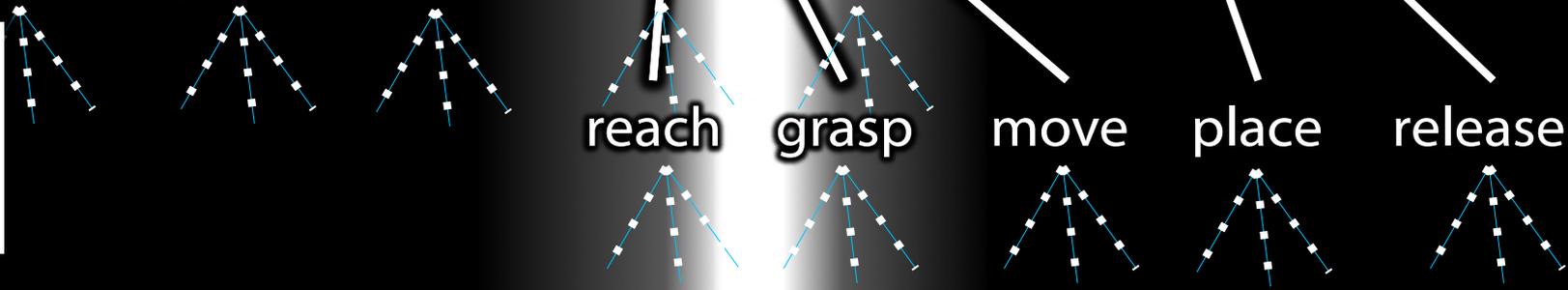
grasp

move

place

release

similar timing  
problem



Move it from there to here

joint action:  
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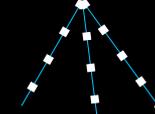
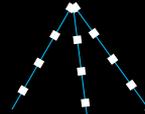
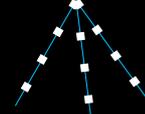
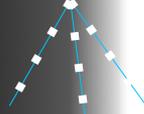
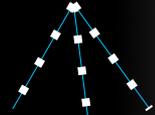
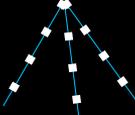
grasp

move

place

release

similar timing  
problem



Move it from there to here

joint action:  
same goal

get it

move it

position it

hand-1

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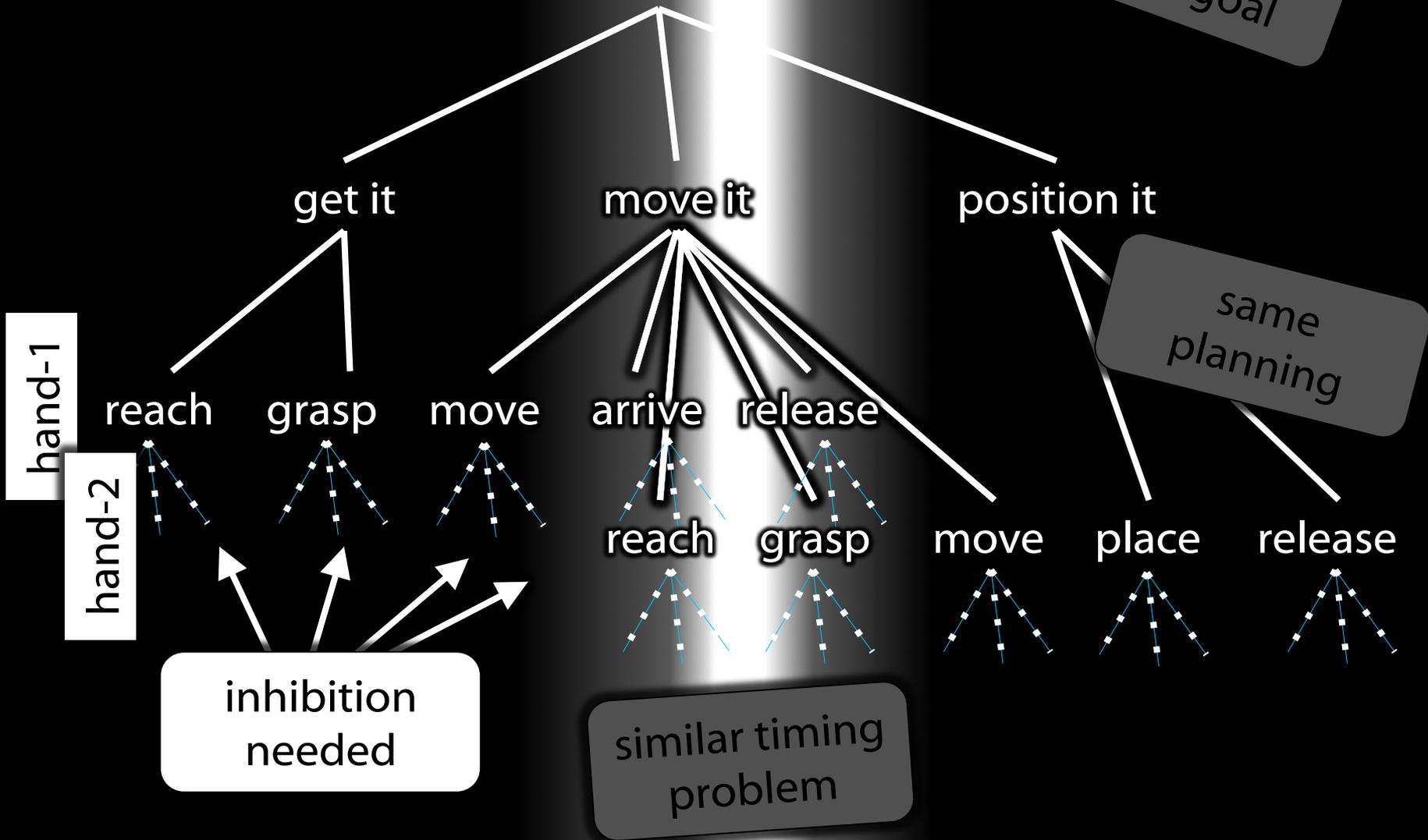
move

place

release

inhibition  
needed

similar timing  
problem



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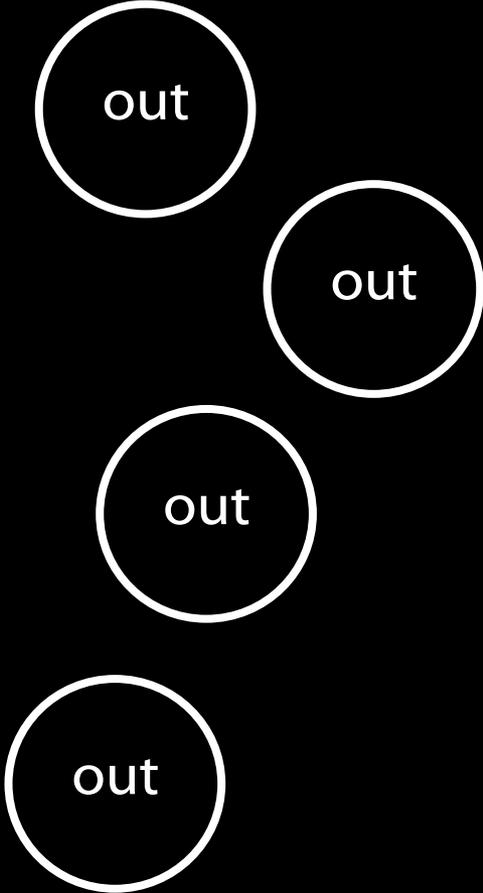
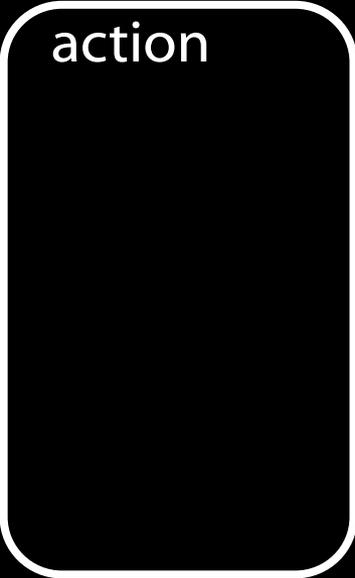
question:

