DESIGNING COMMUNICATIVE ACTS

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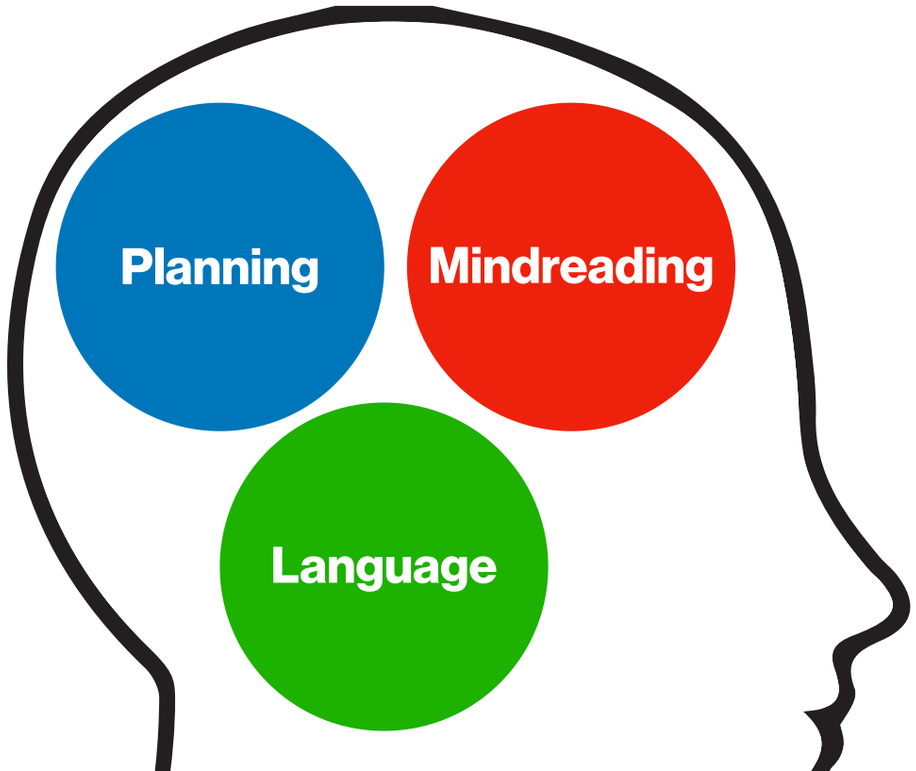
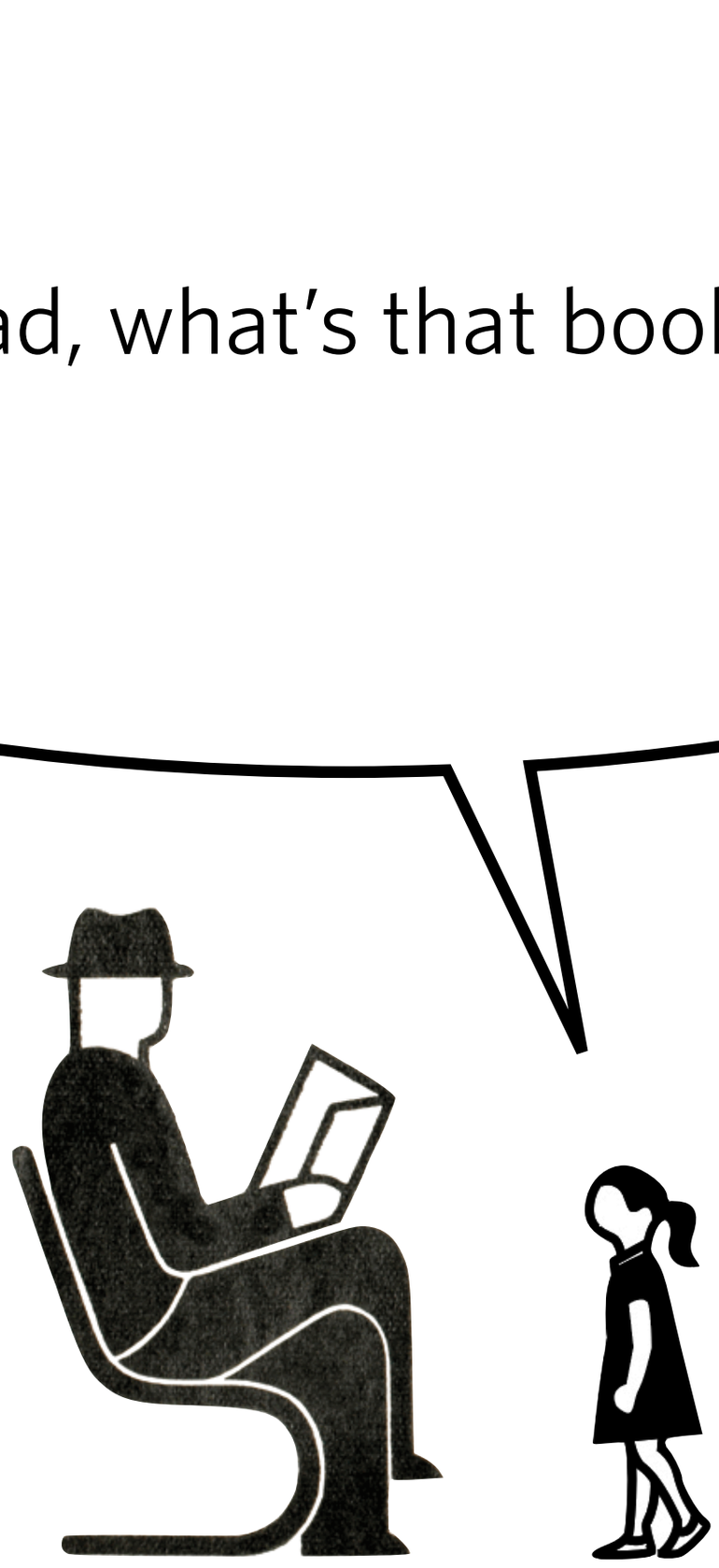
The Plot

- Humans design both what we say and how we say it with our addressees and their thoughts in mind.
- We do it by applying our general-purpose capacities for practical reasoning and mindreading.
- This gives us communicative superpowers!
- And we can do that because we communicate in the Gricean way, via intention recognition.



A Conversation

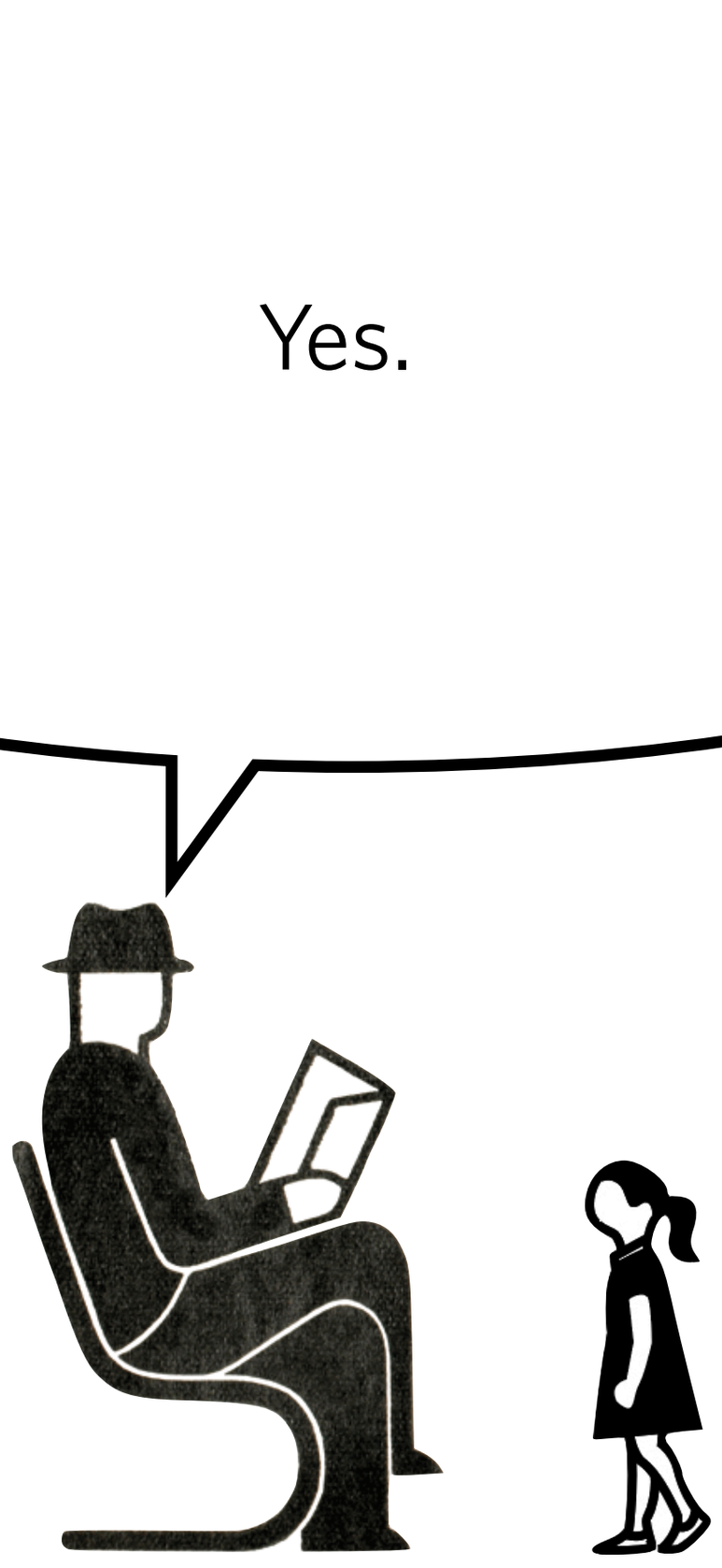
Dad, what's that book?



