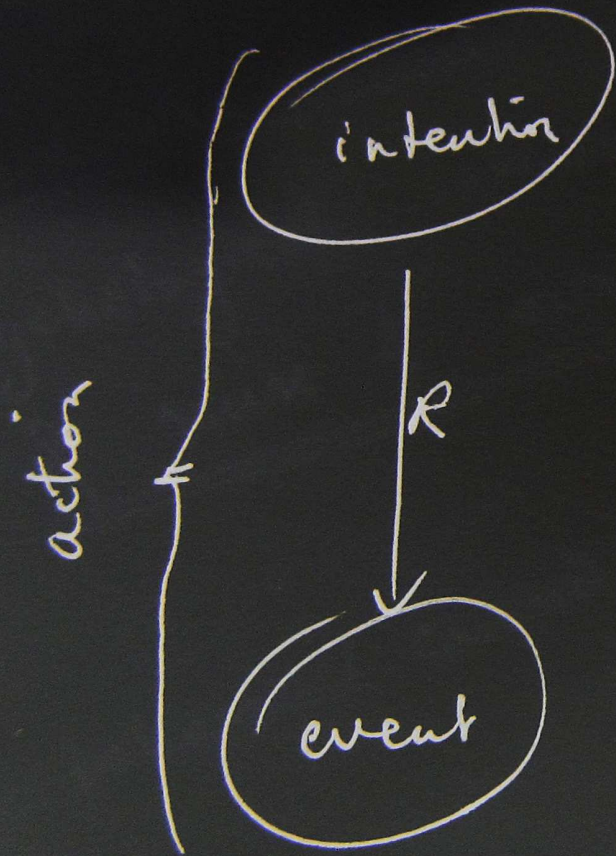


Intention and Motor Representation in Action Explanation

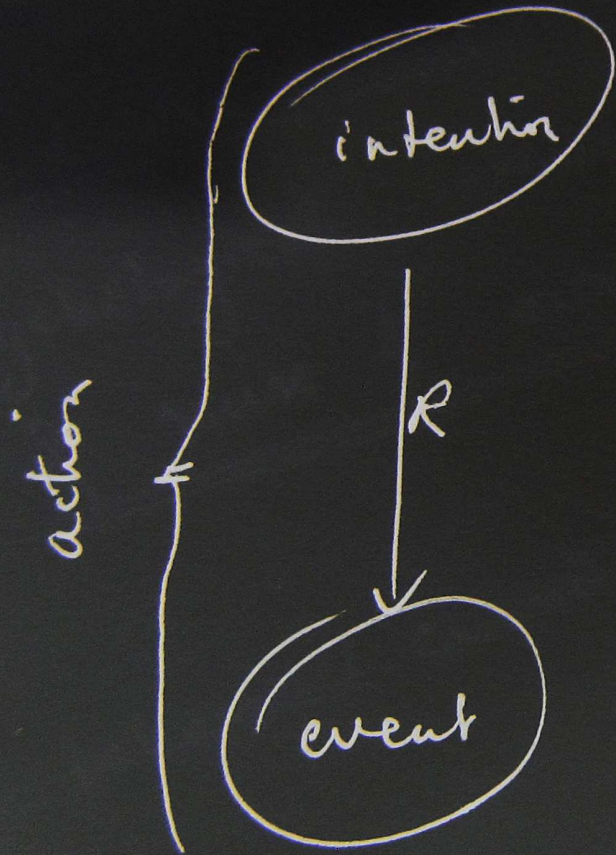
s.butterfill@warwick.ac.uk
corrado.sinigaglia@unimi.it



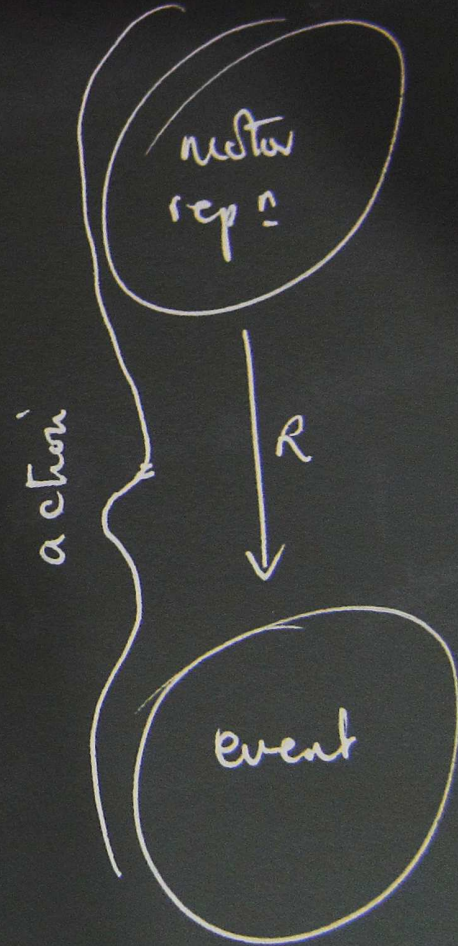
philosophy



philosophy



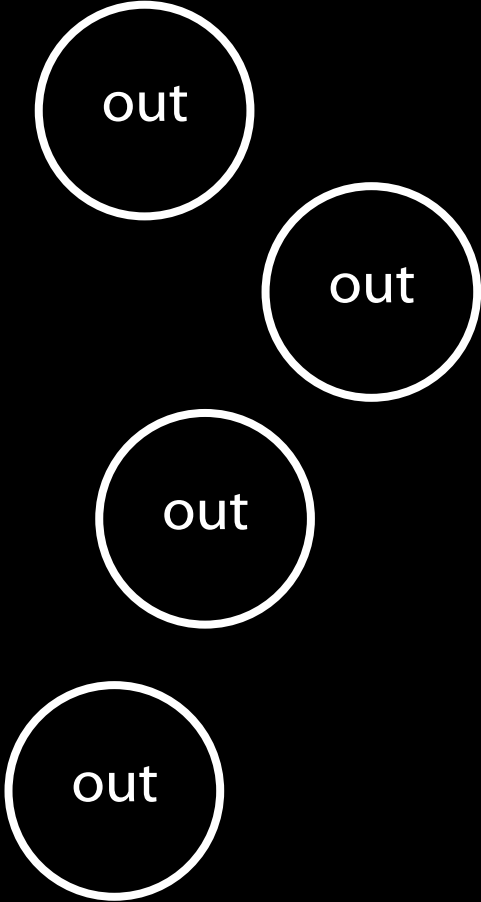
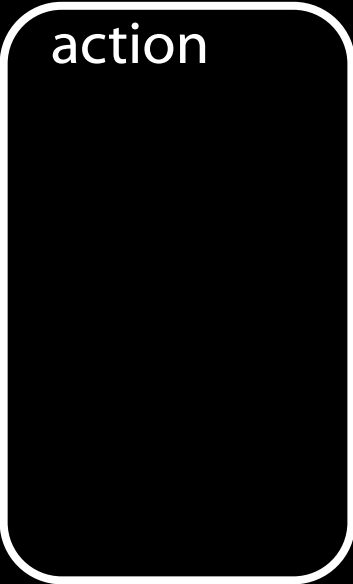
science



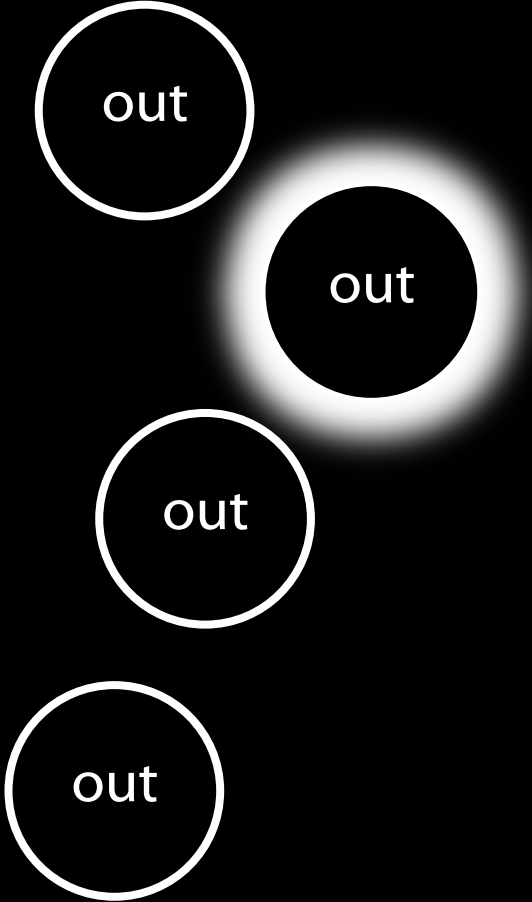
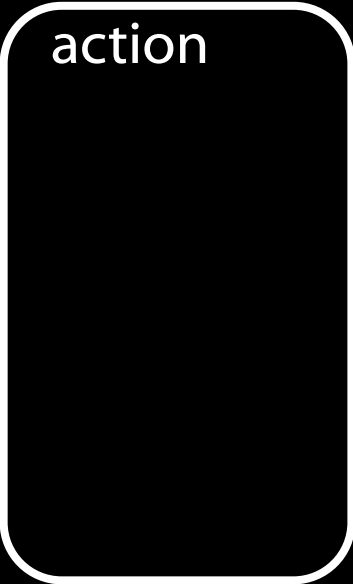
hip.