Does reciprocal agent-  
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role in explaining what  
joint action is? [Yes]

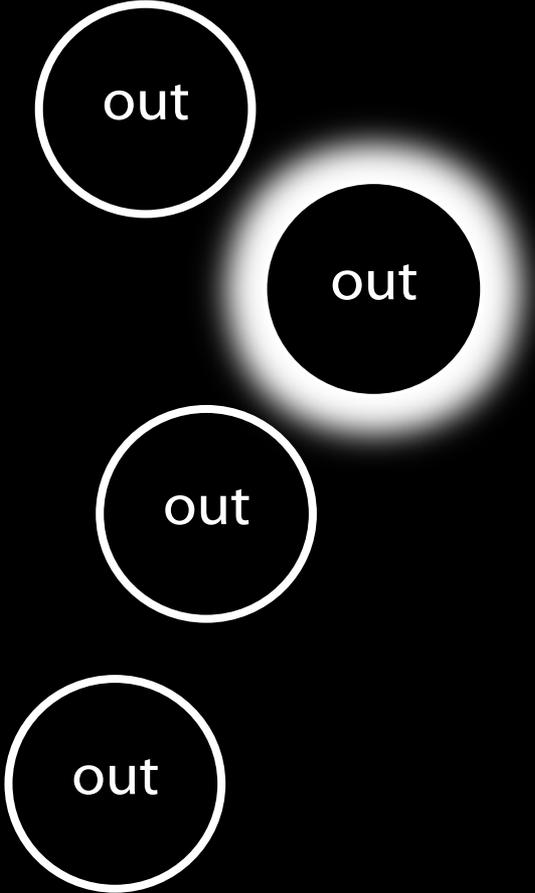
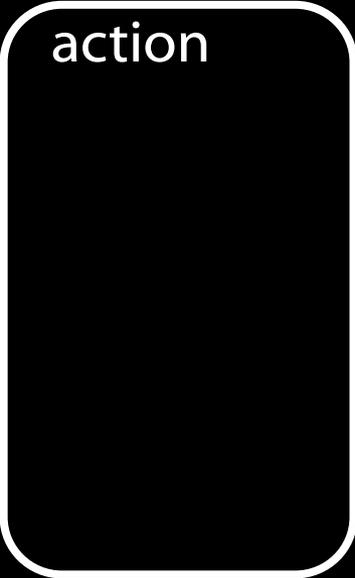
challenge:

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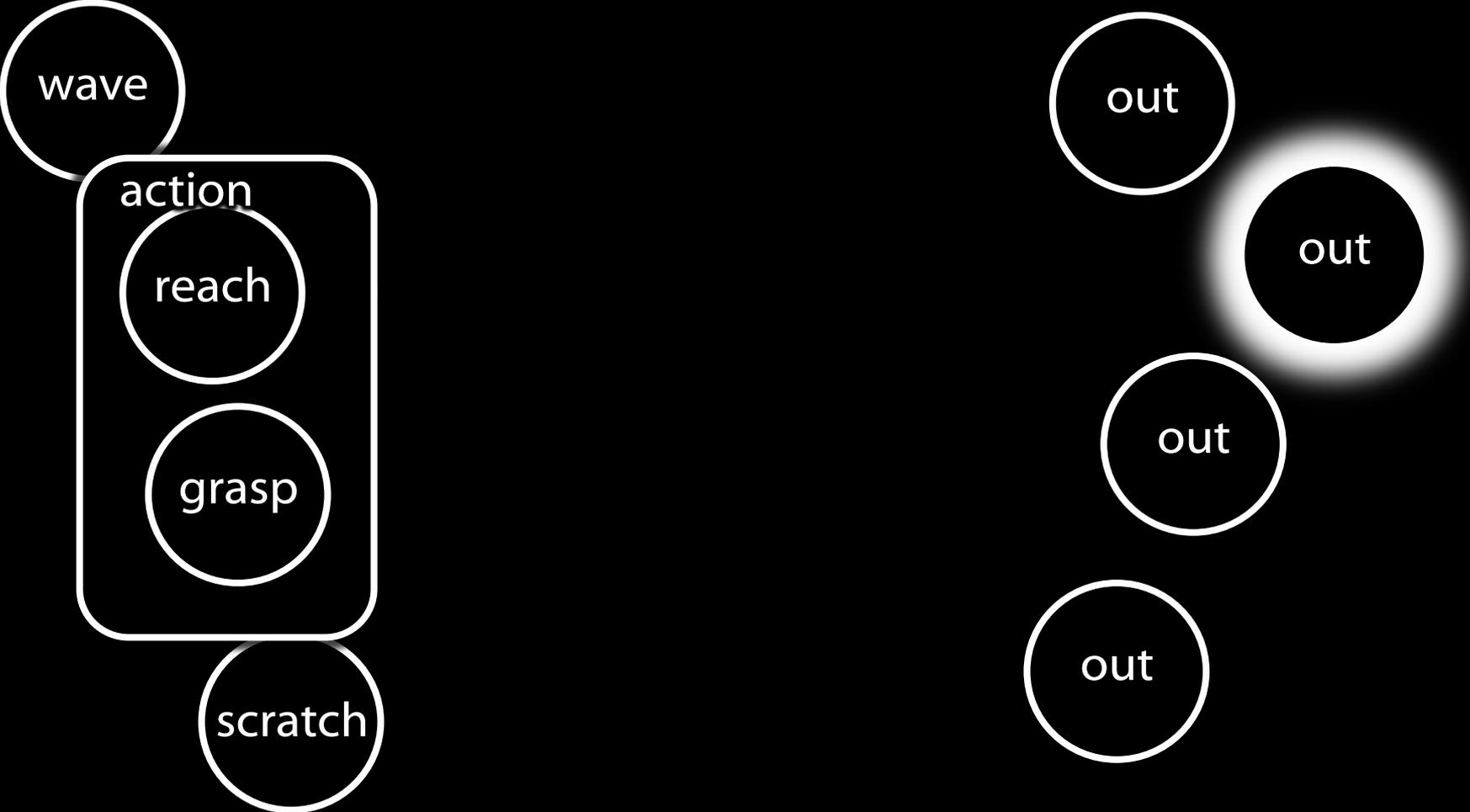
What is the relation between a purposive action and the outcome or outcomes to which it is directed?