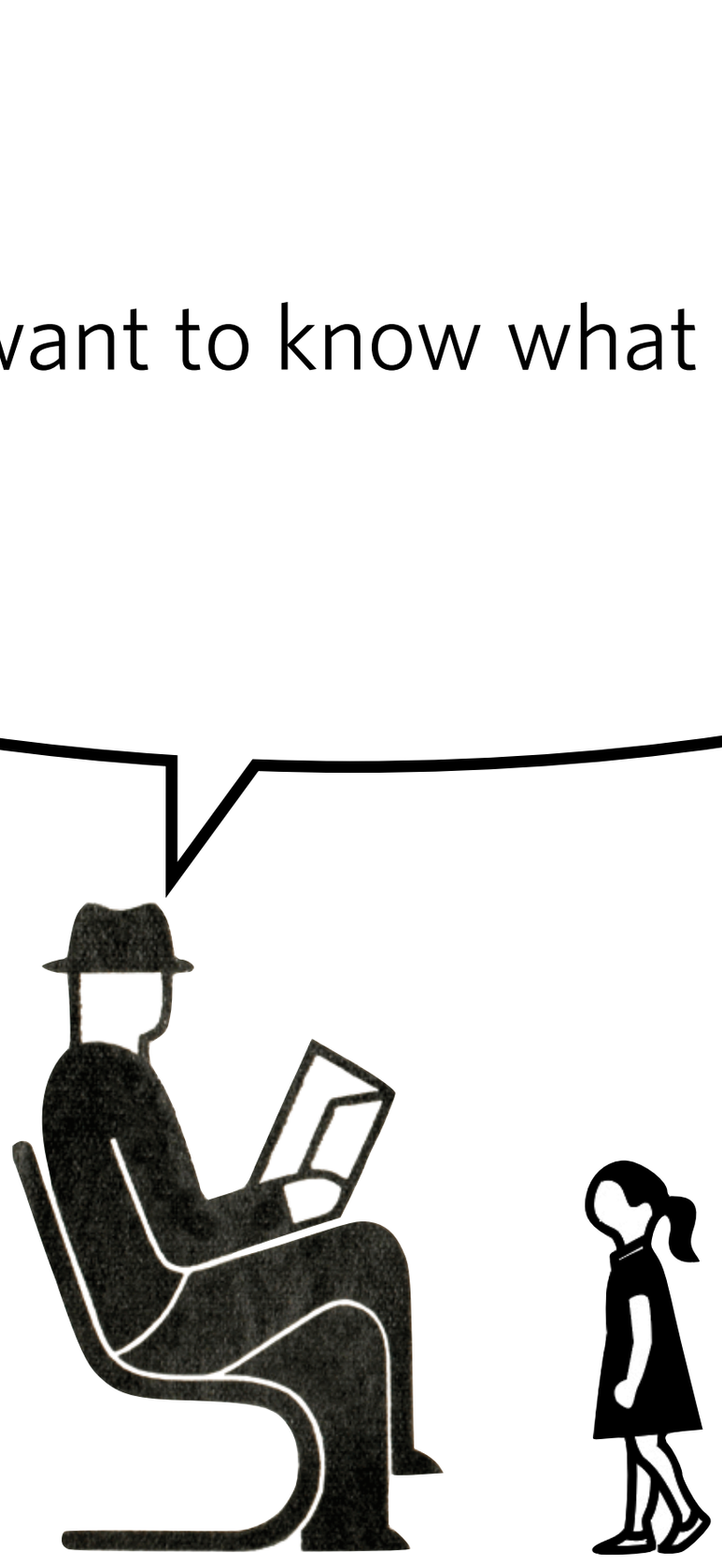
This is one of my philosophy books.
It's by Ludwig Wittgenstein.
It's called *The Philosophical Investigations*.

Wittgen…stein?

Yes.



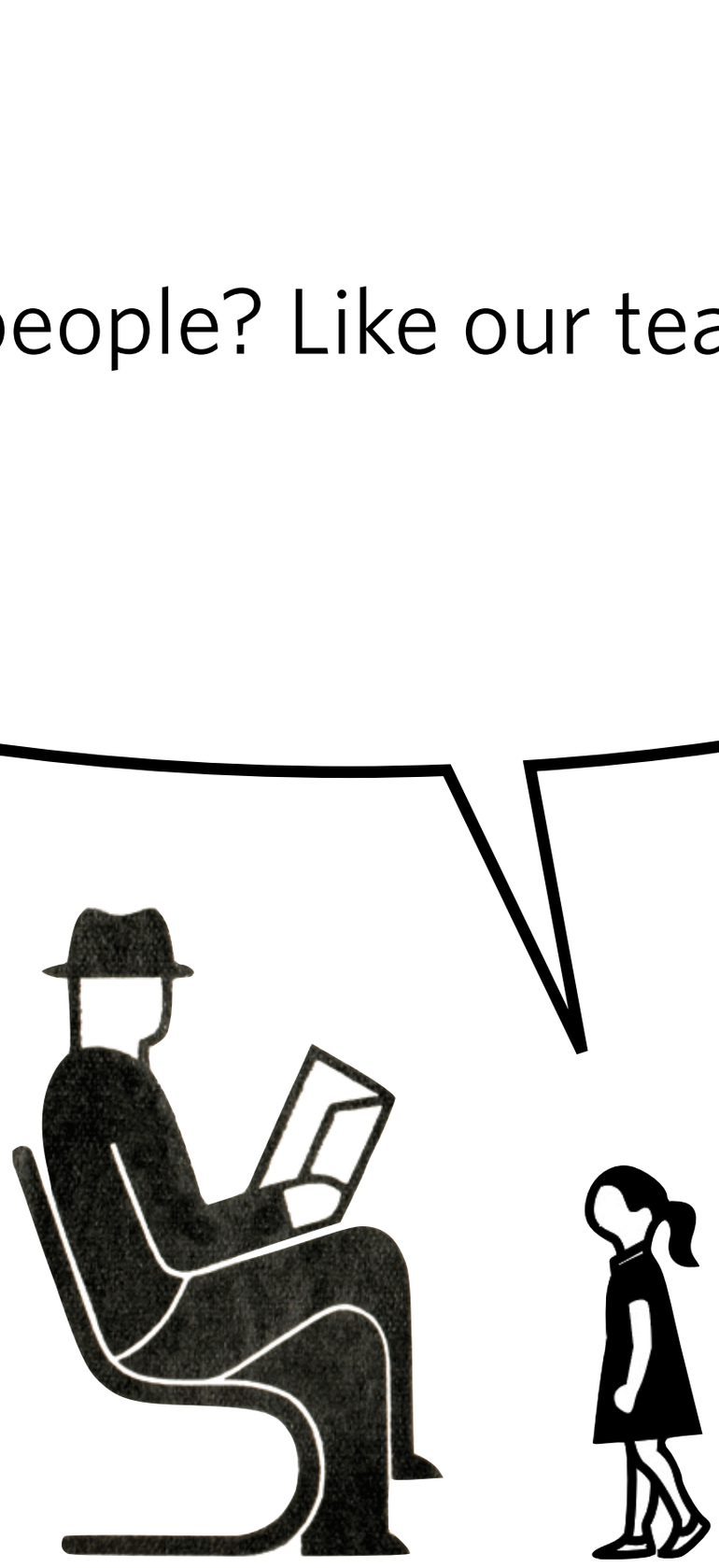
Do you want to know what it says?



Yes.

Well, here's one thing that it says:
In order to know what a rule tells us to do, we need help from other people.

Other people? Like our teachers?



Yes, or our friends, or our family. If they don't help us, we won't know what the rule means.

This is one of
my philosophy books.
It's by Ludwig Wittgenstein.
It's called *The Philosophical Investigations*.

Message Design

The *Investigations*.

Oona doesn't know much about philosophy, and hasn't heard of Wittgenstein. So I will start with some very general information about the book to introduce her to a new topic.

This is one of my philosophy books. It's by Ludwig Wittgenstein. It's called *The Philosophical Investigations*.

The *Investigations*.

Message Design

My colleague has read this book before,
and so all I need to do is to increment
some information she already has.

This is one of
my philosophy books.
It's by Ludwig Wittgenstein.
It's called *The Philosophical Investigations*.

The *Investigations*.

Message Design

Well, here's one thing that it says:
In order to know what a rule tells us to do,
we need help from other people.

Signal Design

I think the view is that following a
rule is an essentially social
practice.

Oona doesn't know what a "social practice" is, or what the word "essentially" means. So I will describe those ideas in simple terms.

Well, here's one thing that it says:
In order to know what a rule tells us to do, we need help from other people.

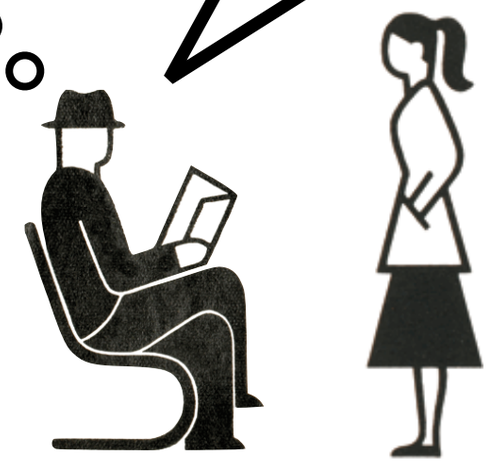
I think the view is that following a rule is an essentially social practice.

Signal Design

My colleague knows lots of philosophical terminology, and will be offended if I talk to her like she's a kid, so I will say "essentially social practice."

Well, here's one thing that it says: In order to know what a rule tells us to do, we need help from other people.

I think the view is that following a rule is an essentially social practice.