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

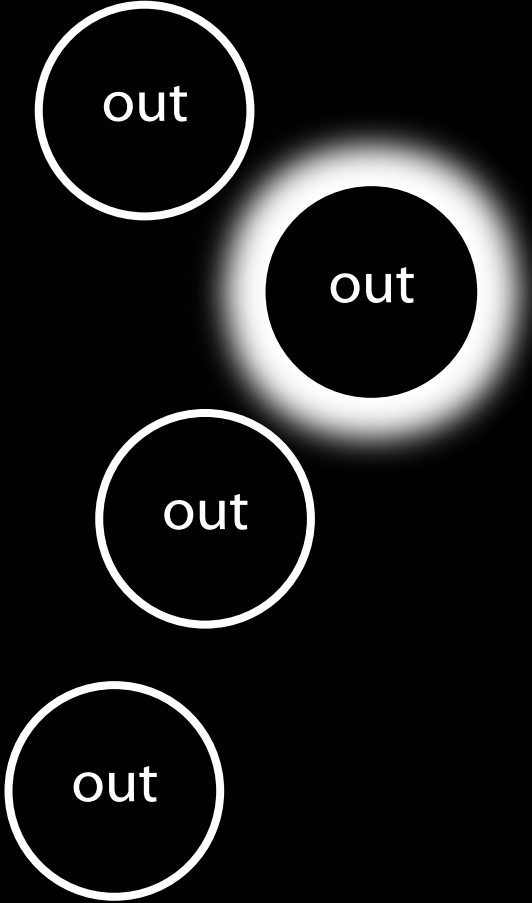
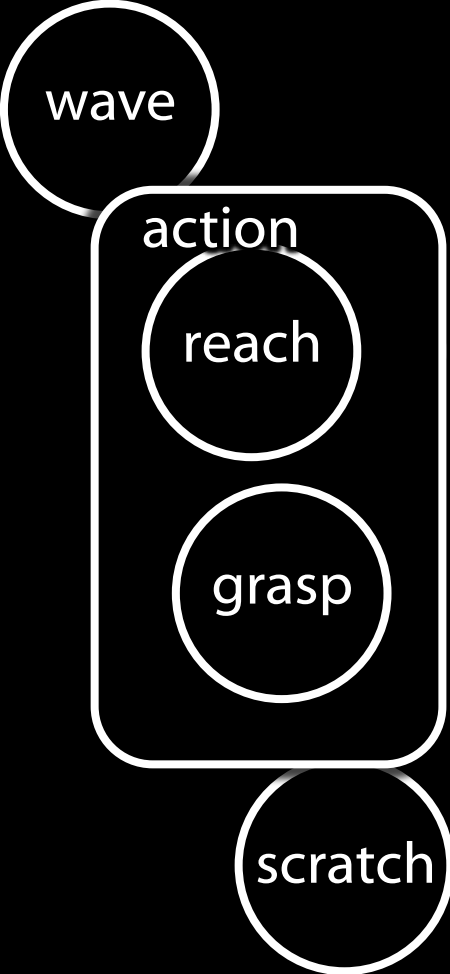
What is the relation between a purposive action and the outcome or outcomes to which it is directed?



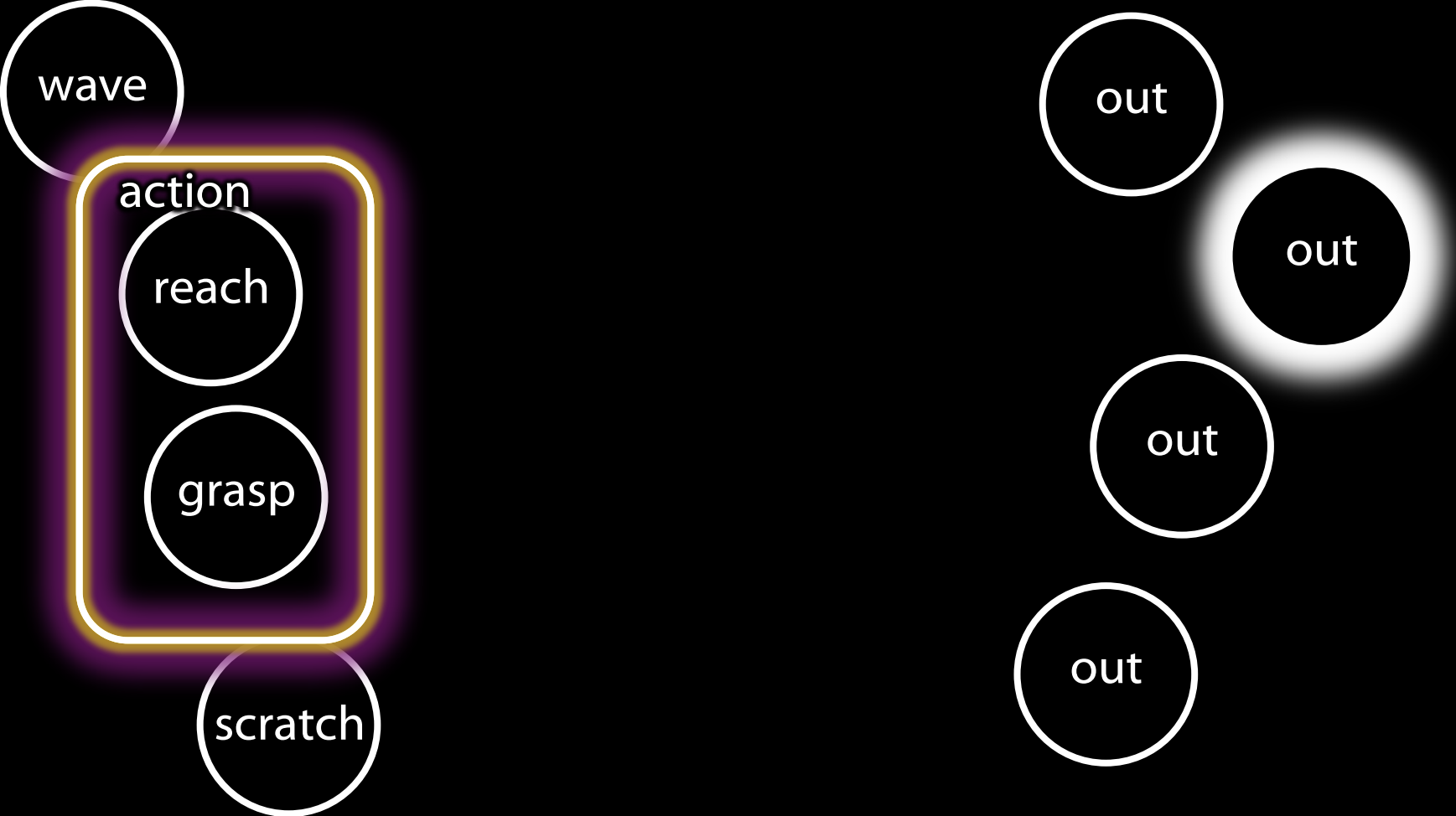
What is the relation between a purposive action and the outcome or outcomes to which it is directed?