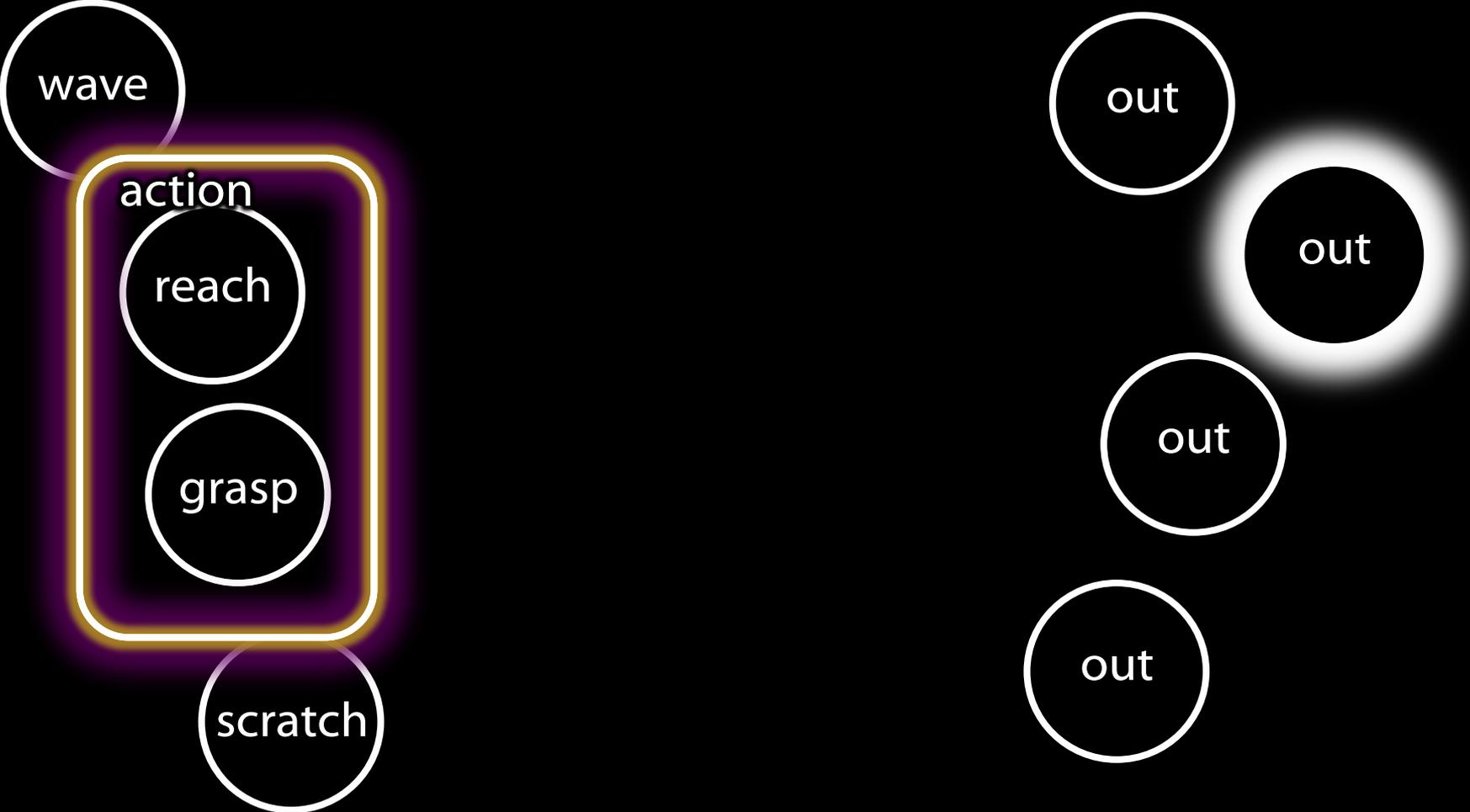
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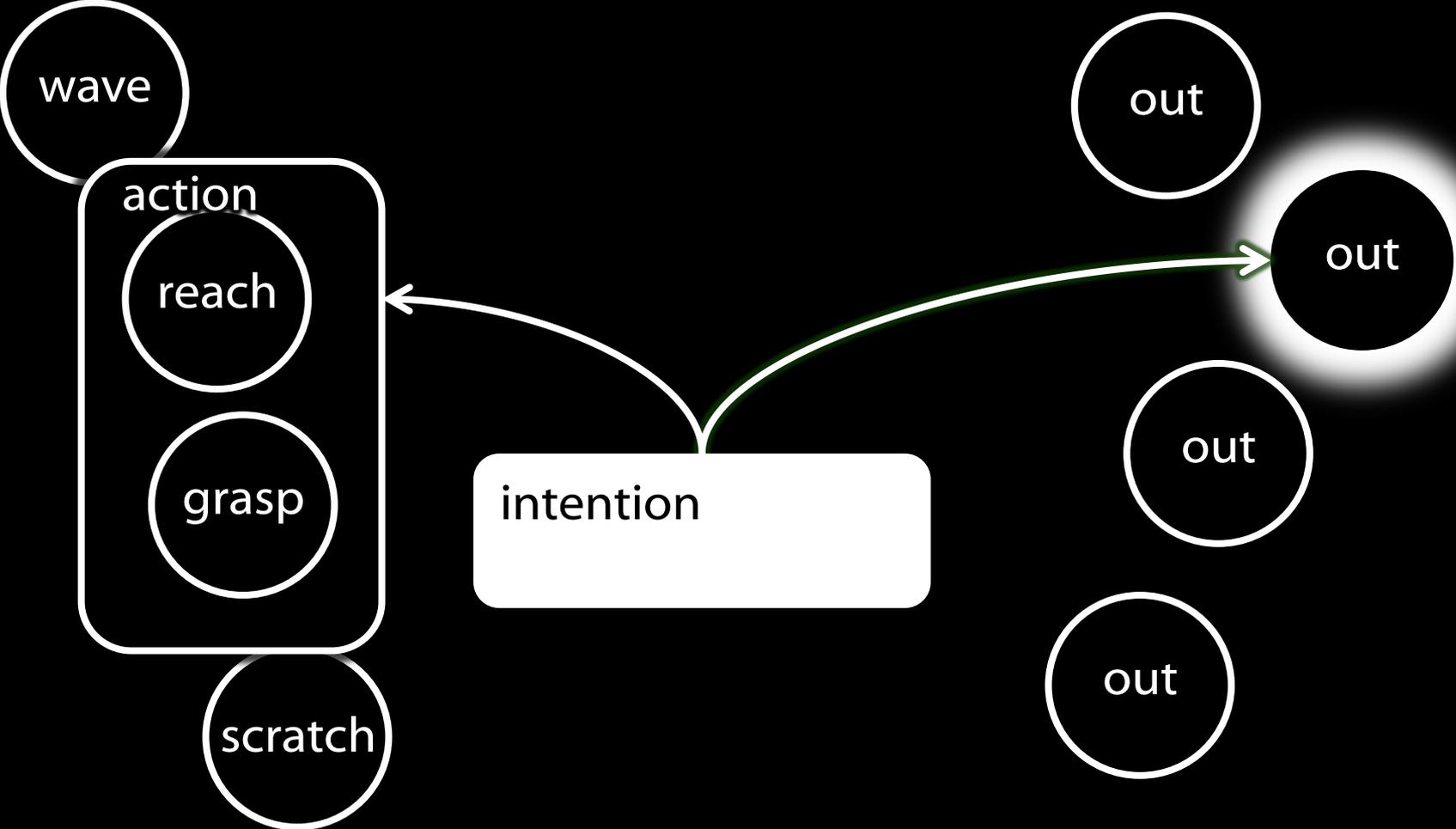
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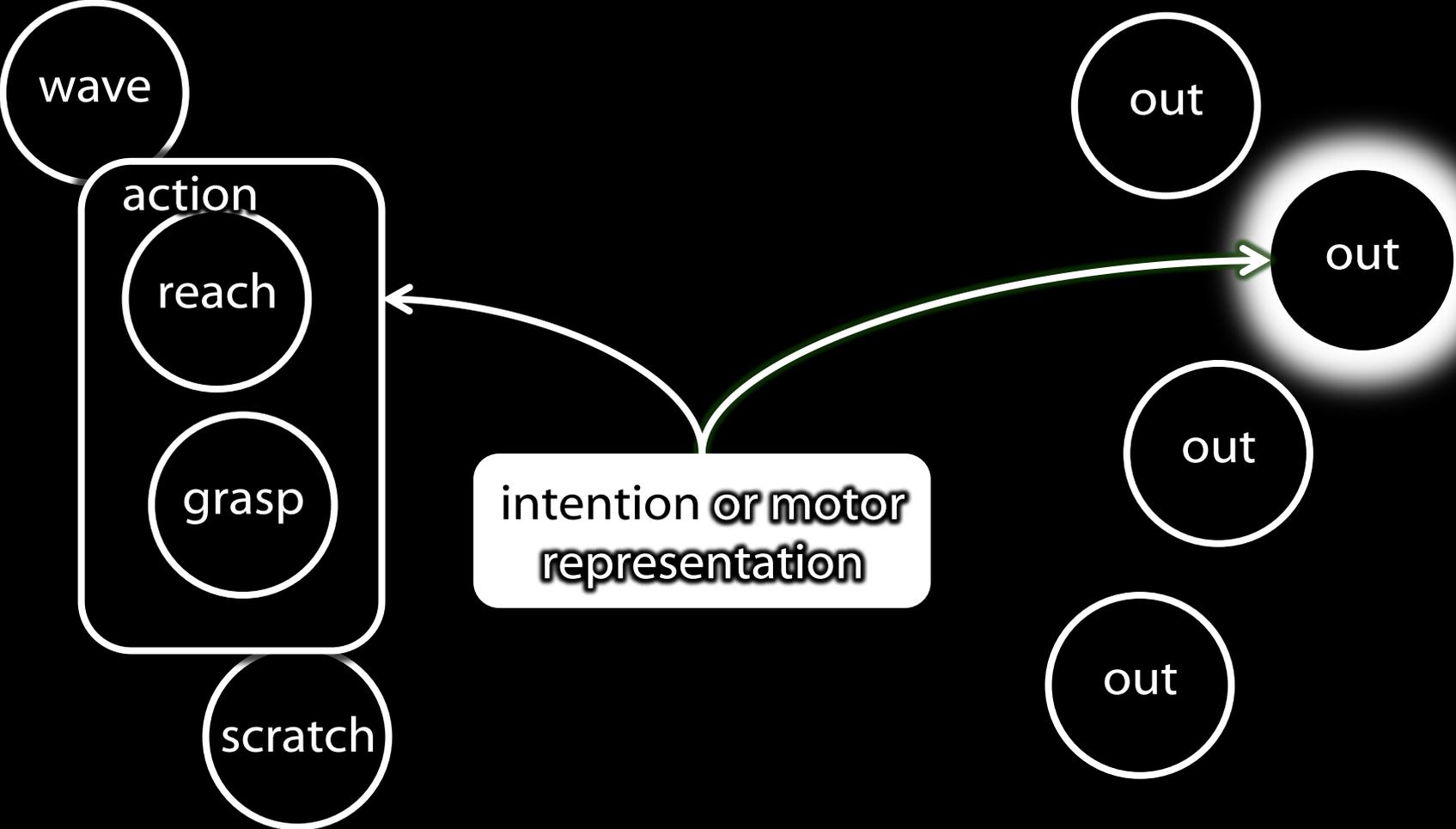