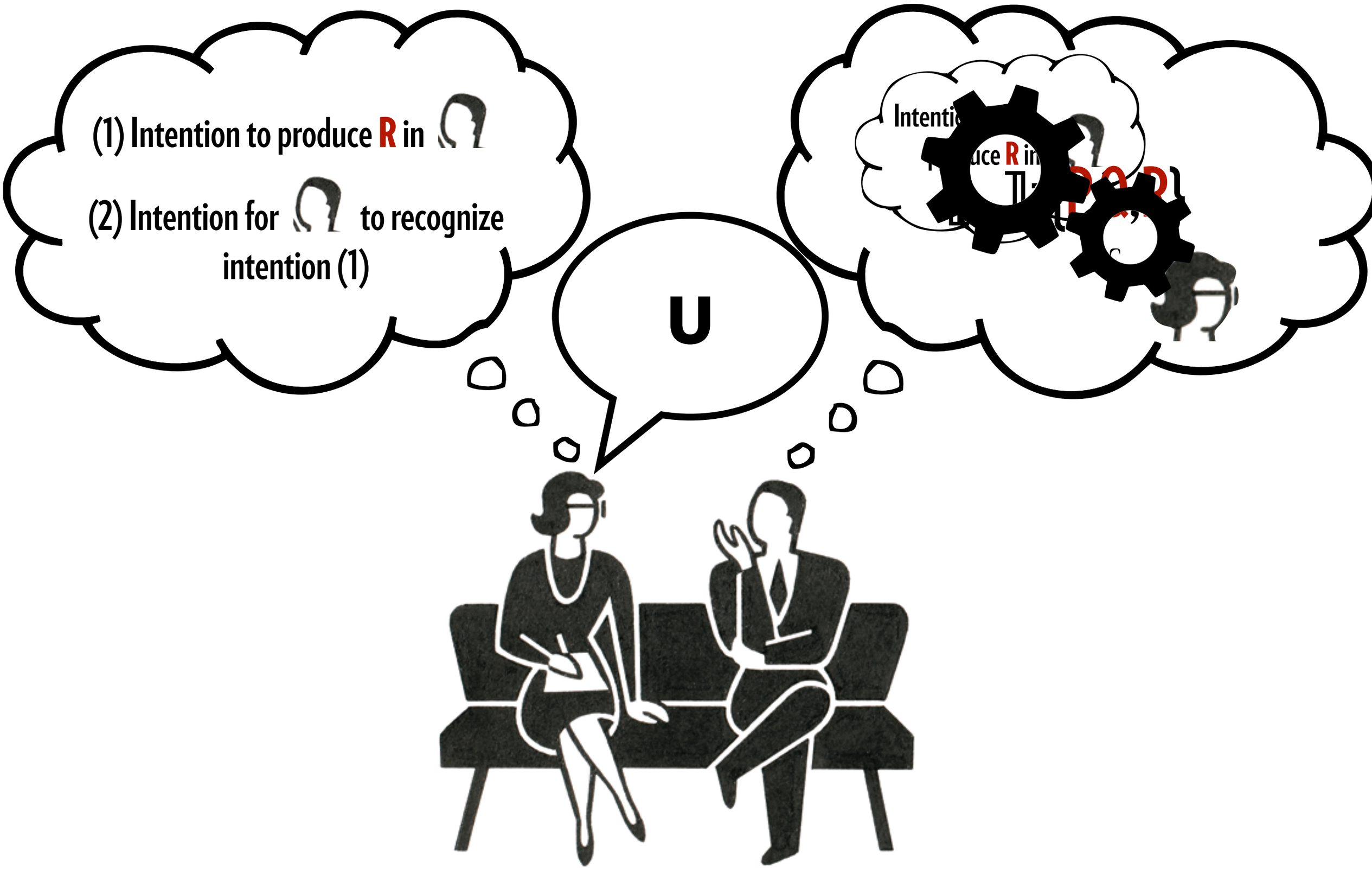


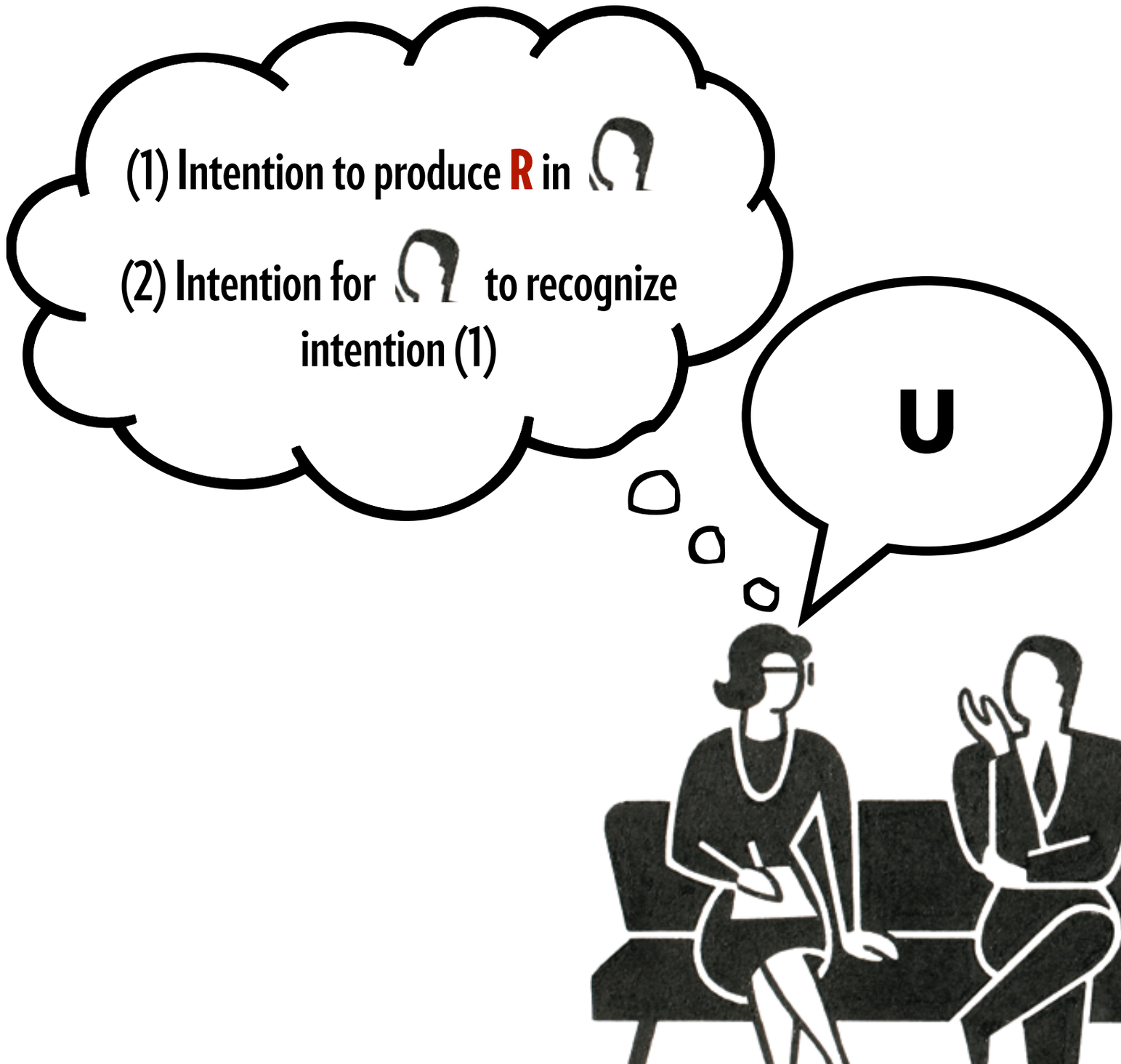
Signal Design

Intention Recognition and Communication Design

INTENTION RECOGNITION

(cf. Grice 1957, 1969)

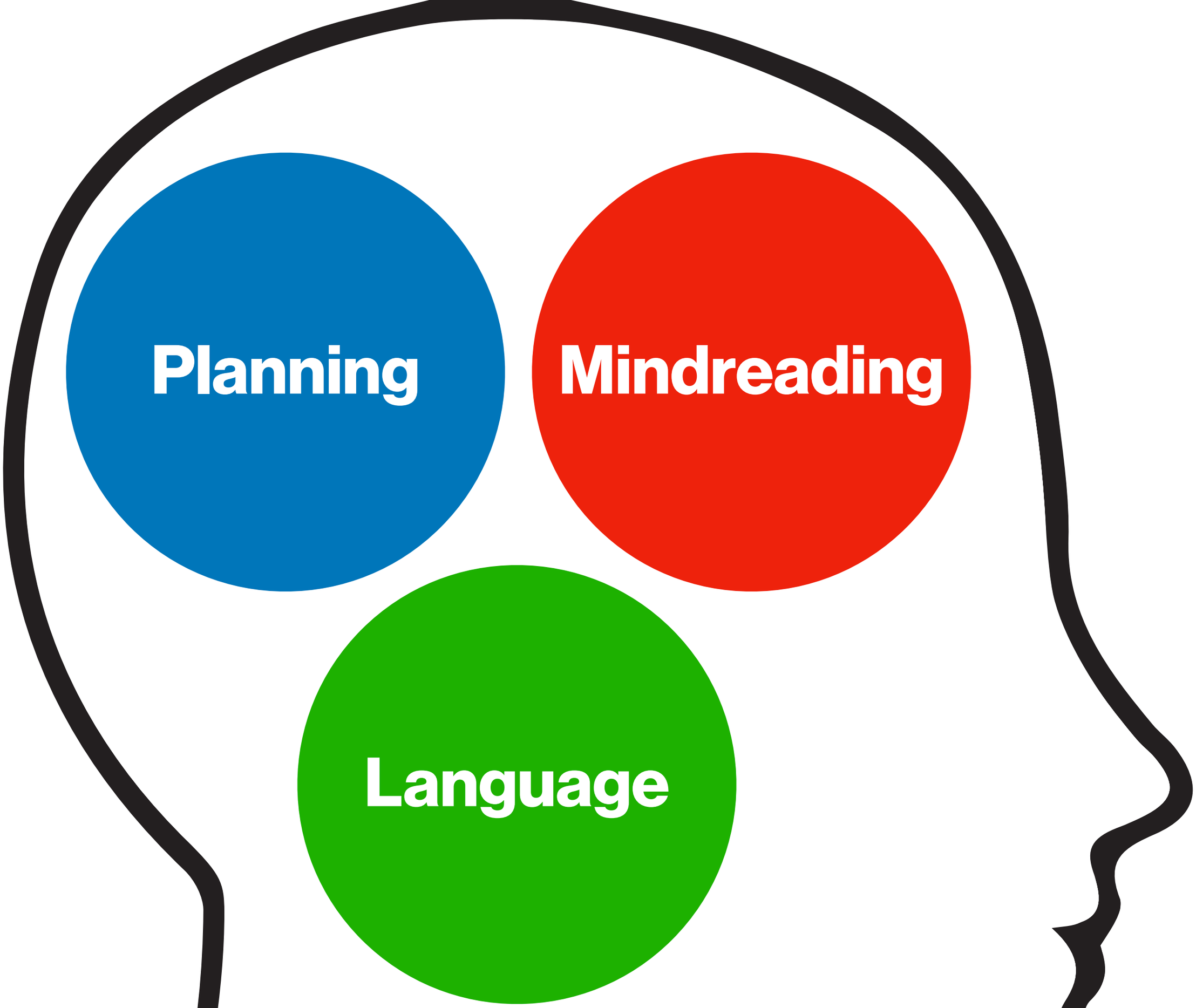



(1) Intention to produce R in
(2) Intention for to recognize intention (1)
U

Intentions and planning

(Bratman 1987, etc.)

Intentions are stable, action-guiding commitments that serve as both the inputs and outputs of episodes of practical reasoning.


Planning
Mindreading
Language

Planning

PRIOR INTENTION

Intention to go to Lisbon

relevant beliefs, other intentions, pressure to stay rationally coherent

SUBPLAN

Intention to book a flight

Planning

PRIOR INTENTION

Intention to book a flight

relevant beliefs, other intentions, pressure to stay rationally coherent

SUBPLAN

Intention to book *this* flight

Planning

PRIOR INTENTION

Intention to book *this* flight

relevant beliefs, other intentions, pressure to stay rationally coherent

SUBPLAN

Motor instructions to move my fingers in a certain way

Rational Requirements

MEANS-END RATIONALITY

To be rational, you have to intend what you take to be the necessary means to your intended ends.

CONSISTENCY OF INTENTIONS

To be rational, you have to avoid intending inconsistent things

DOXASTIC CONSTRAINT

To be rational, you should avoid intending things that you believe you can't do.

Beliefs about where Lisbon is, the nature of air travel, my finances...

Domain Generality and Unencapsulation

Preferences about when to fly, where to sit, how much to pay...

Intentions about when to be in other places, what else to spend money on, who to travel with, etc.

Grice, meet Bratman

Communicative intentions are intentions.

This means that part of their functional role is to serve intrapersonal and interpersonal coordination.