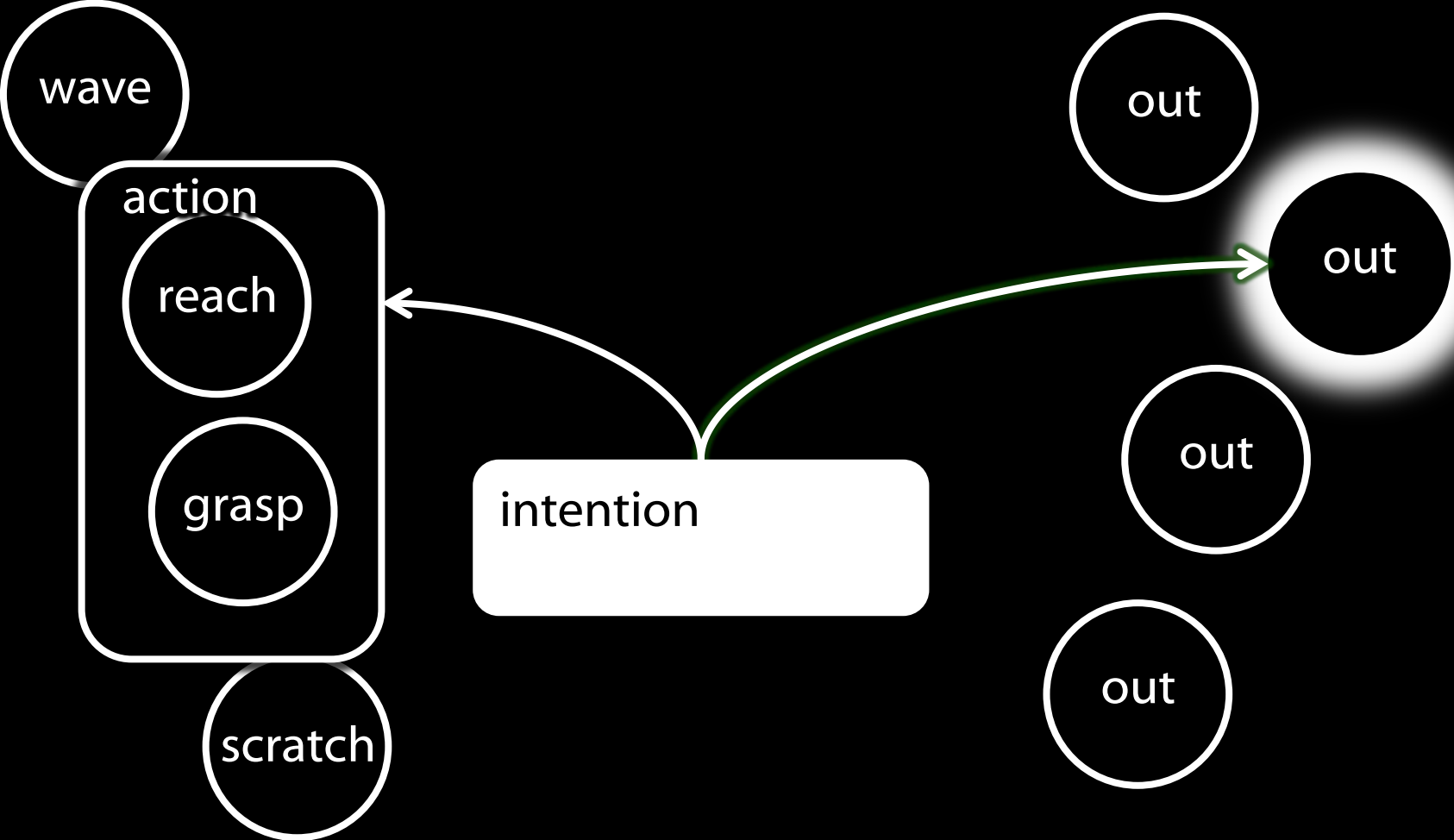
What is the relation between a purposive action and the outcome or outcomes to which it is directed?



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

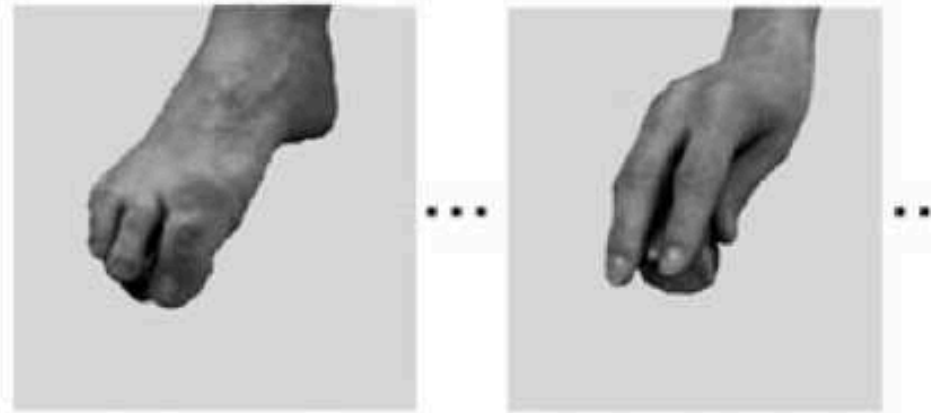


What is the relation between a purposive action and the outcome or outcomes to which it is directed?



Some motor representations carry information about outcomes.

Some motor representations carry information about outcomes.



same
effector

different
effector



same outcome

Cattaneo et al (2010)

Some motor representations carry information about outcomes.



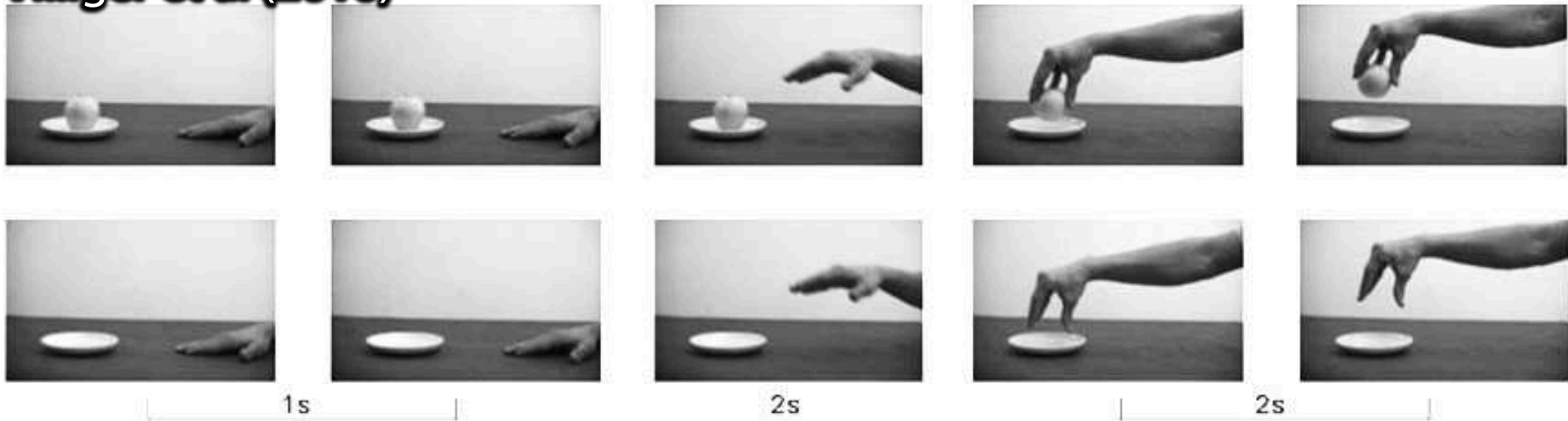
same effector

different effector

same outcome

Cattaneo et al (2010)

Villiger et al (2010)



Some motor representations carry information about outcomes.



same
effector

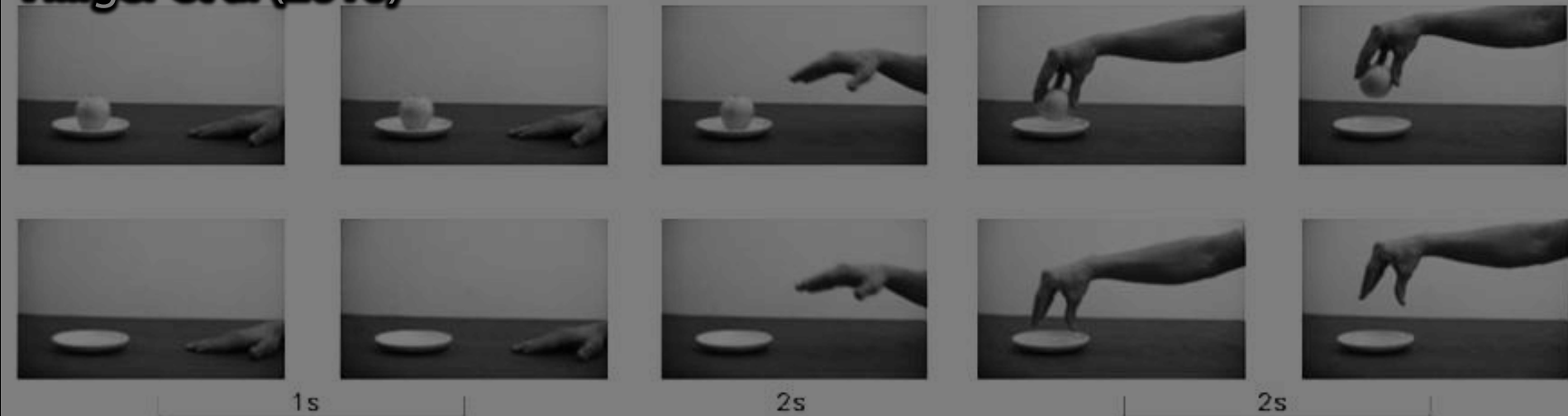
different
effector



same outcome

Cattaneo et al (2010)