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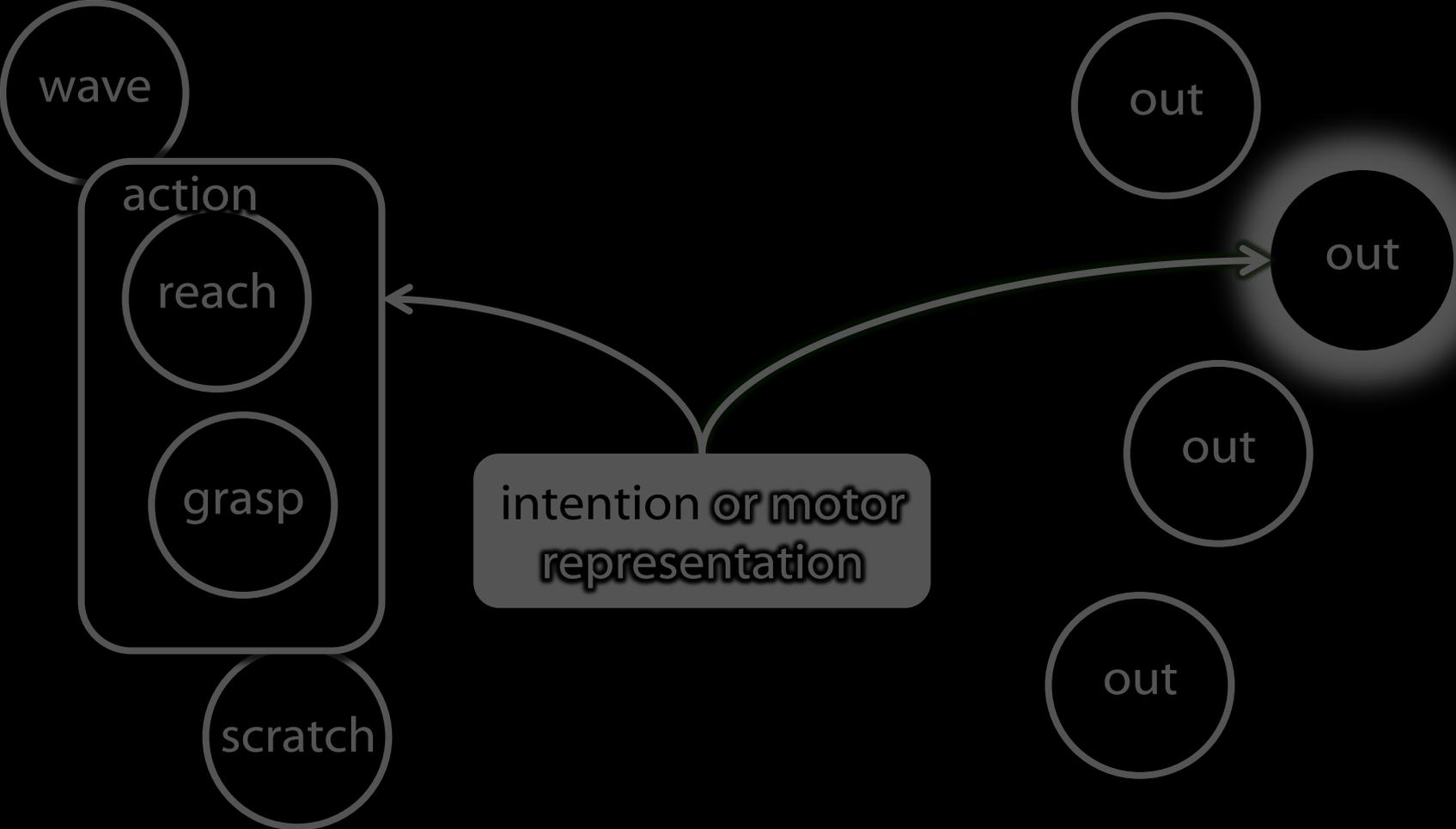
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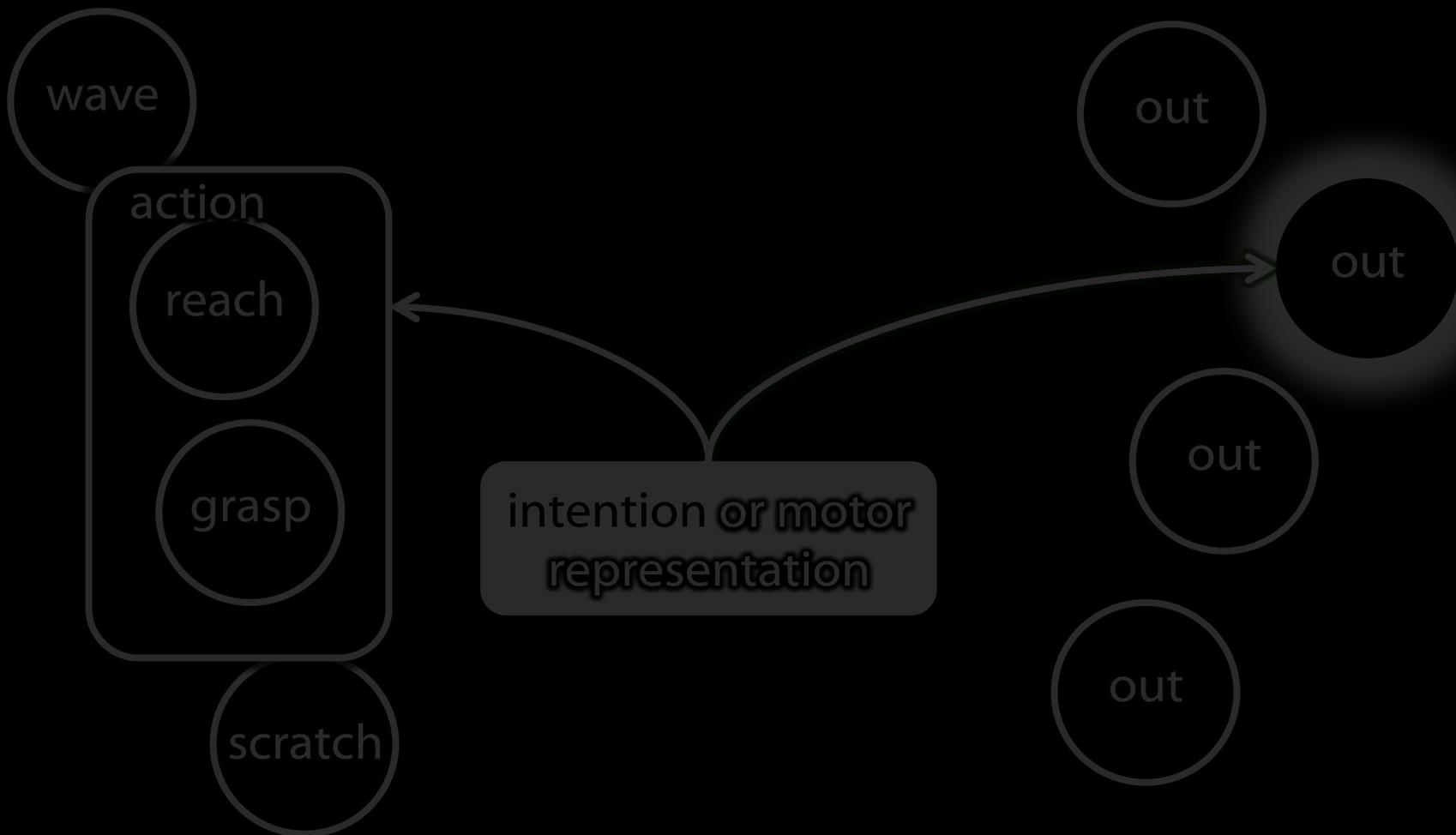
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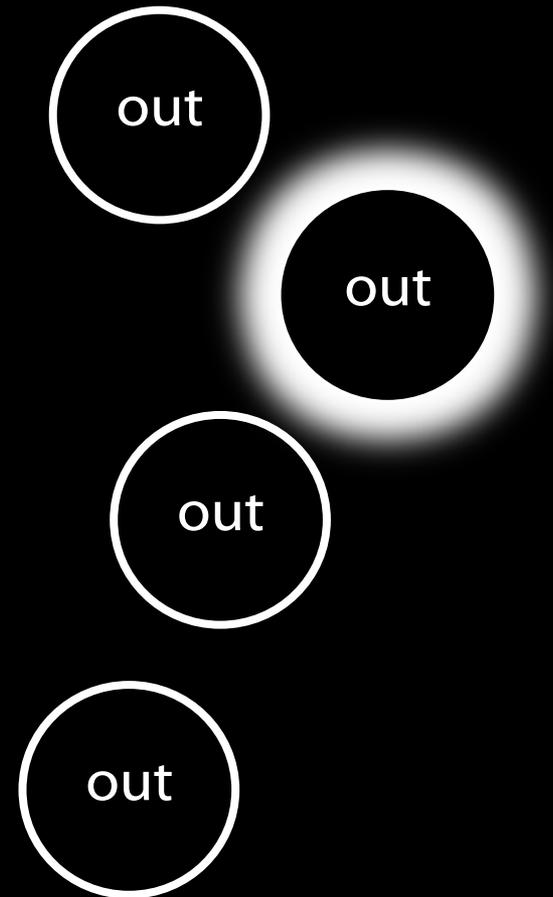