Planning

PRIOR INTENTION

Intention to give a talk

relevant beliefs,
other intentions,
pressure to stay
rationally coherent

SUBPLAN

Intention about what to say

Planning

PRIOR INTENTION

Intention about what to say

relevant beliefs, other intentions, pressure to stay rationally coherent

SUBPLAN

Intentions about how to say it

Planning

PRIOR INTENTION

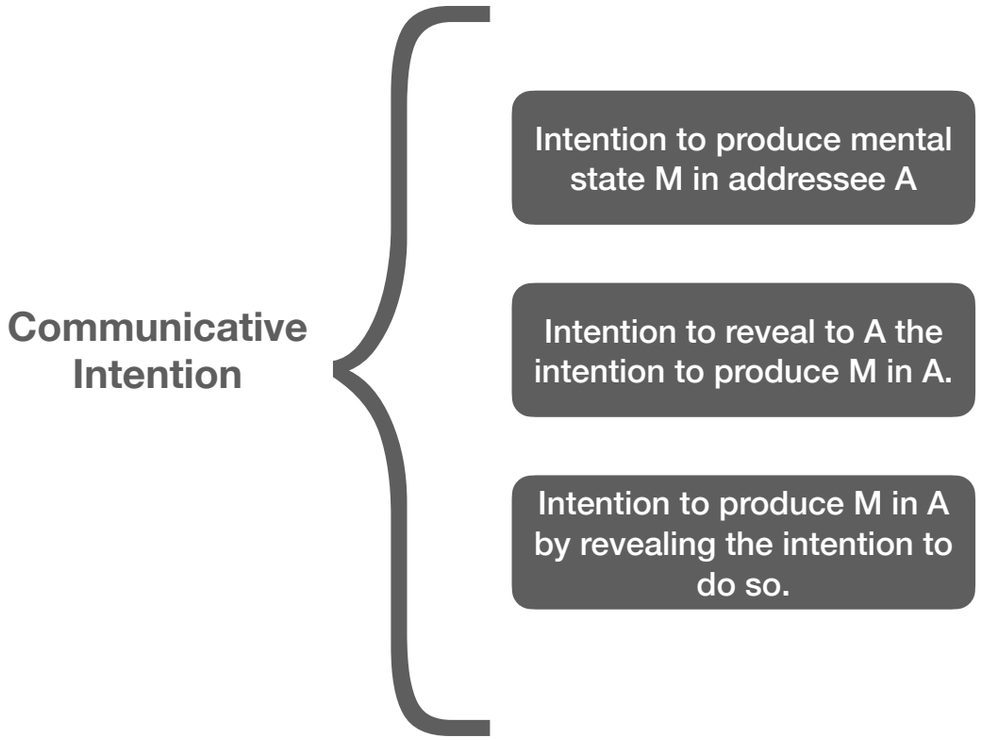
Intentions about how to say it

relevant beliefs, other intentions, pressure to stay rationally coherent

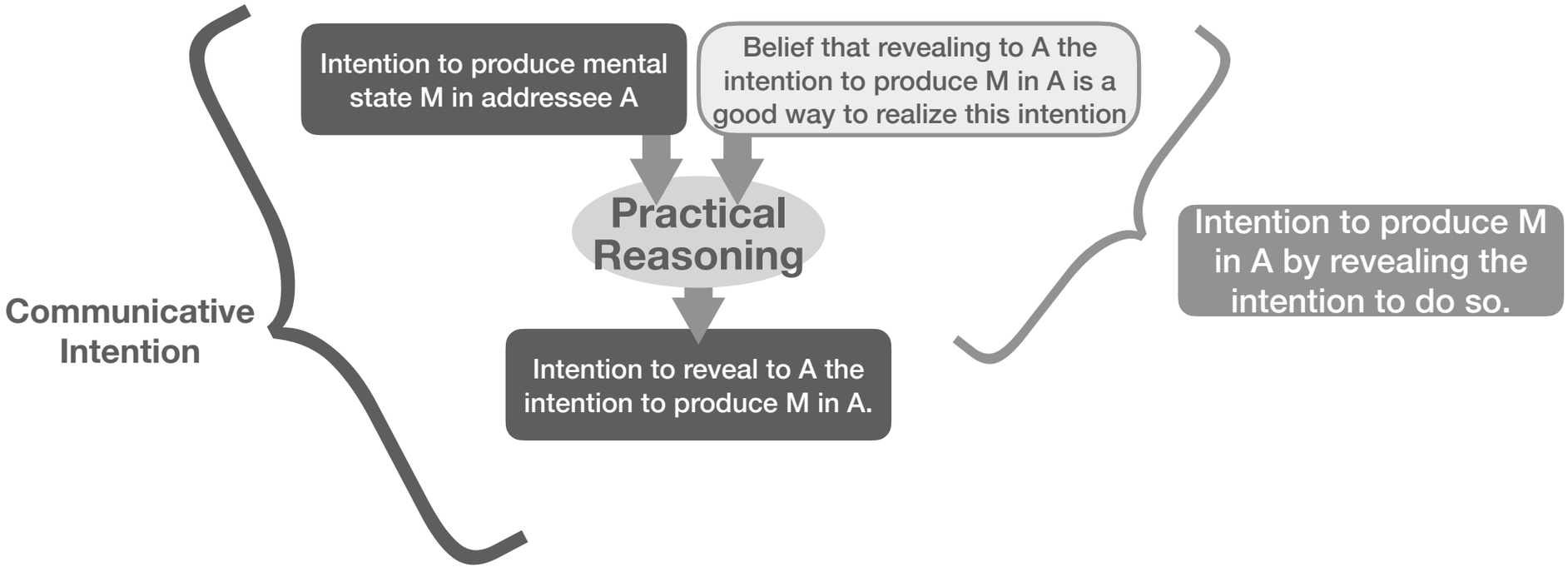