Villiger et al (2010)

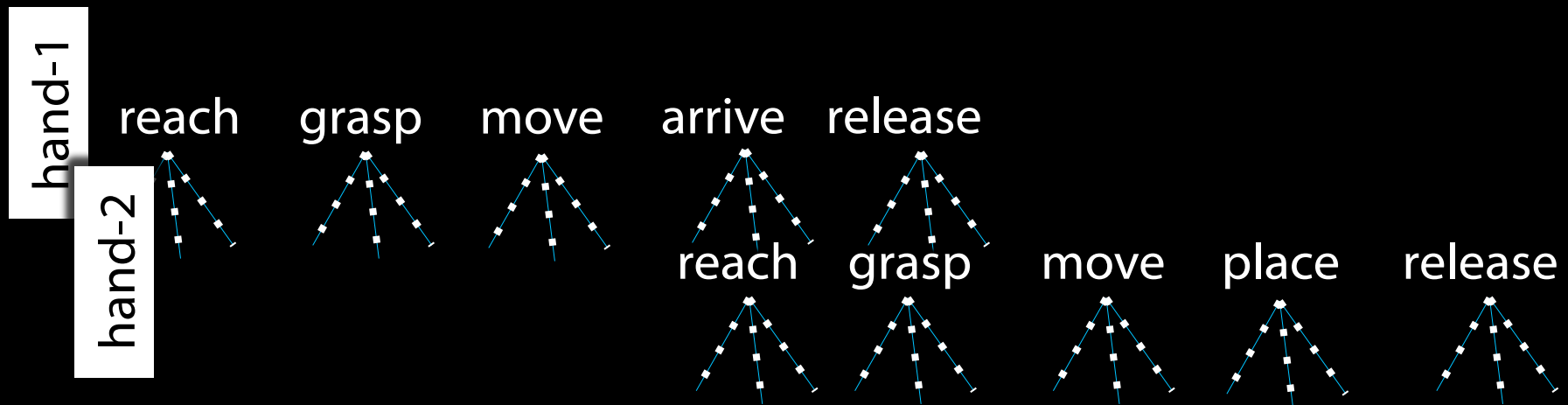


Some motor representations carry information about outcomes.

Information about outcomes guides planning.

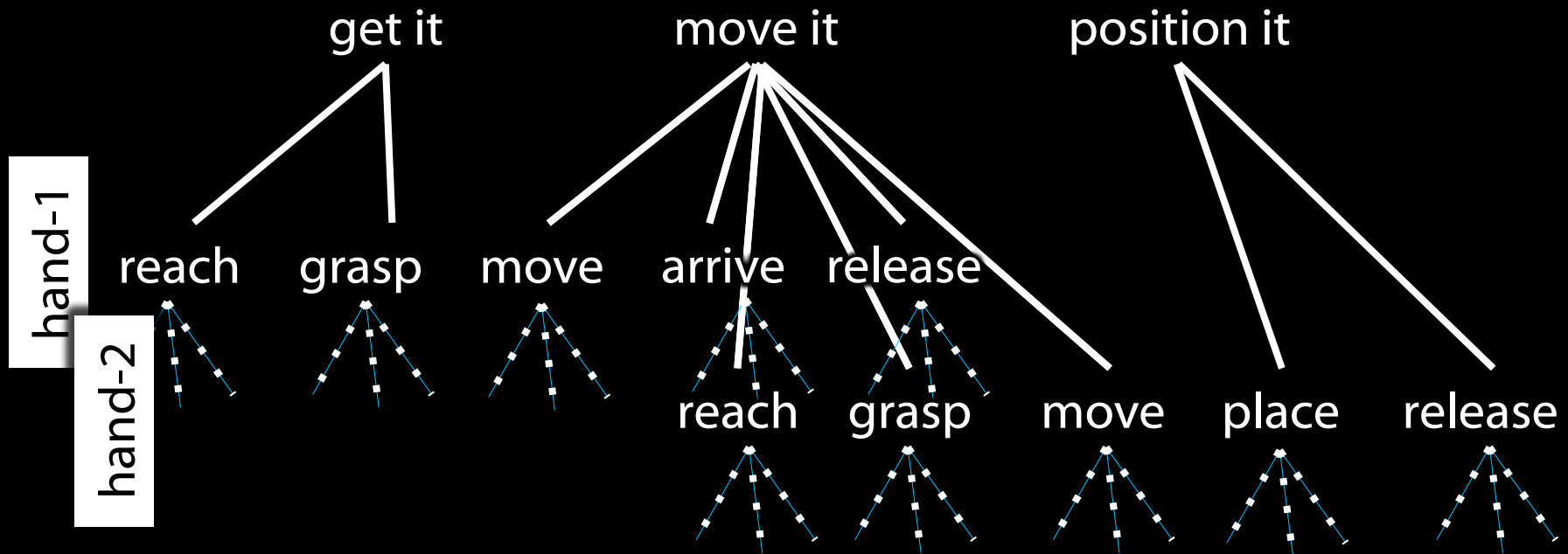
Some motor representations carry information about outcomes.

Information about outcomes guides planning.



Some motor representations carry information about outcomes.

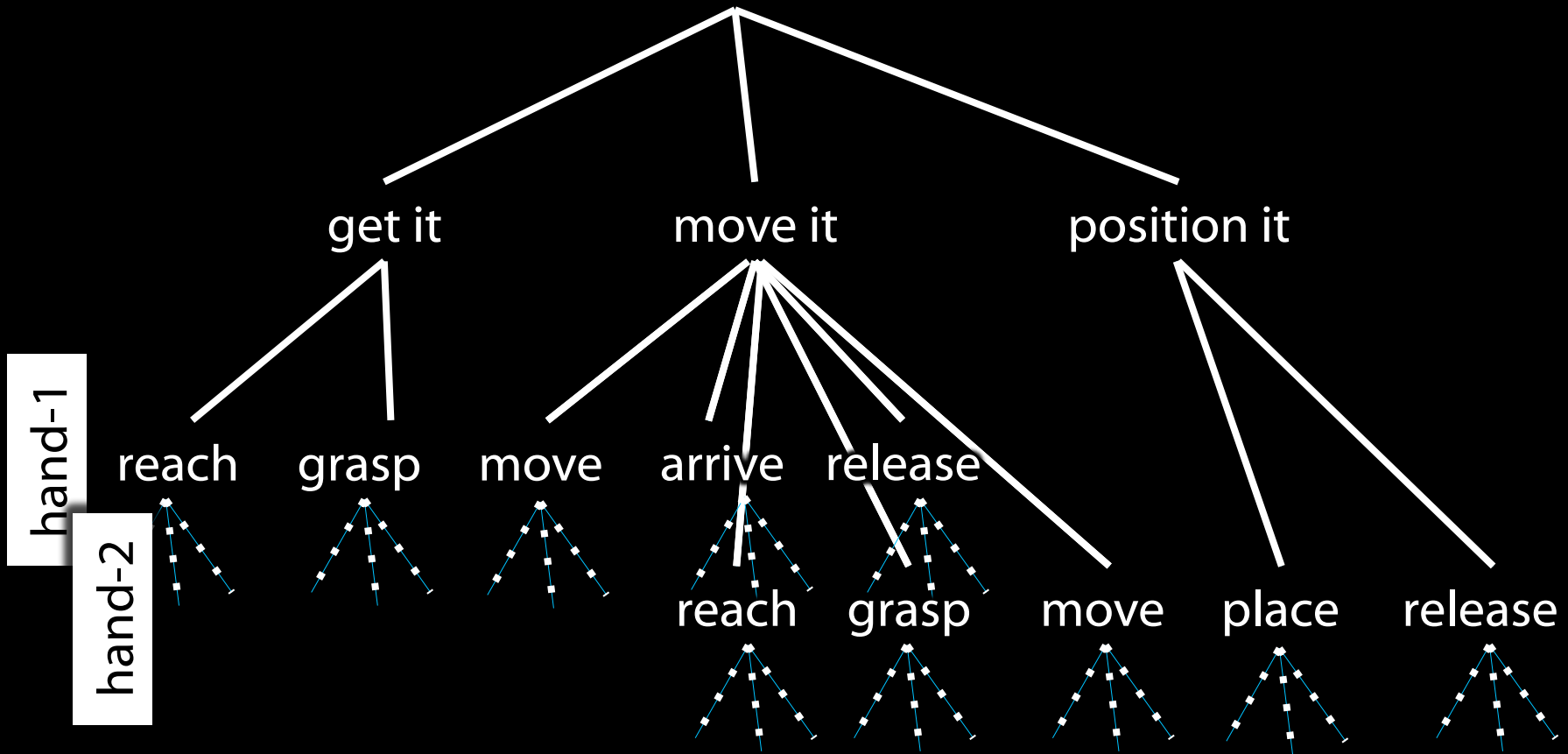
Information about outcomes guides planning.