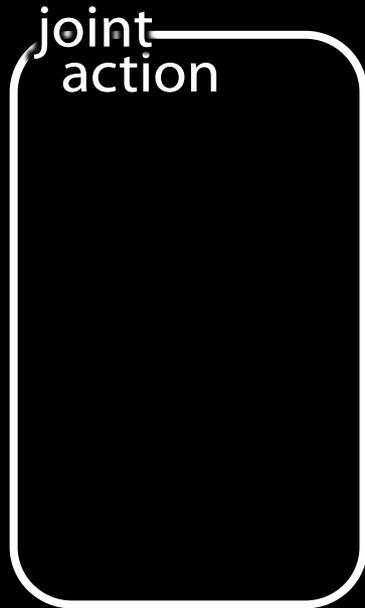
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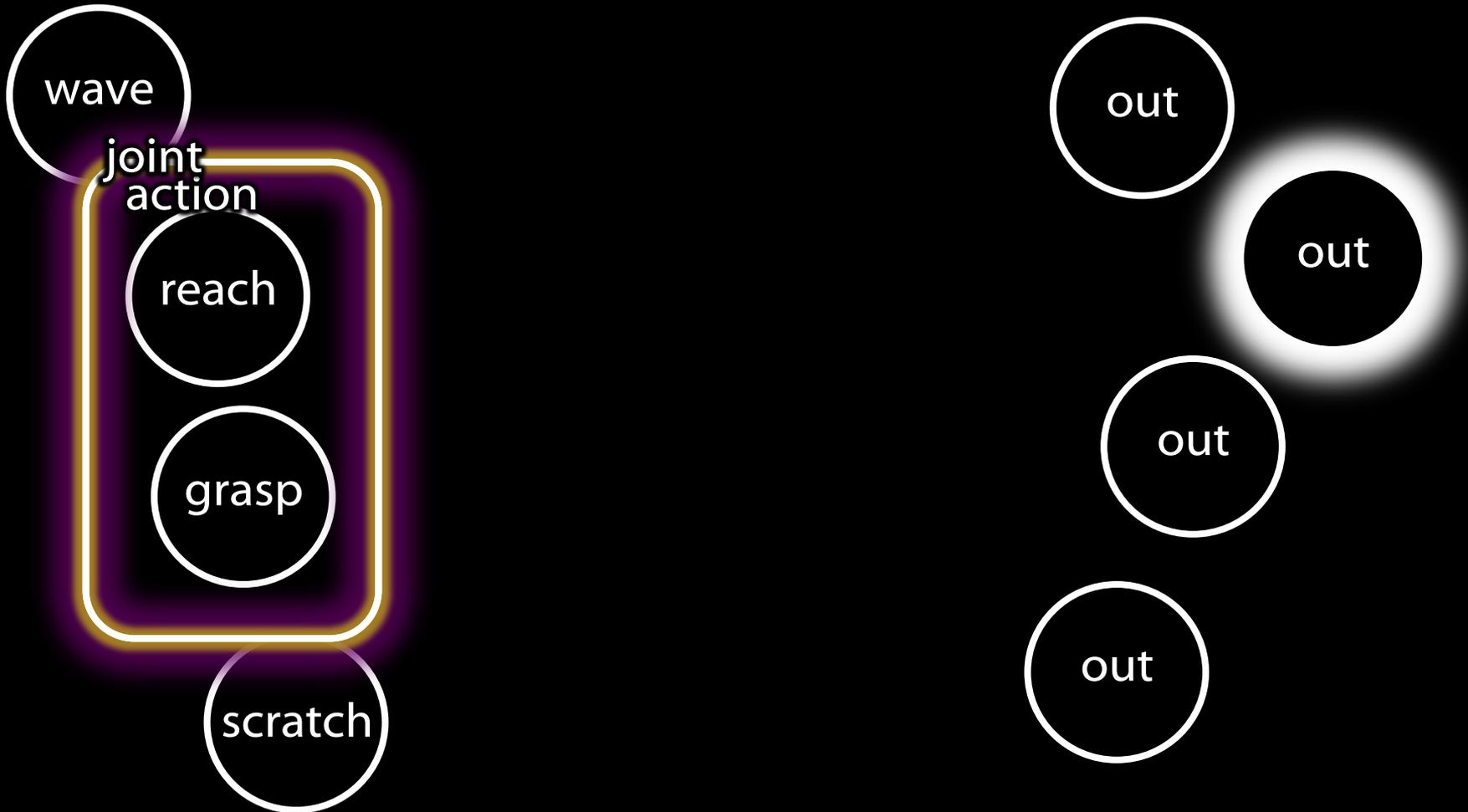
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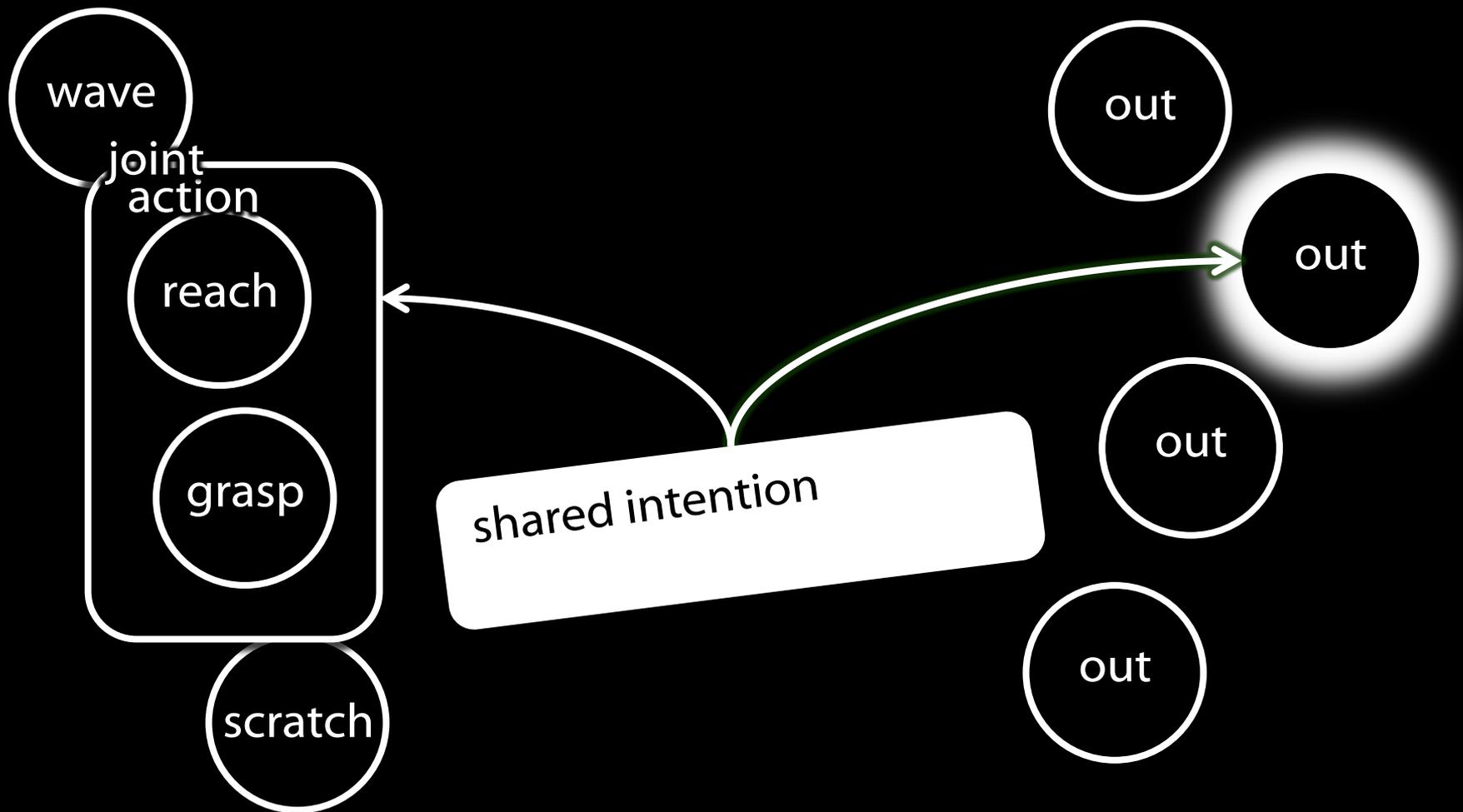