SUBPLAN

Motor instructions to move my lips in a certain way

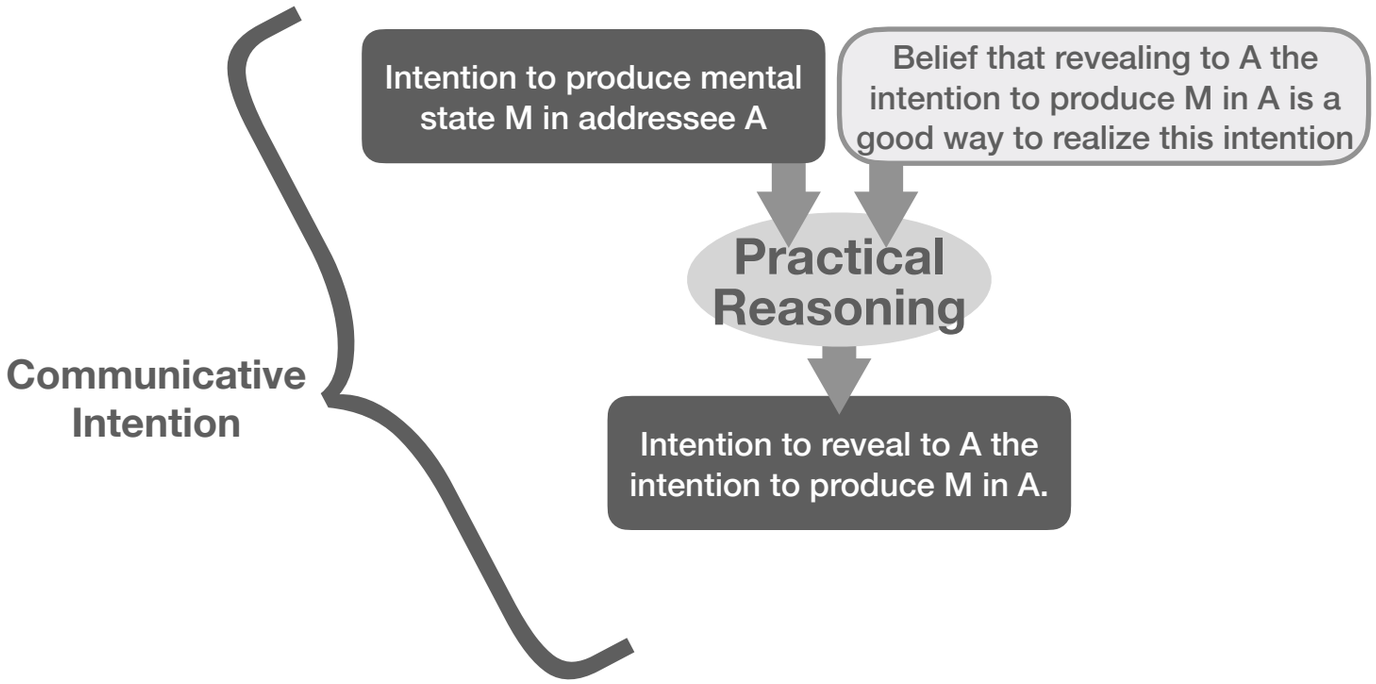
Planning and Communicative Intentions



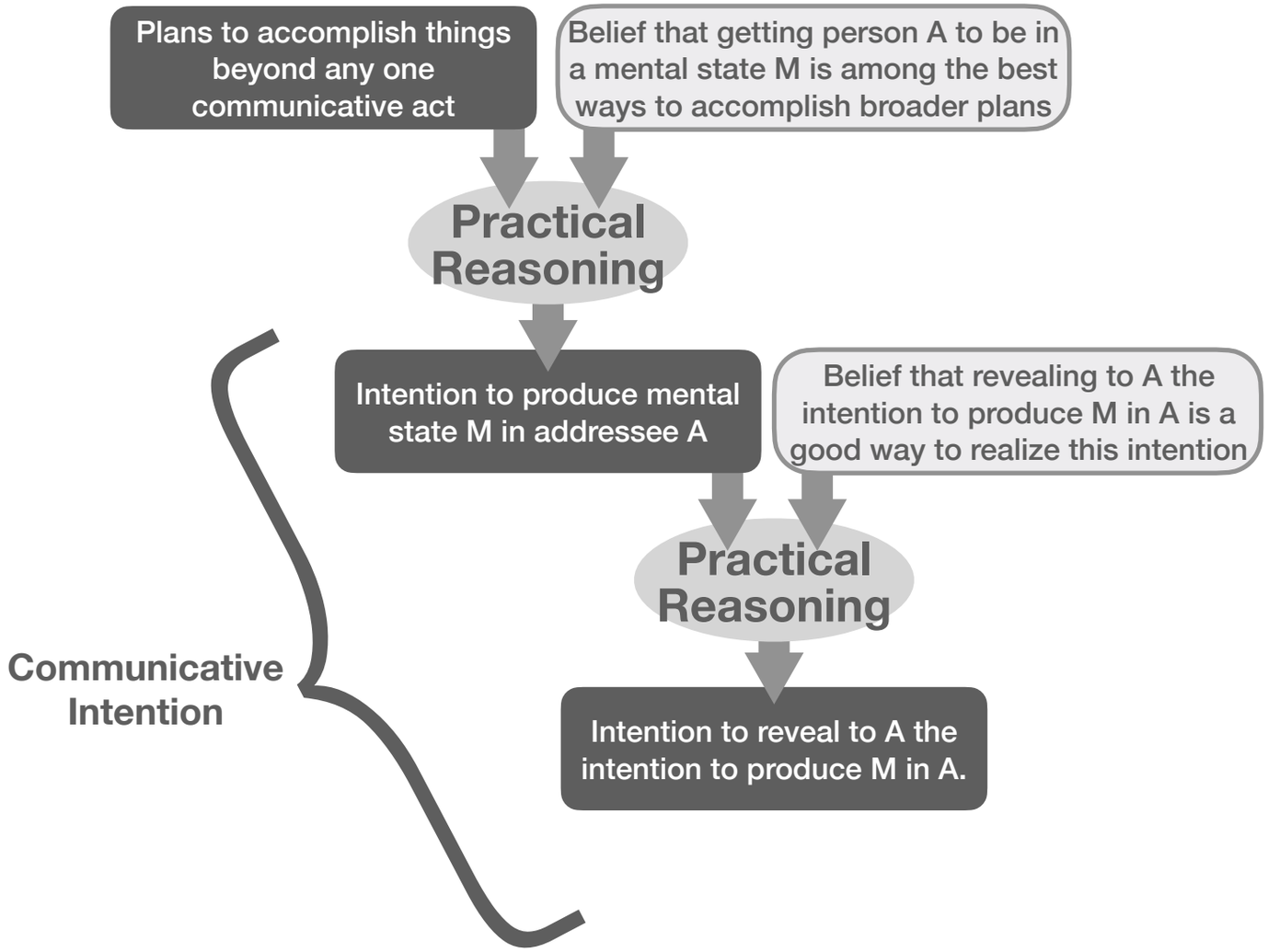
Planning and Communicative Intentions



Planning and Communicative Intentions



Planning and Communicative Intentions



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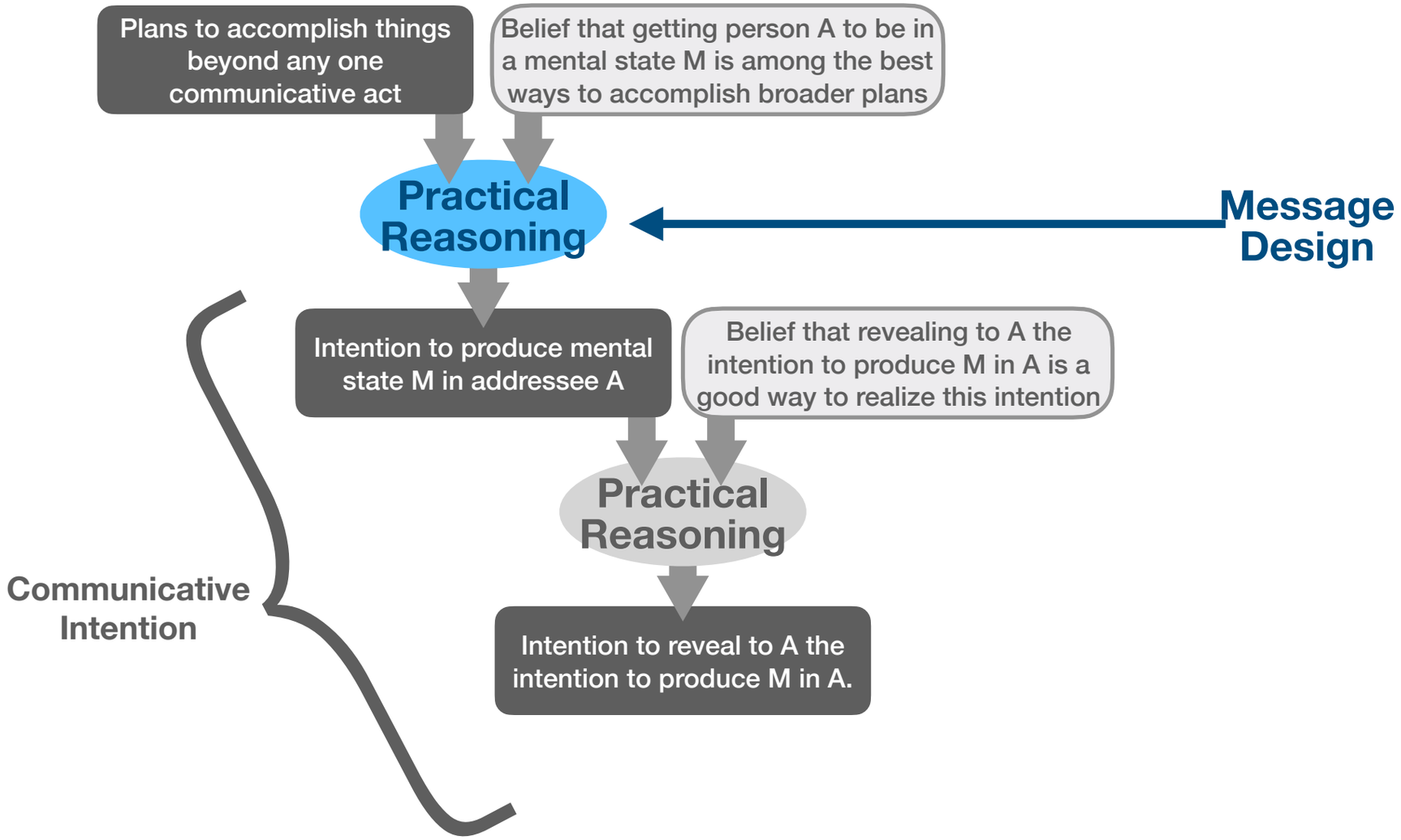

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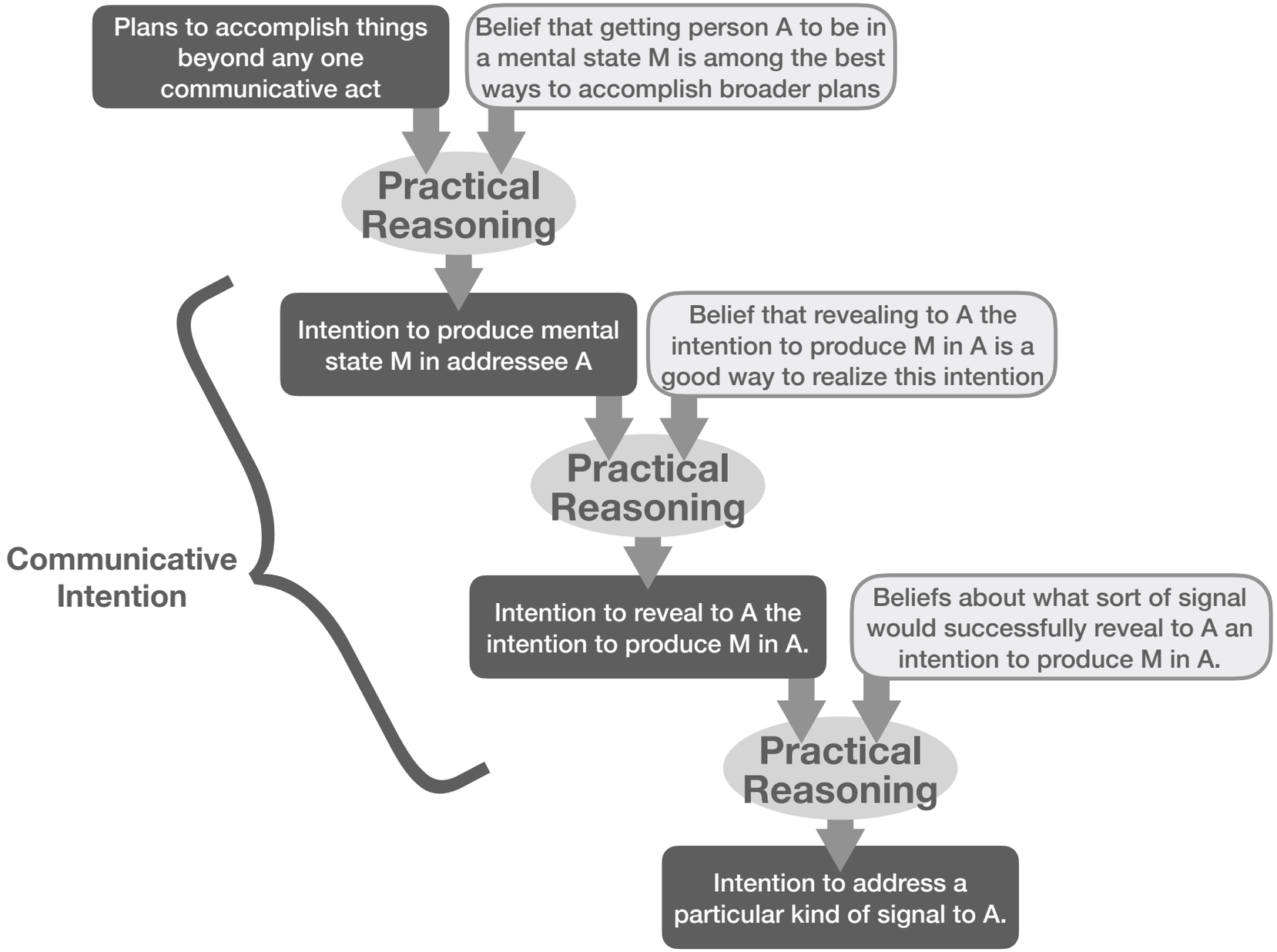
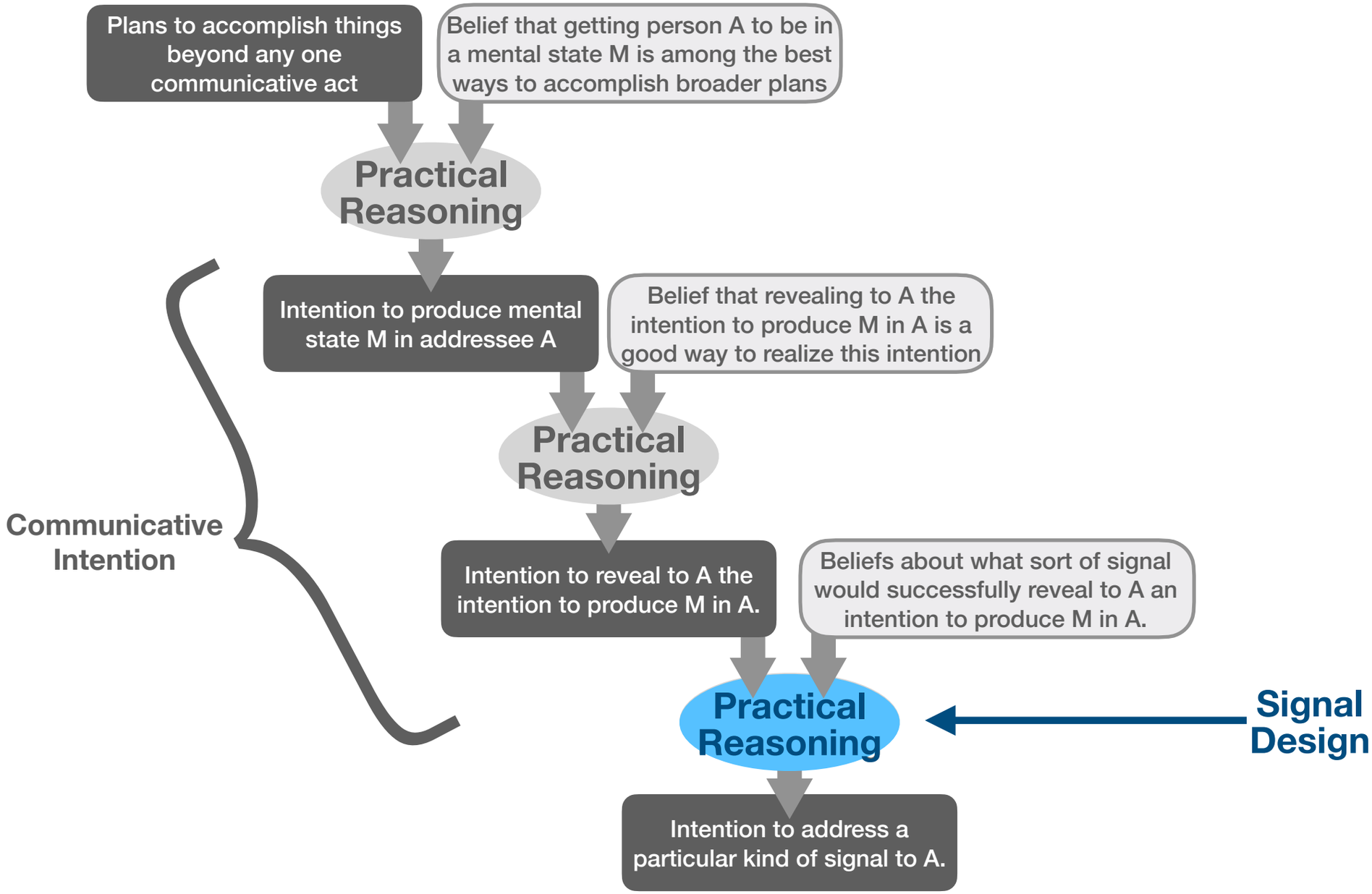