Some motor representations carry information about outcomes.

Information about outcomes guides planning.

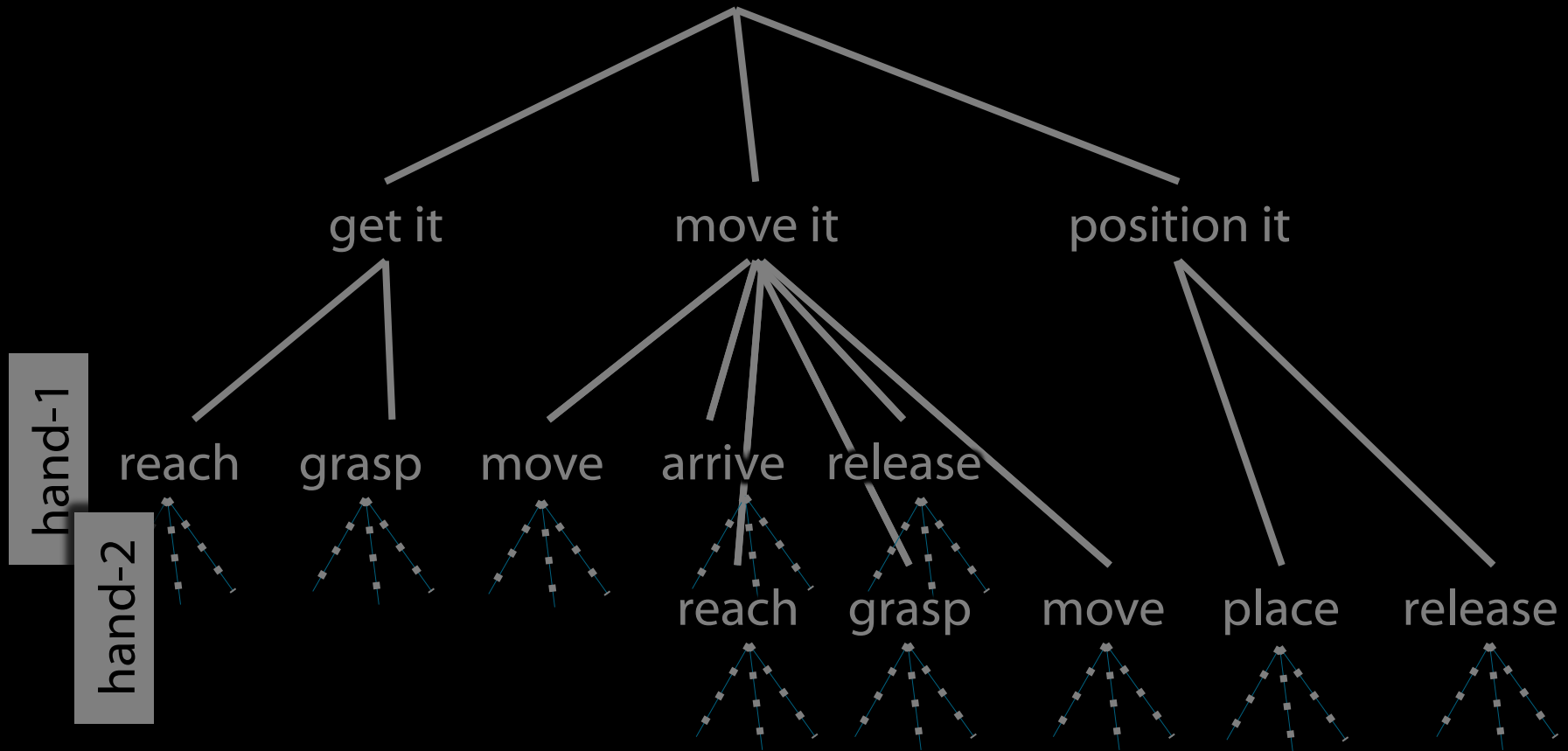
Move it from there to here



Some motor representations carry information about outcomes.

Information about outcomes guides planning.

Move it from there to here

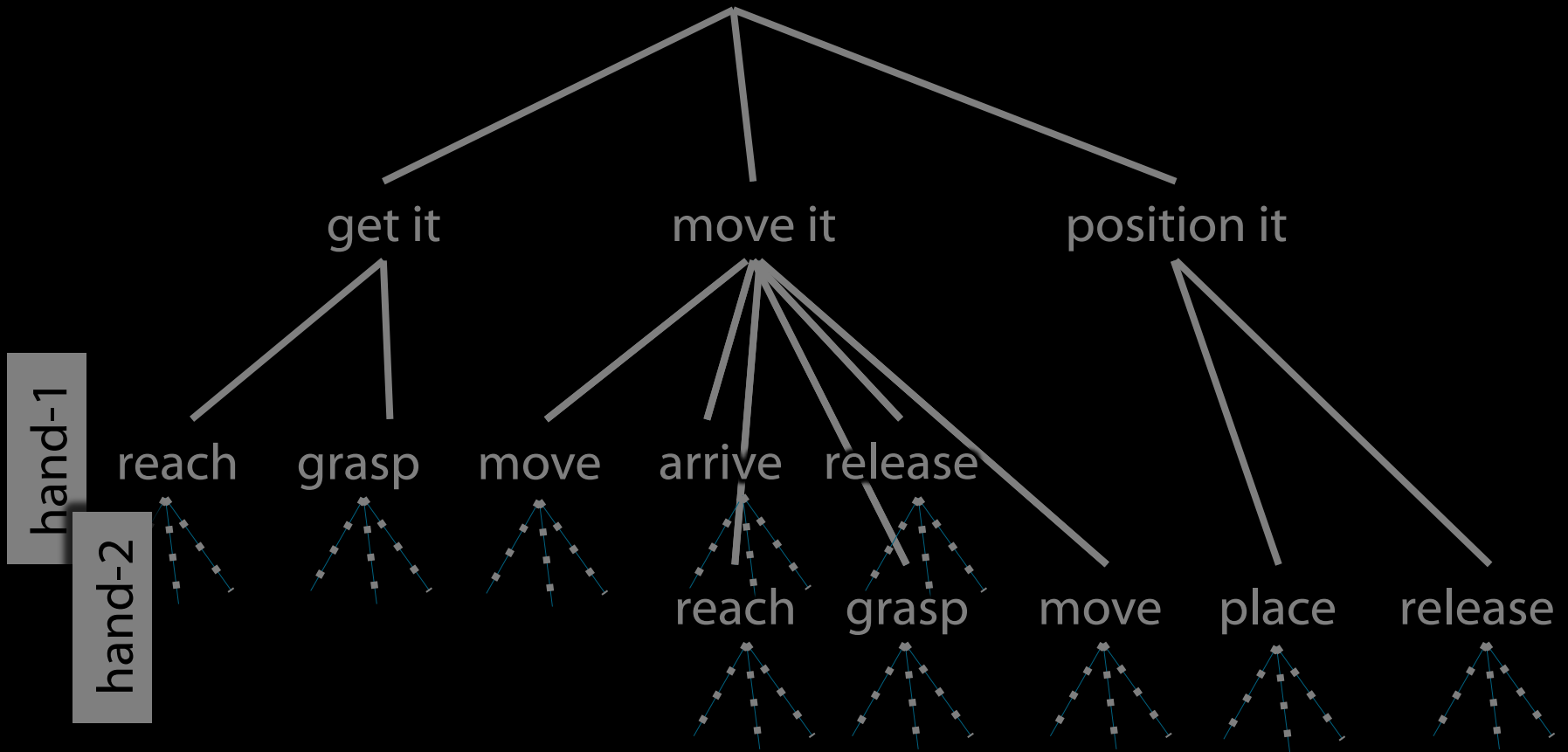


Some motor representations carry information about outcomes.