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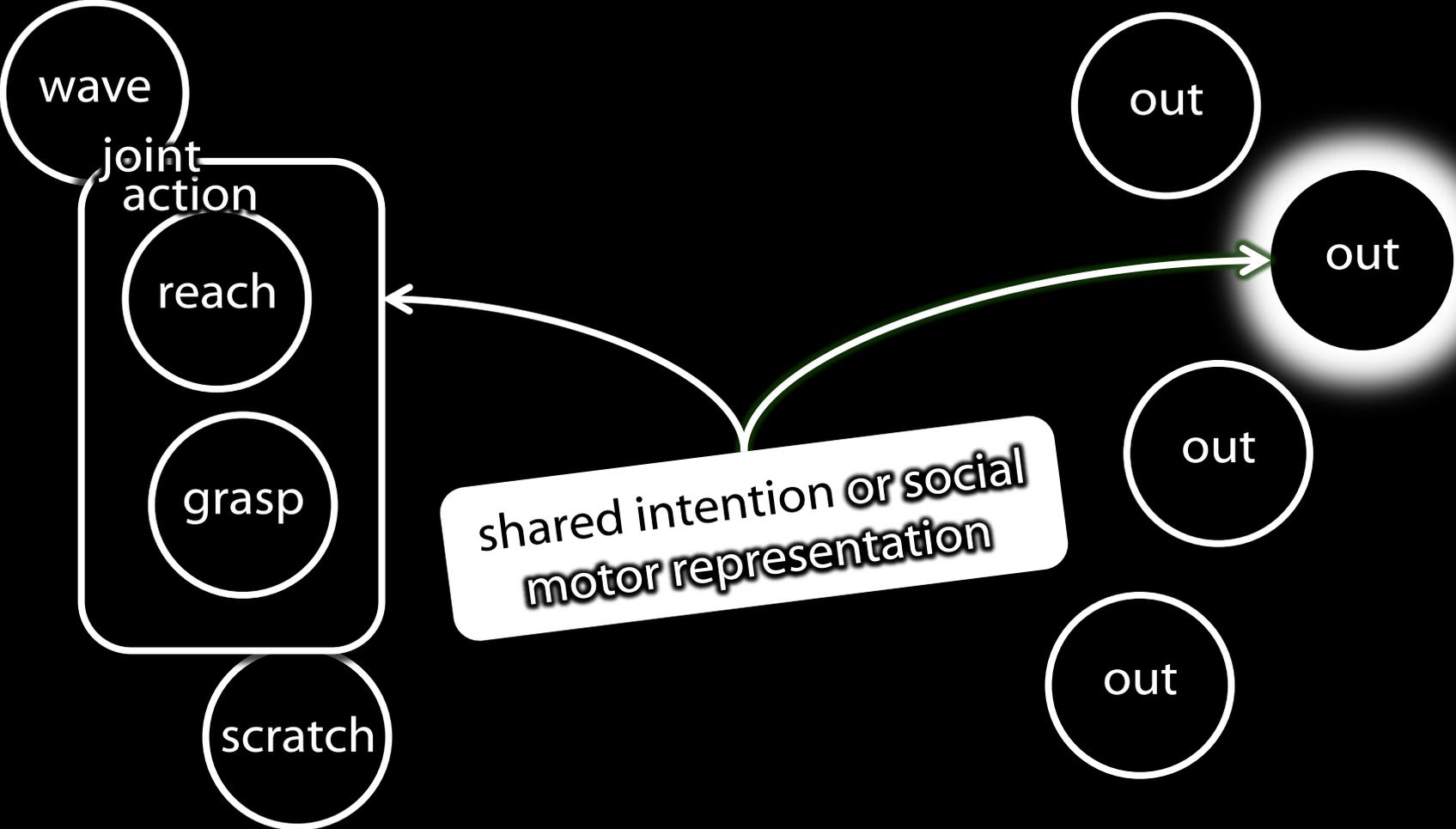
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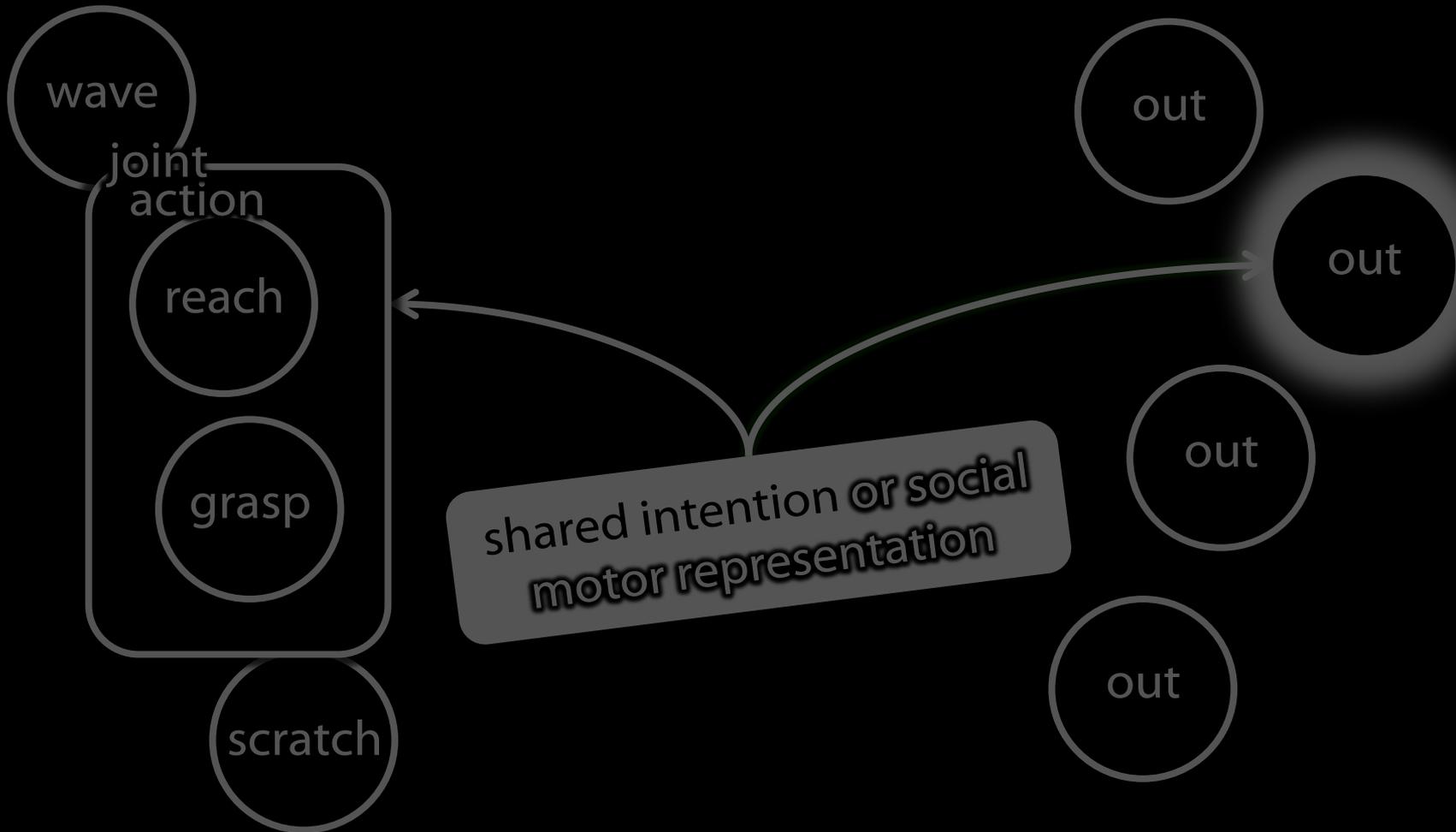
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## Sufficient conditions