Planning and Communicative Intentions



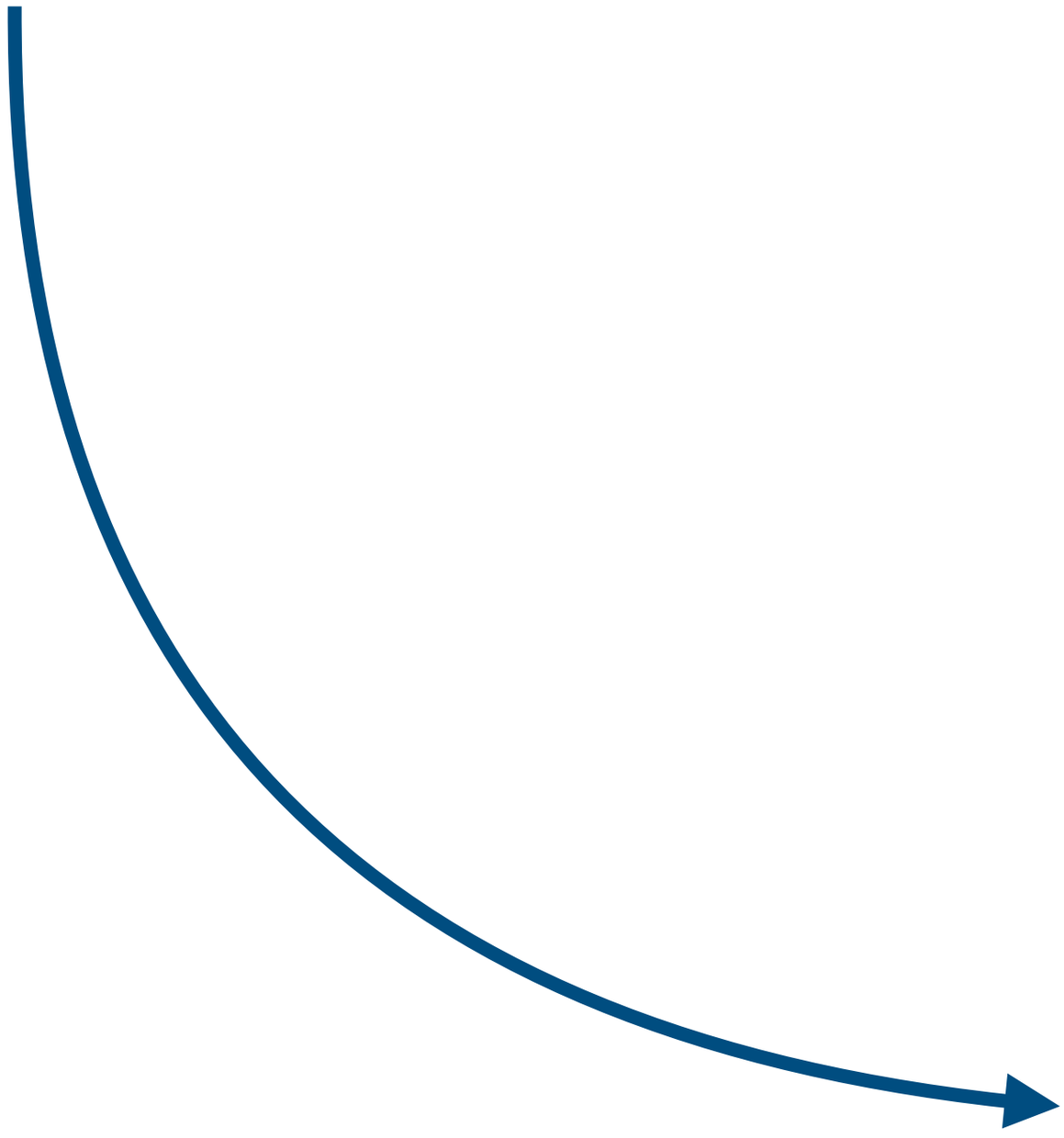
Communicative Superpowers!

The Complexity and Flexibility of Humans' Plans

Muscle movements needed
to insert my credit card into a
slot next to the bank's door

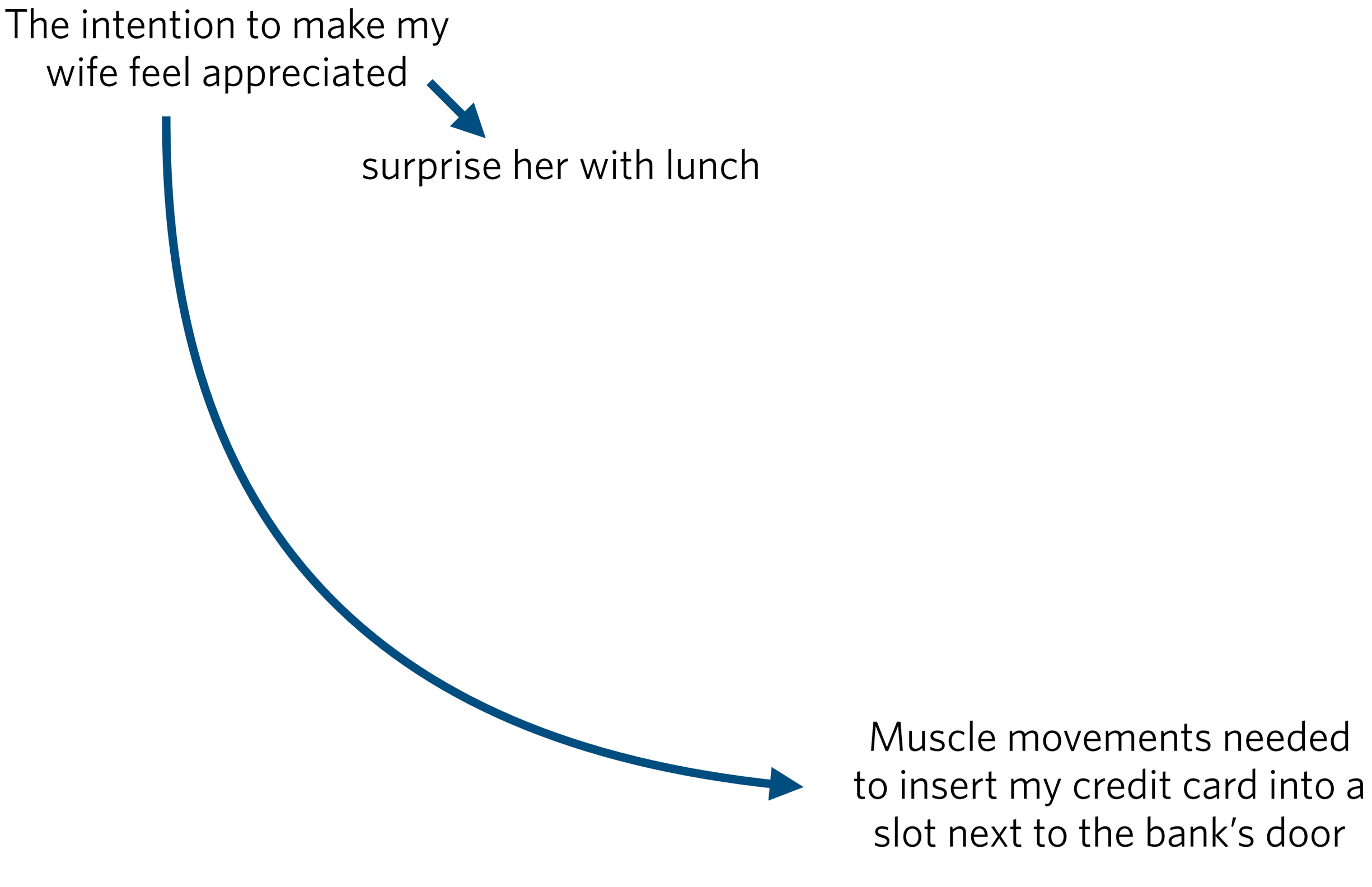
The Complexity and Flexibility of Humans' Plans

The intention to make my wife feel appreciated



Muscle movements needed to insert my credit card into a slot next to the bank's door