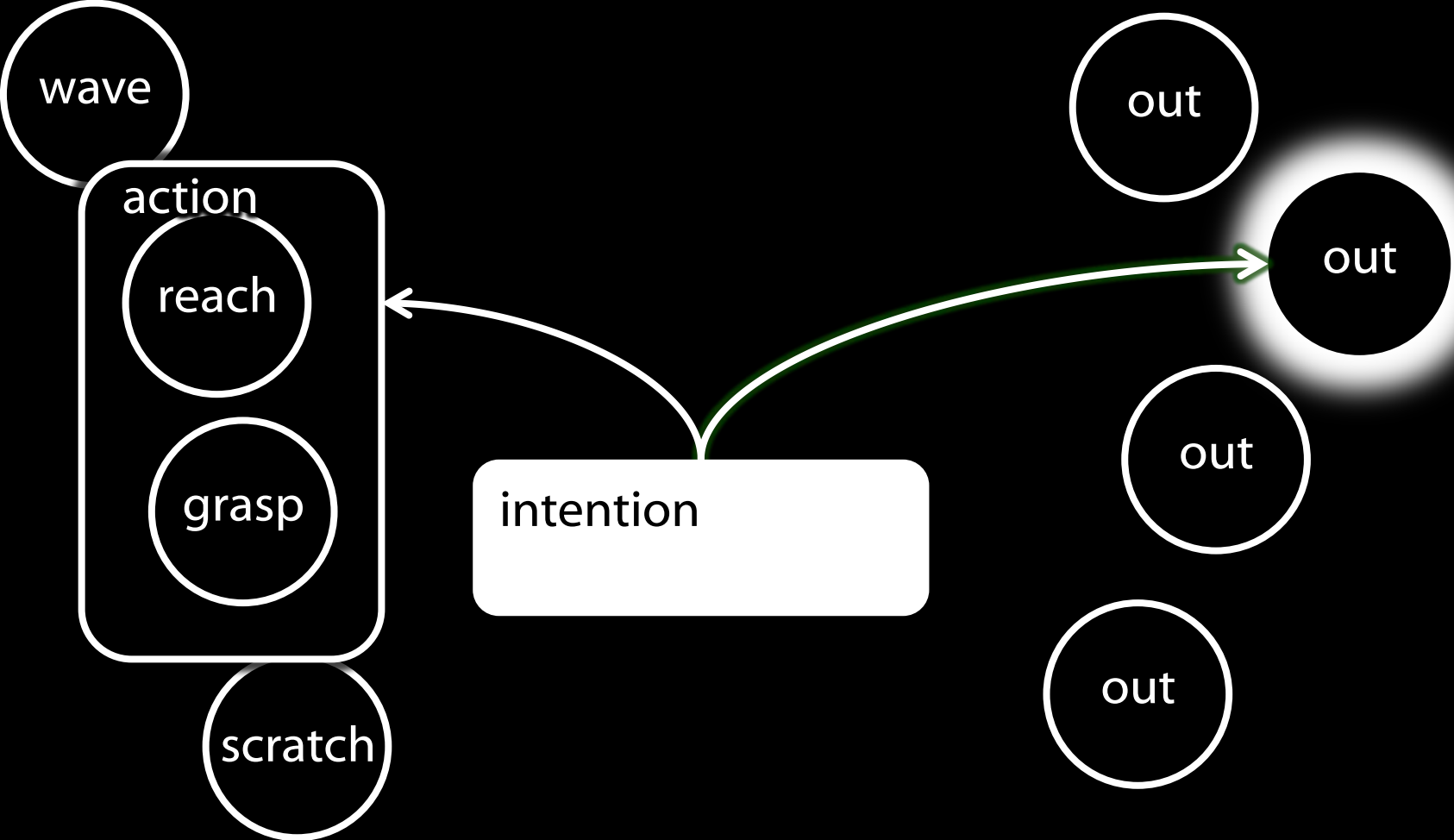
Information about outcomes guides planning.

Some motor representations represent outcomes

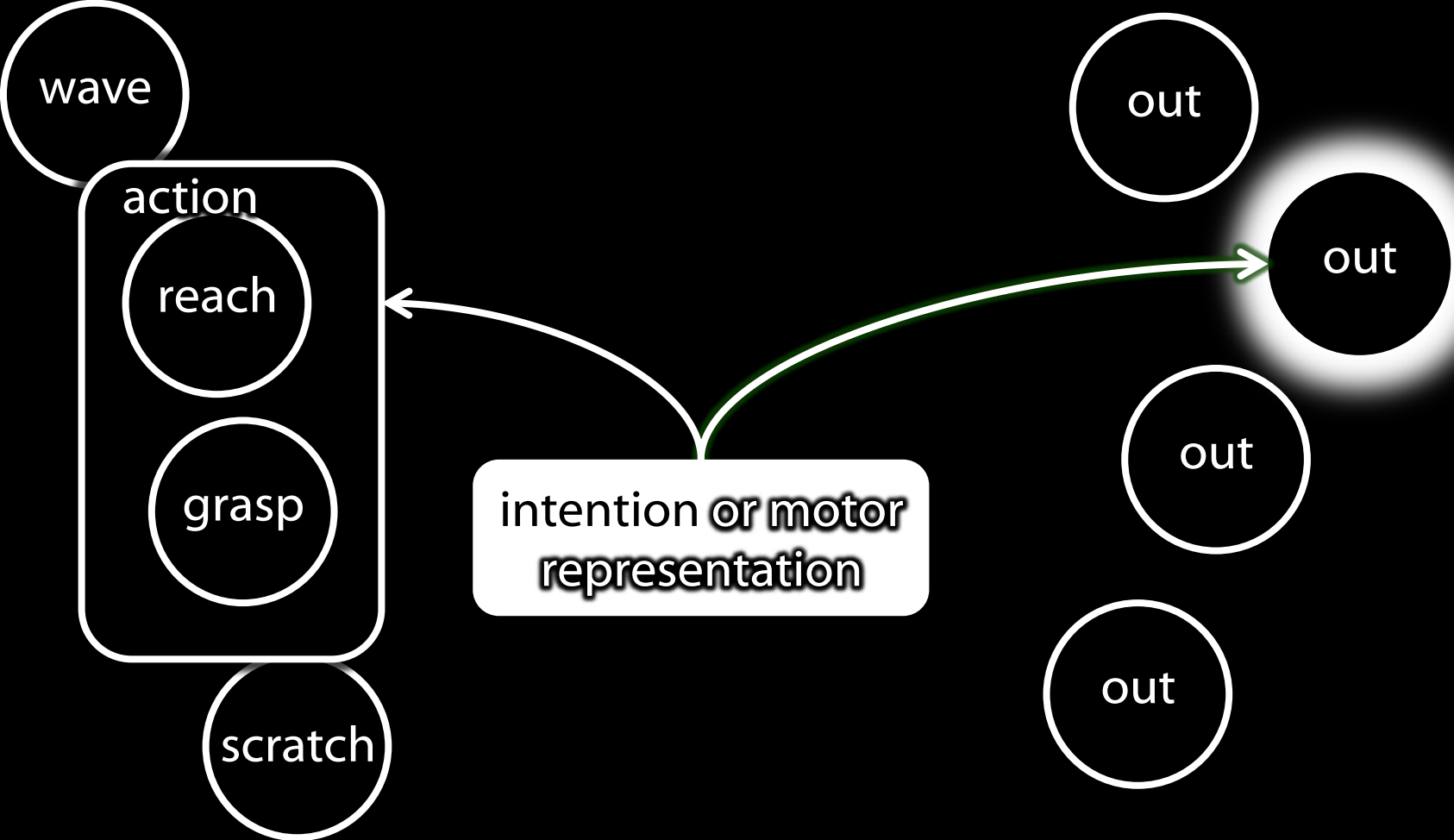
Move it from there to here



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



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



motor representation = intention ?

motor representation = intention ? No !

< 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...