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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Reciprocal agent-neutral motor representation  
enables some joint actions

question:

Does reciprocal agent-  
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representation also play a  
role in explaining what  
joint action is? [Yes]

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How could social motor  
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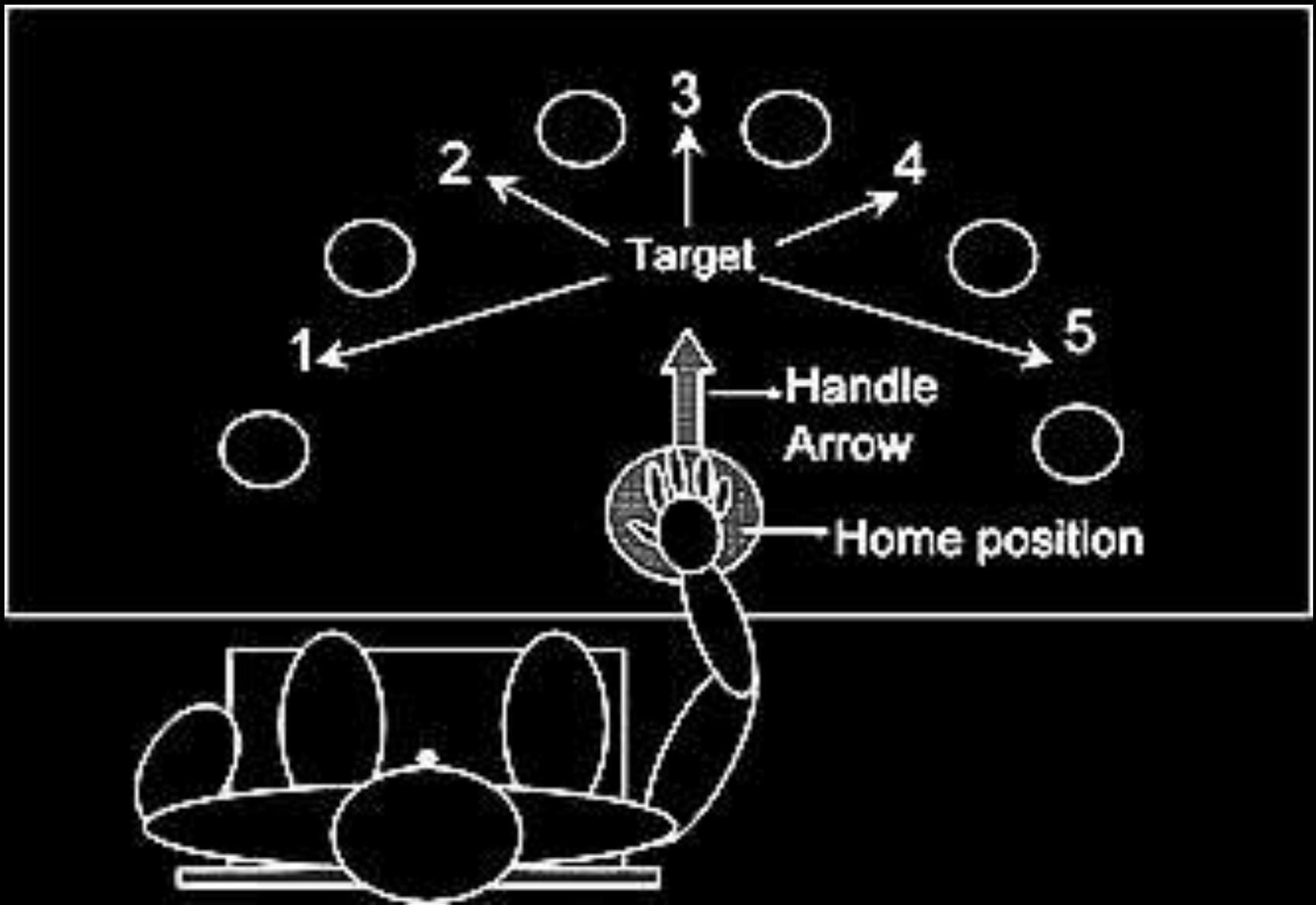
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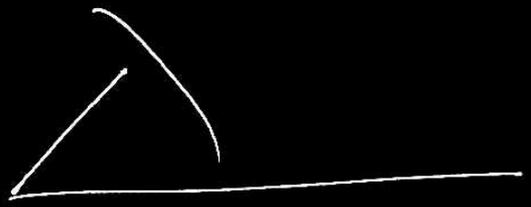
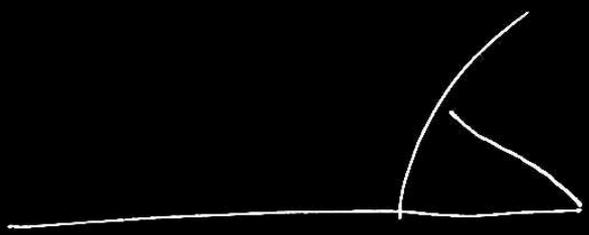
What are intentions for?