The Complexity and Flexibility of Humans' Plans



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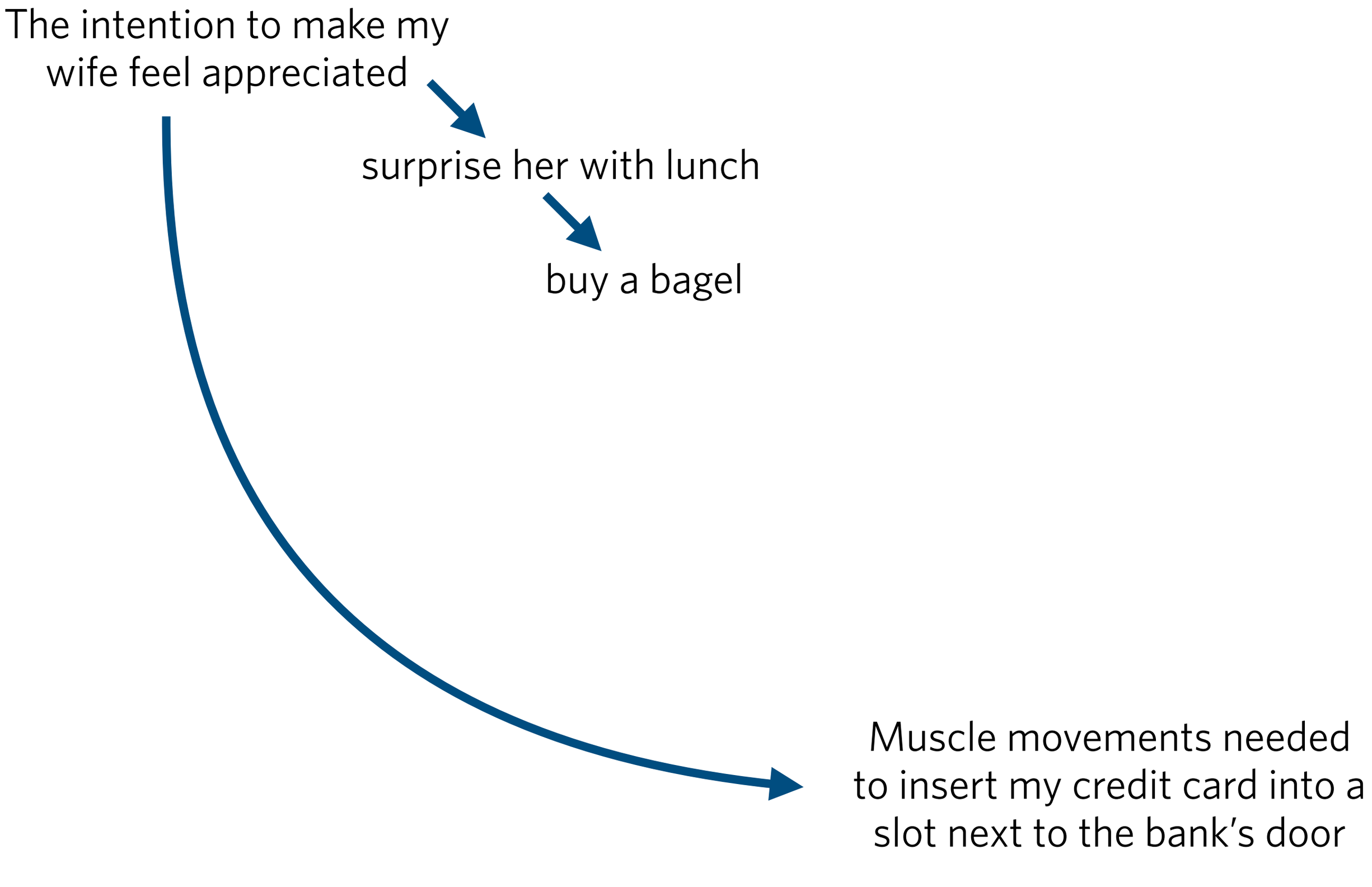

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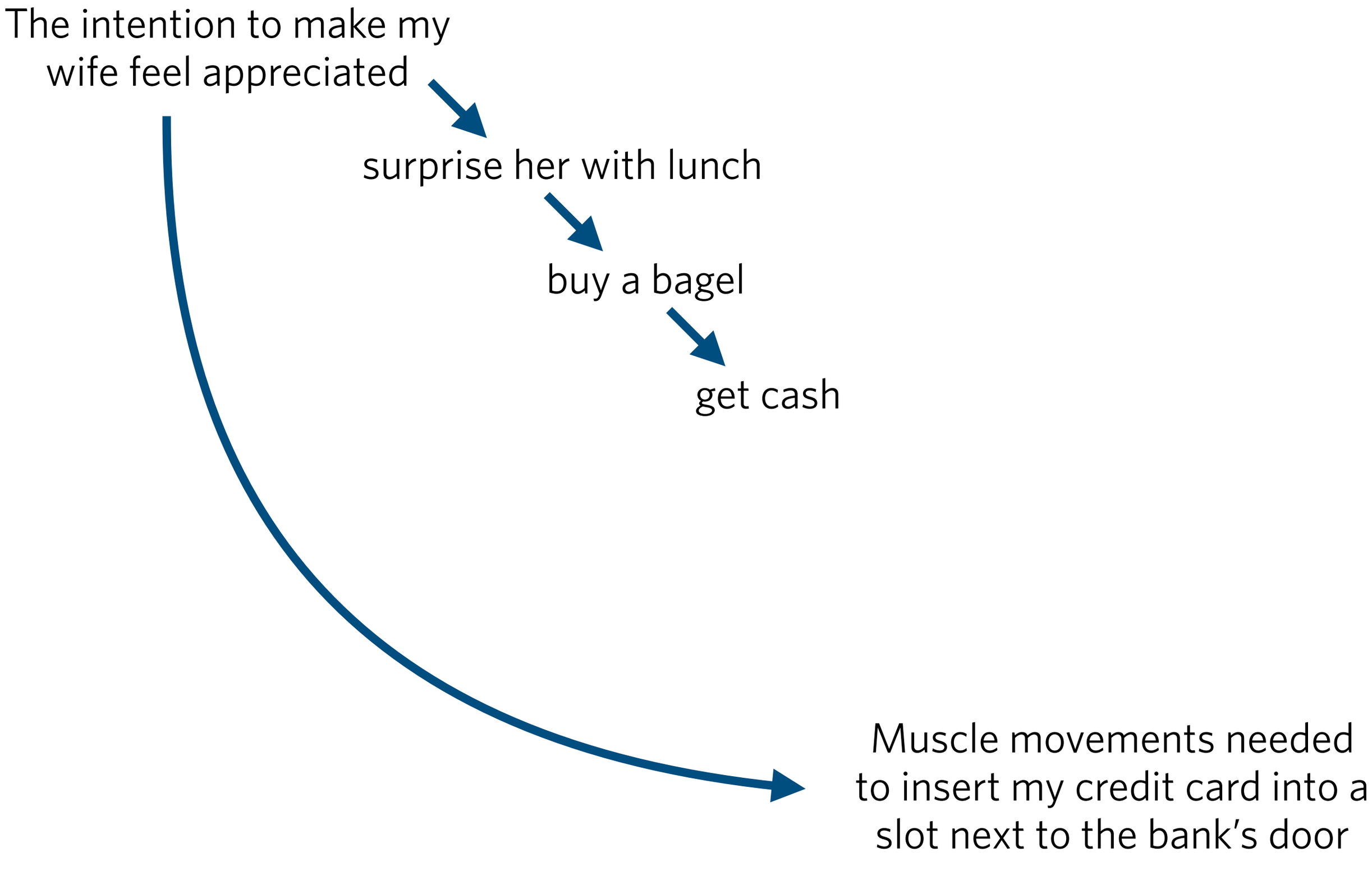

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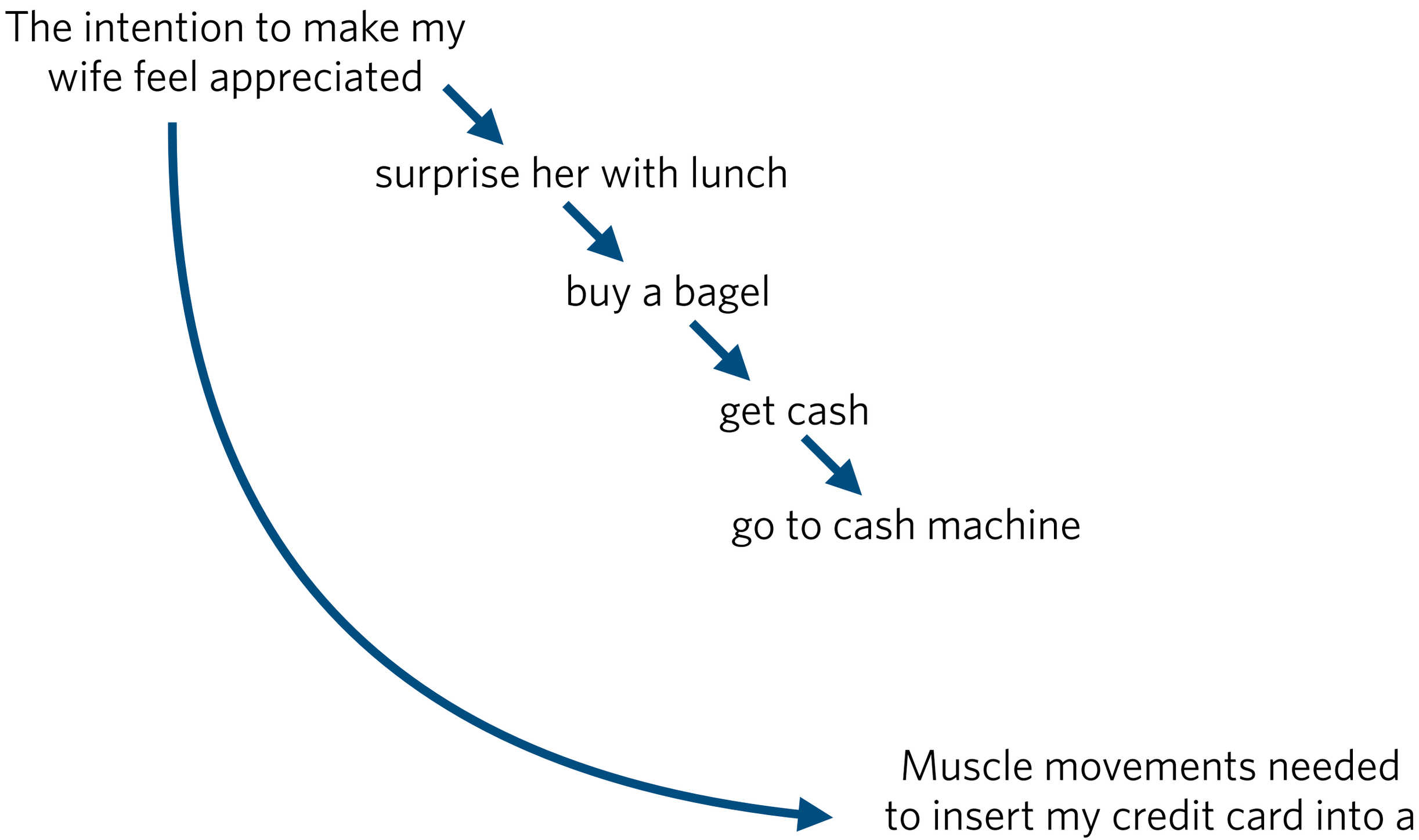