< different format >

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



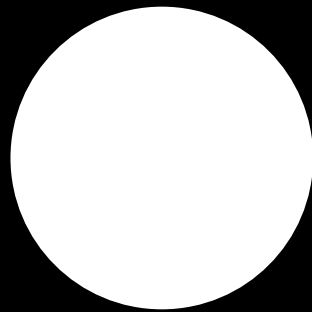
e.g. rapid identification of key landmarks; slow translation into compass directions

Rapid identification of direction of start from end (projection-dependent)

< different performance >

imagine

seeing

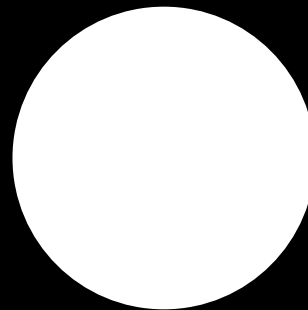


imagine

actually

seeing

seeing



imagine

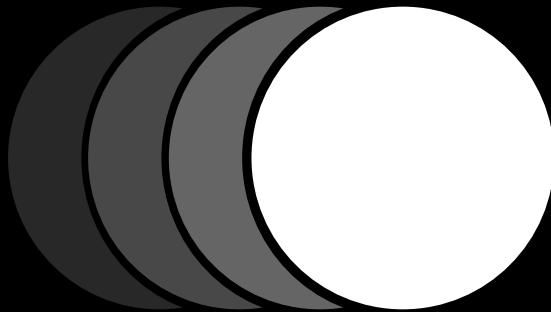
actually

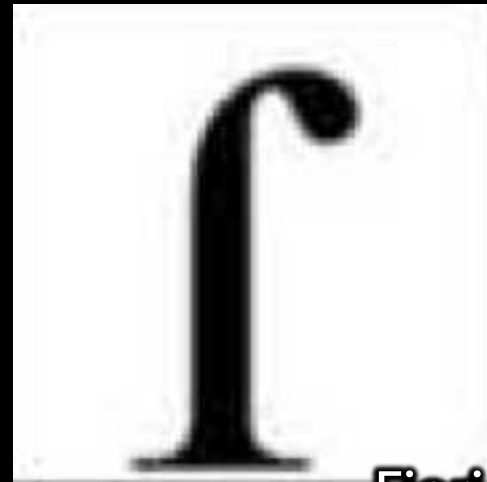
seeing

acting

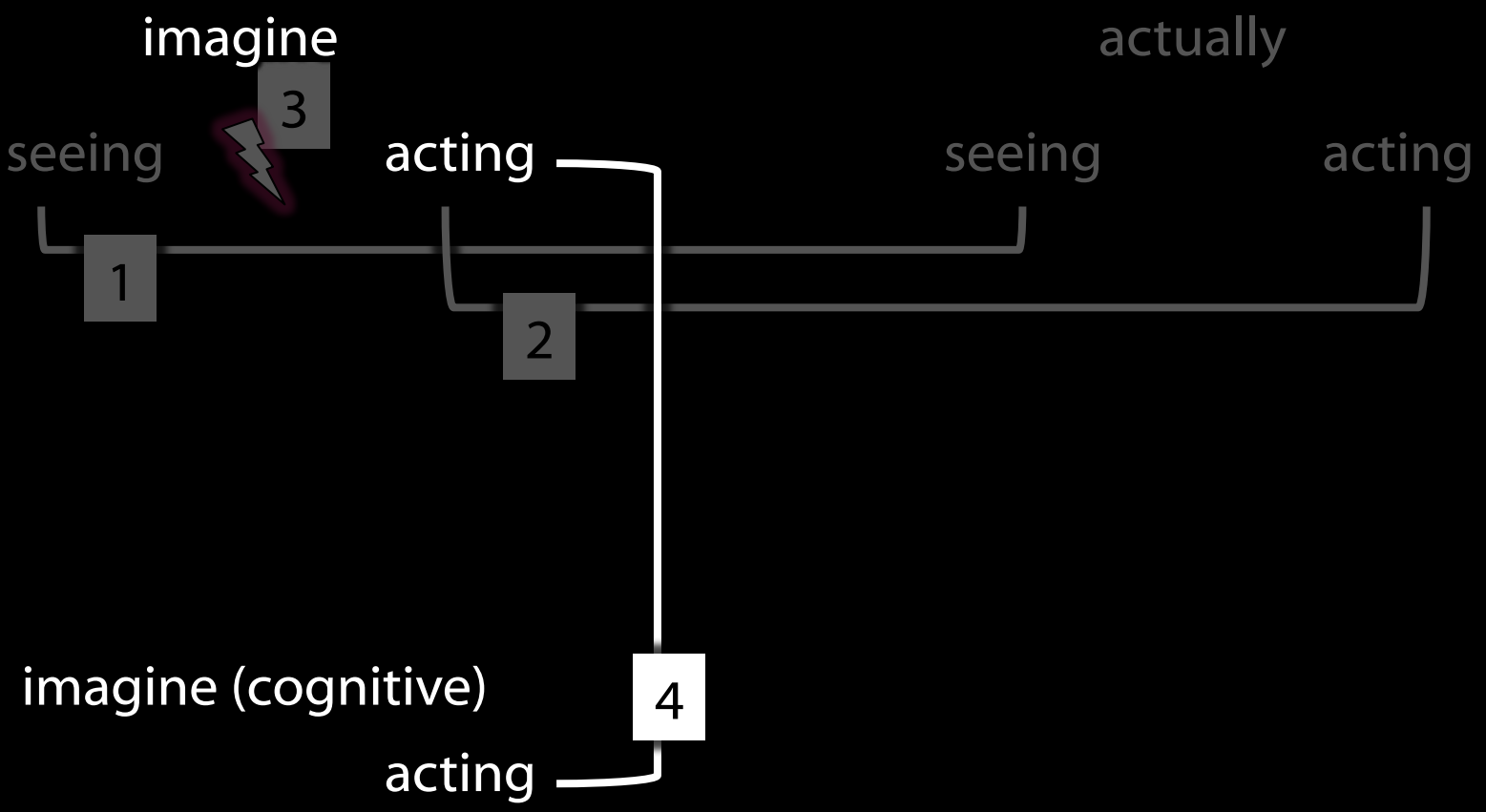
seeing

acting





Fiori et al (2012)



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 Lyon on Friday is a propositional attitude.

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 Lyon on Friday is a propositional attitude.



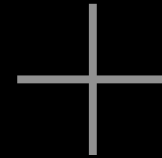
All intentions are propositional attitudes.

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 Lyon on Friday is a propositional attitude.

All intentions are propositional attitudes.



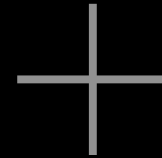
No motor representations are propositional attitudes.

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 Lyon on Friday is a propositional attitude.

All intentions are propositional attitudes.



No motor representations are propositional attitudes.

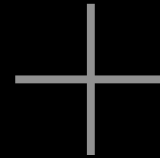
No motor representations are intentions

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 Lyon on Friday is a propositional attitude.

All intentions are propositional attitudes.



No motor representations are propositional attitudes.

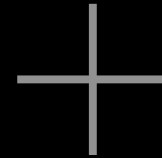
No motor representations are intentions

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 Lyon on Friday is a propositional attitude.

All intentions are propositional attitudes.



No motor representations are propositional attitudes.

No motor representations are intentions

The Interface Problem

The Interface Problem

Some actions involve both
intention and motor
representation

The Interface Problem

motor representations:

i. represent outcomes;

ii. ground the
purposiveness of some
actions

Some actions involve both
intention and motor
representation

The Interface Problem

motor representations:

i. represent outcomes;

ii. ground the
purposiveness of some
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.

Some actions involve both
intention and motor
representation

The Interface Problem:

How are non-accidental matches possible?

motor representations:

i. represent outcomes;

ii. ground the
purposiveness of some
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.

Some actions involve both
intention and motor
representation

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

motor representations:

i. represent outcomes;

ii. ground the
purposiveness of some
actions; and

iii. differ in format from
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 actions involve both
intention and motor
representation

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

motor representations:

i. represent outcomes;

ii. ground the
purposiveness of some
actions; and

iii. differ in format from
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 actions involve both
intention and motor
representation

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



Follow *that* route

=



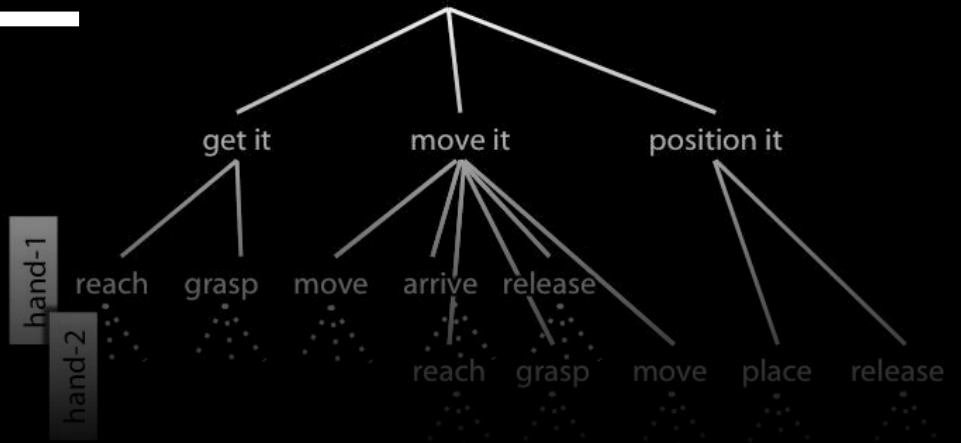
?