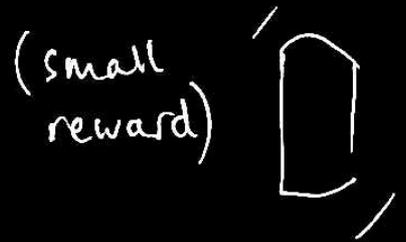
(Zhang and Rosenbaum 2007)



(big  
reward)



↑  
ONE  
WAY

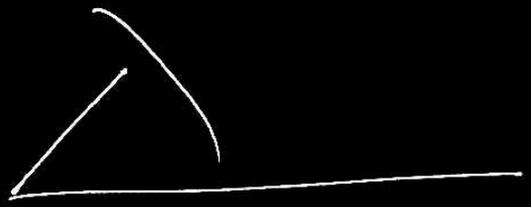
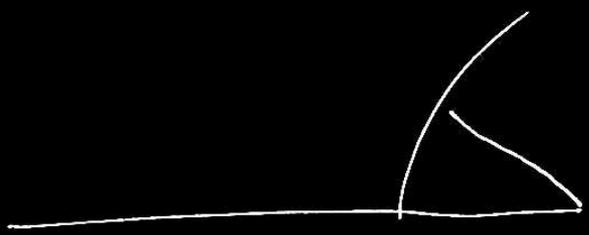


x start here

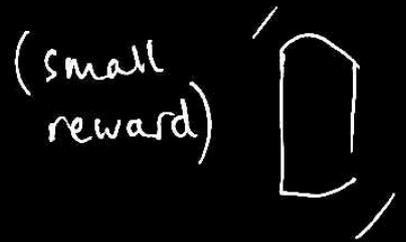
shared  
What are intentions for?  
人



(big  
reward)



↑  
ONE  
WAY



x start here

moving an object together

(Kourtis et al 2010)

tidying up the toys together

(Behne et al 2005)

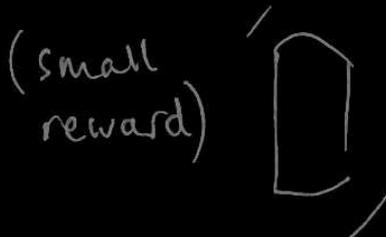
cooperatively pulling  
handles in sequence to  
make a dog-puppet sing

(Brownell et al 2006)

bouncing a cube on a large  
trampoline together

(Tomasello & Carpenter 2007)

pretending to row a boat  
together



ONE  
WAY

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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.



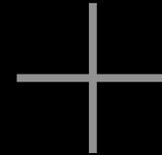
All intentions are propositional attitudes.

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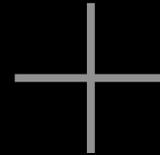
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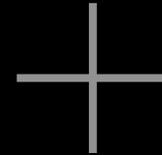
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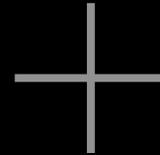
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No motor representations are intentions

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# The Interface Problem

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Some joint actions involve  
both shared intention and  
reciprocal agent-neutral  
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# 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?

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iii. differ in format from  
(the constituent attitudes  
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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

=



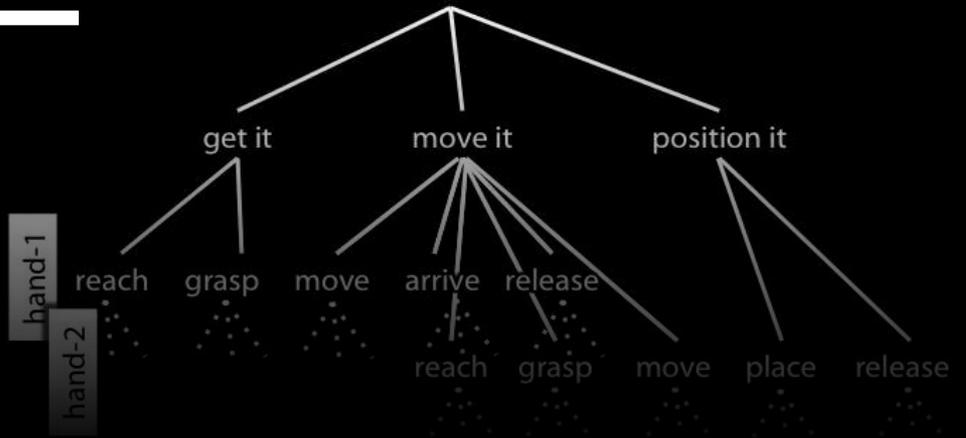
?

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.

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

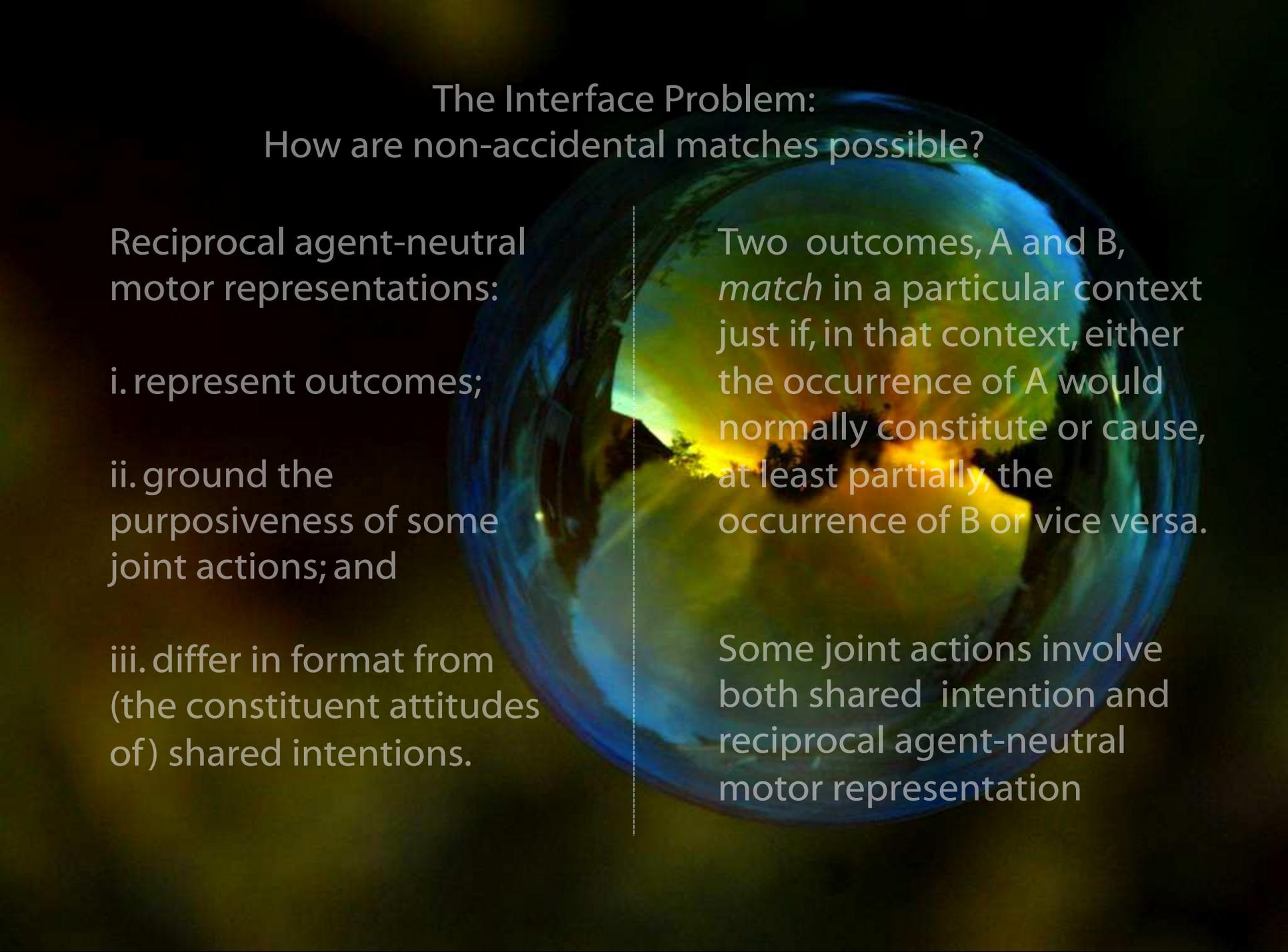
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