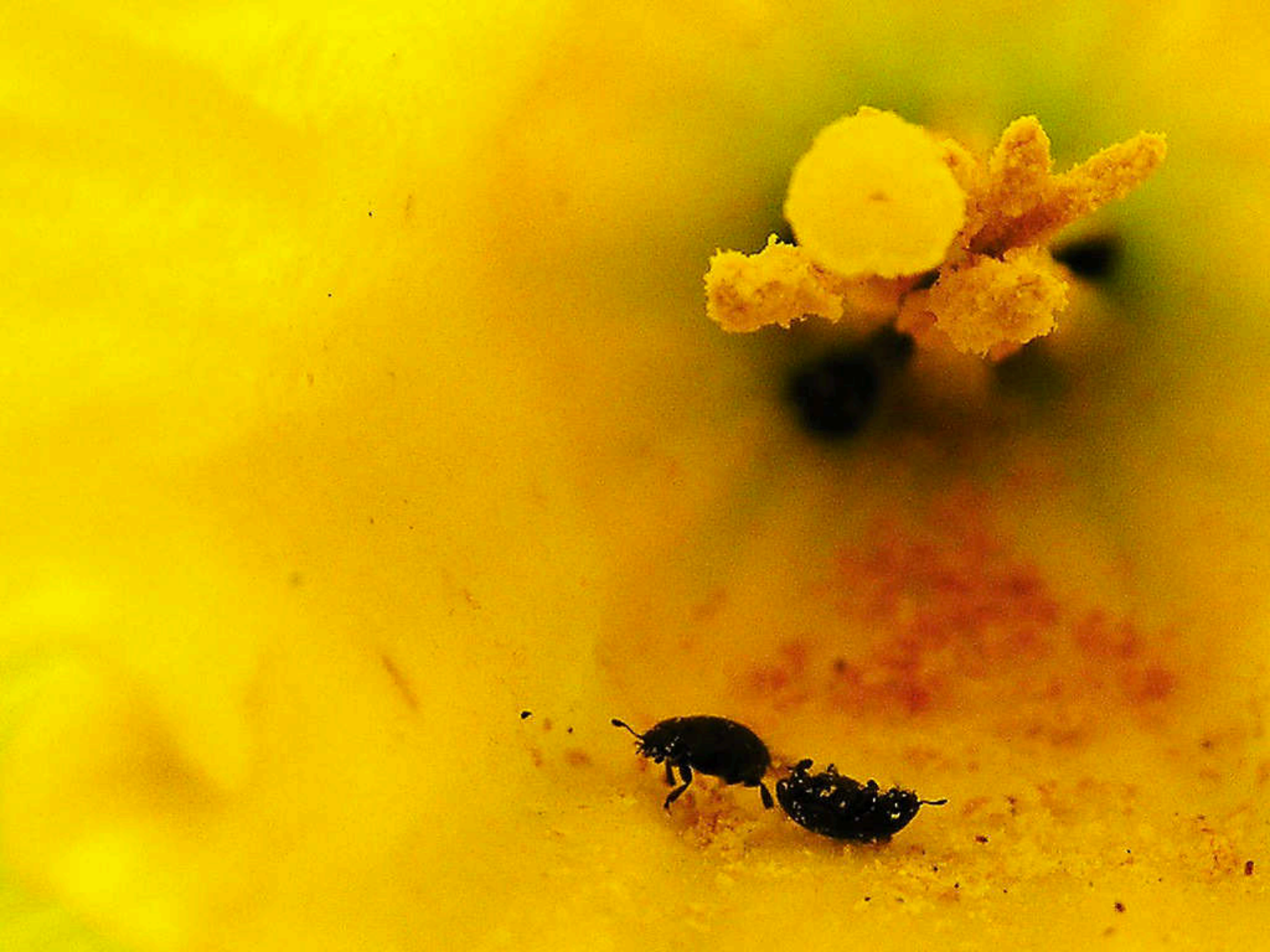
Do that

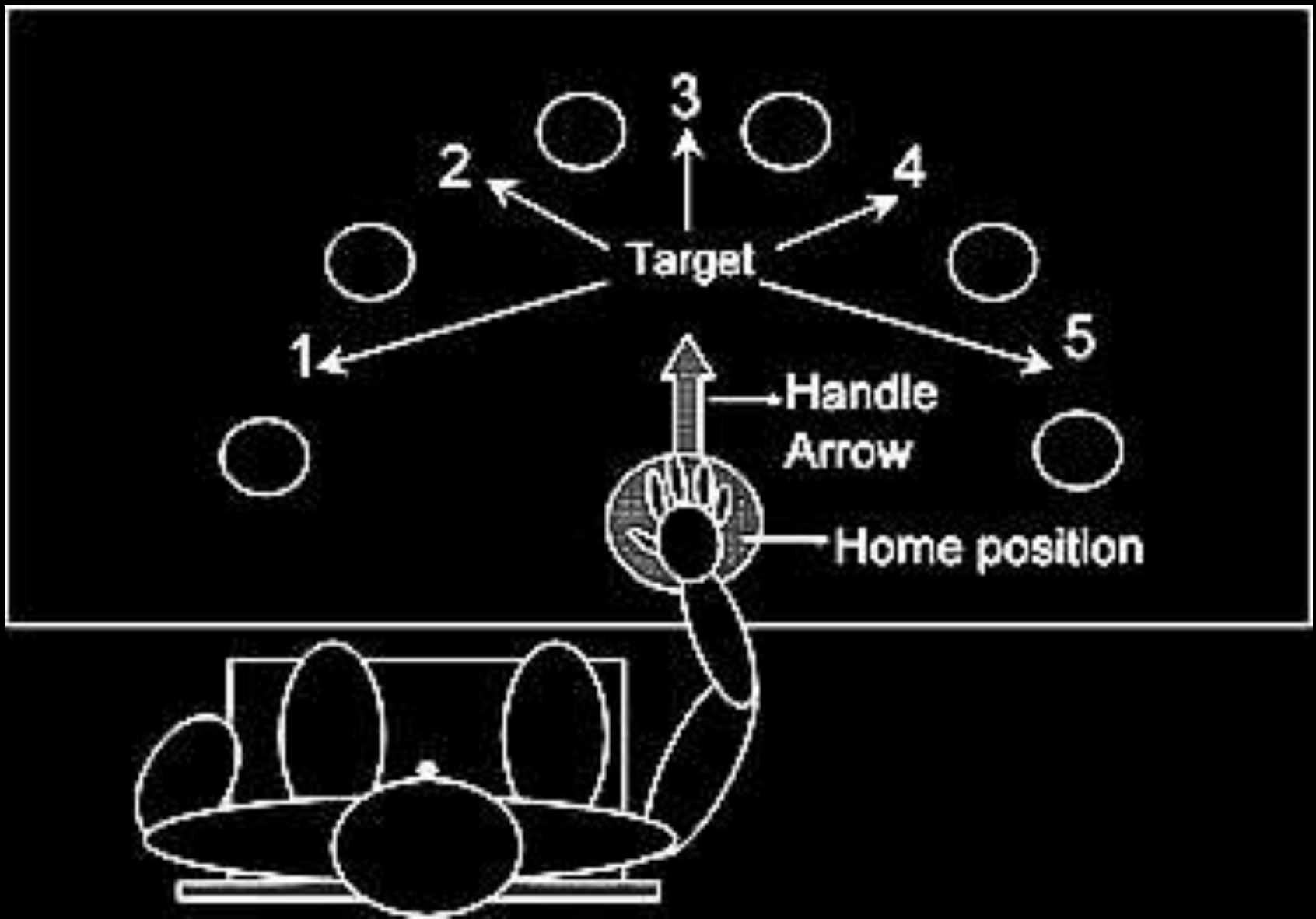
==

Move it from there to here

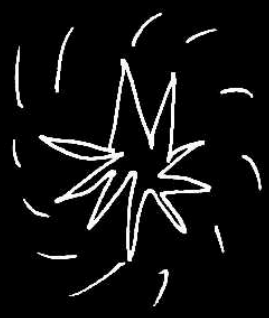
?



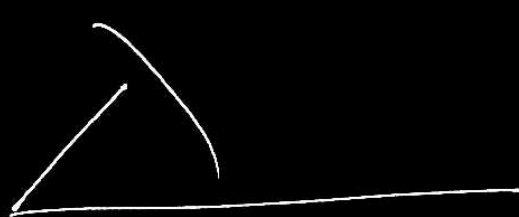




(Zhang and Rosenbaum 2007)



(big
reward)



↑
ONE
WAY



x start here