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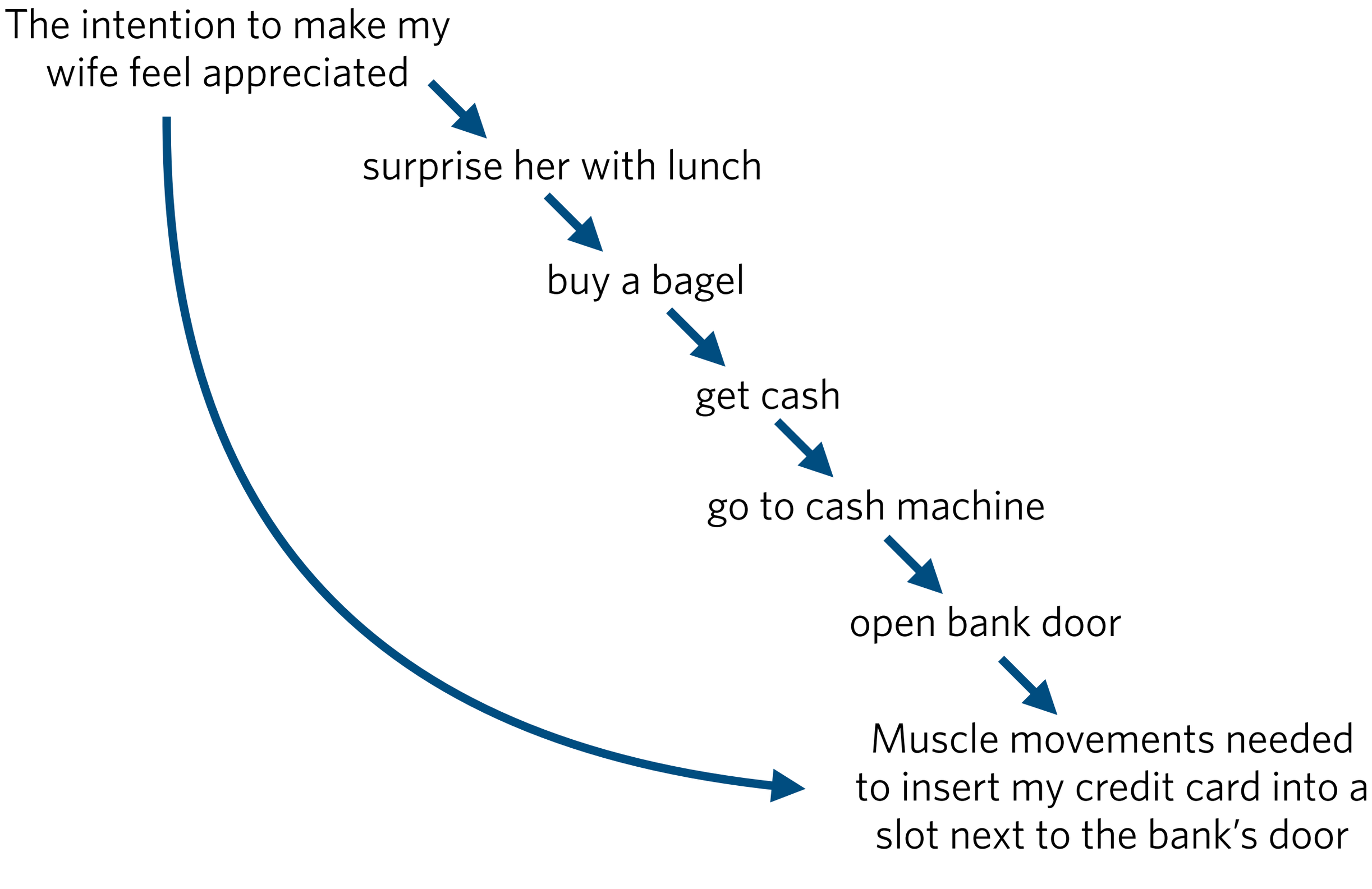

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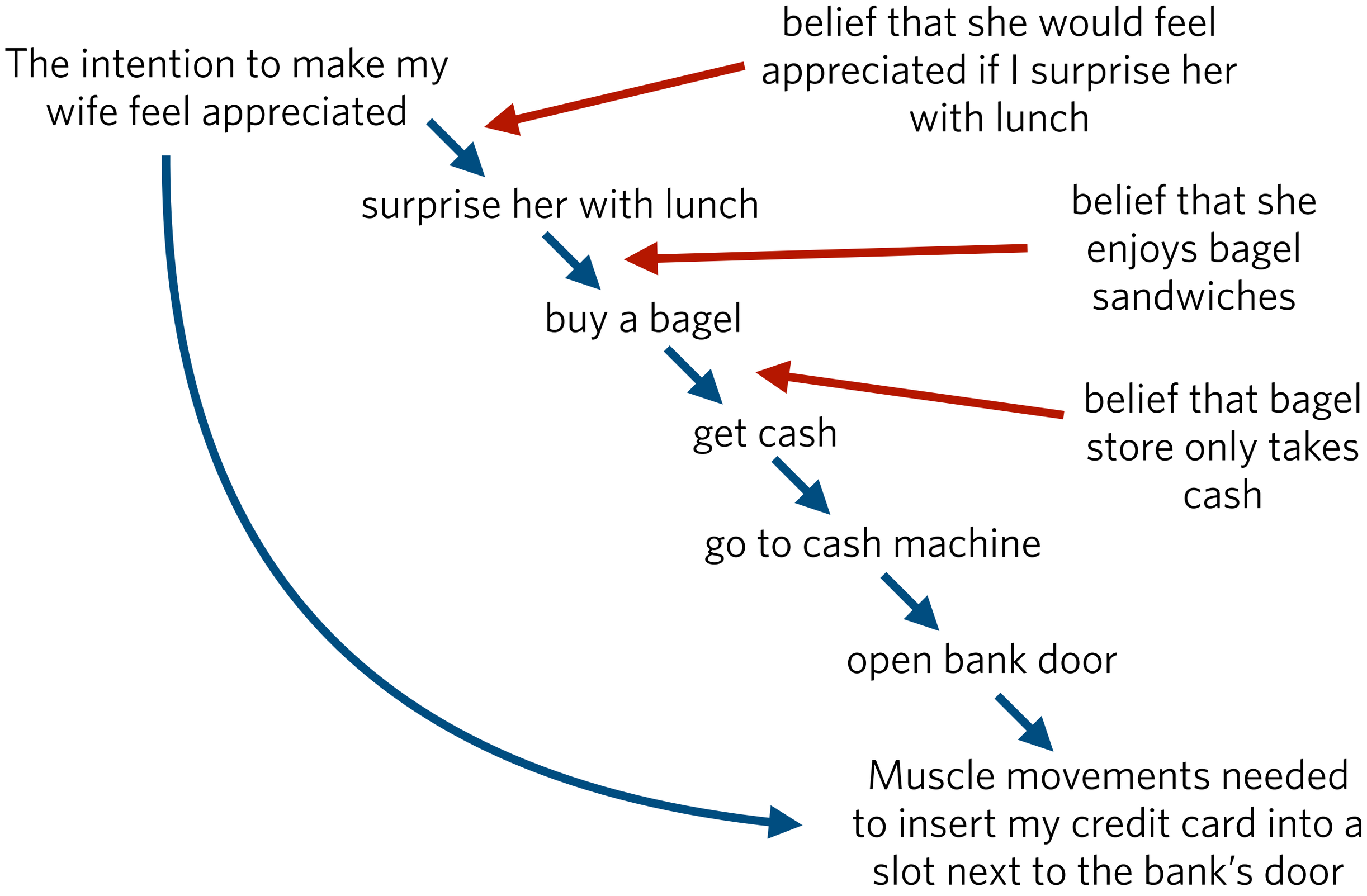
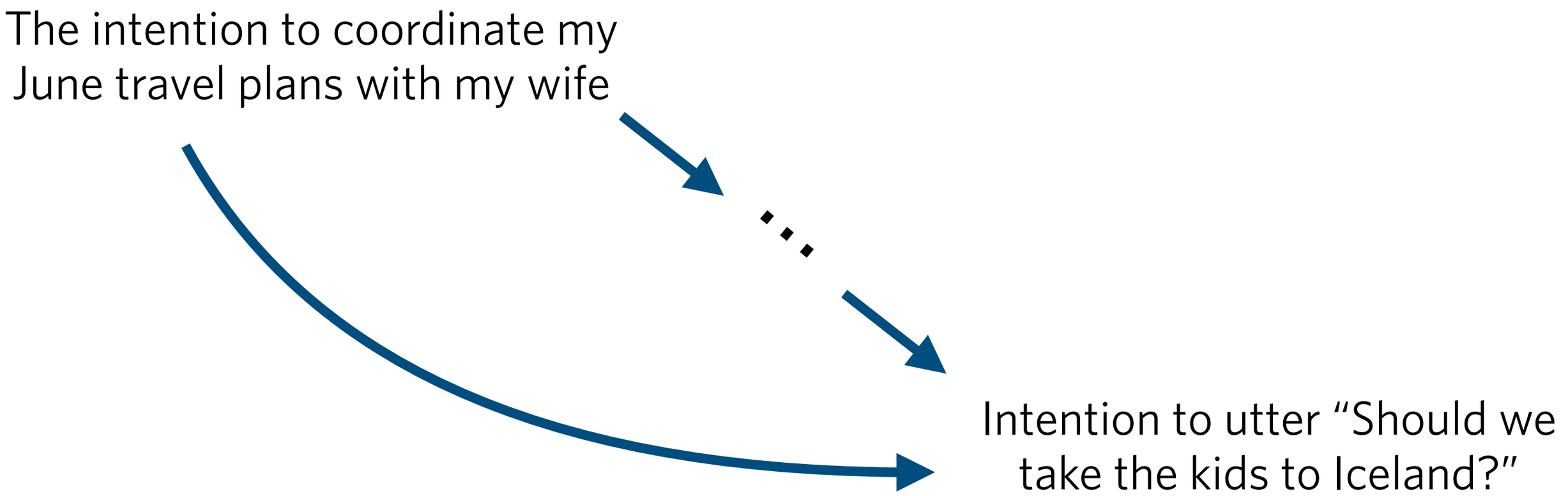


Stimulus Independence

cf. Camp 2009, "Putting Thoughts to Work"

- Our capacity to reason from abstract and stimulus-independent goals is a precondition for designing messages about abstract and stimulus-independent topics

- This allows us to communicate in ways and about topics that are far more disconnected from the here, now, and actual than other animals can do.



Strategic and Cooperative Communication

- The capacity to condition what we say on our information about addressees' beliefs and plans allows us to be strategic in using communication to achieve our own goals.

- But it also allows us to be more cooperative, by communicating in ways that are sensitive what we know about addressees' goals and preferences.

Planning

PRIOR INTENTION

Intention to get my wife to buy a Toyota

relevant beliefs, other intentions, pressure to stay rationally coherent

SUBPLAN

???

Planning

PRIOR INTENTION

Intention to get my wife to buy a Toyota

belief that my wife wants a car but isn't sure what kind

SUBPLAN

Intention to inform her that Toyotas are safe

Planning

PRIOR INTENTION

Intention to get my wife to buy a Toyota

belief that my wife isn't sure we need a car

SUBPLAN

Intention to inform her that a car would save time

Lexical Variation

- A normal natural-language user possesses only a small fraction of the words in their language
- E.g., there are millions of lexical items sometimes used in English, but an average speaker only uses 50,000–100,000.
- This allows for amazing communicative efficiency, since each speaker can master a fragment of the language that is customized to their communicative needs.
- E.g., we all get to have specialized technical terms for talking about philosophy.
- But this would not be possible because without an advanced signal-design capacity.

Gigantic Lexicons

- A normal monolingual English-speaking adult has about 50,000–100,000 lexical items in their vocabulary.
- Our repertoires of signal types are far larger than those of other animals.
- How did we get all these lexical items?
- One precondition: We need to be the sort of creatures who can manage lexical variation, so that lexical innovations can spread through the population.
- And so, we need a complex and flexible capacity for signal design.

Semantic Underdetermination

- Many natural-language expressions are semantically underdetermined. We can say different things with them on different occasions.

- This includes seemingly all open-class lexical items, which are to some degree polysemous and so flexible in their contents.

- These expressions allow us to convey far more thoughts with far fewer lexical items.

- But it is only possible to use these expressions to reliably communicate with others if we can make accurate predictions about how our addressees will interpret them on particular occasions.

- This requires an advanced capacity for signal design.

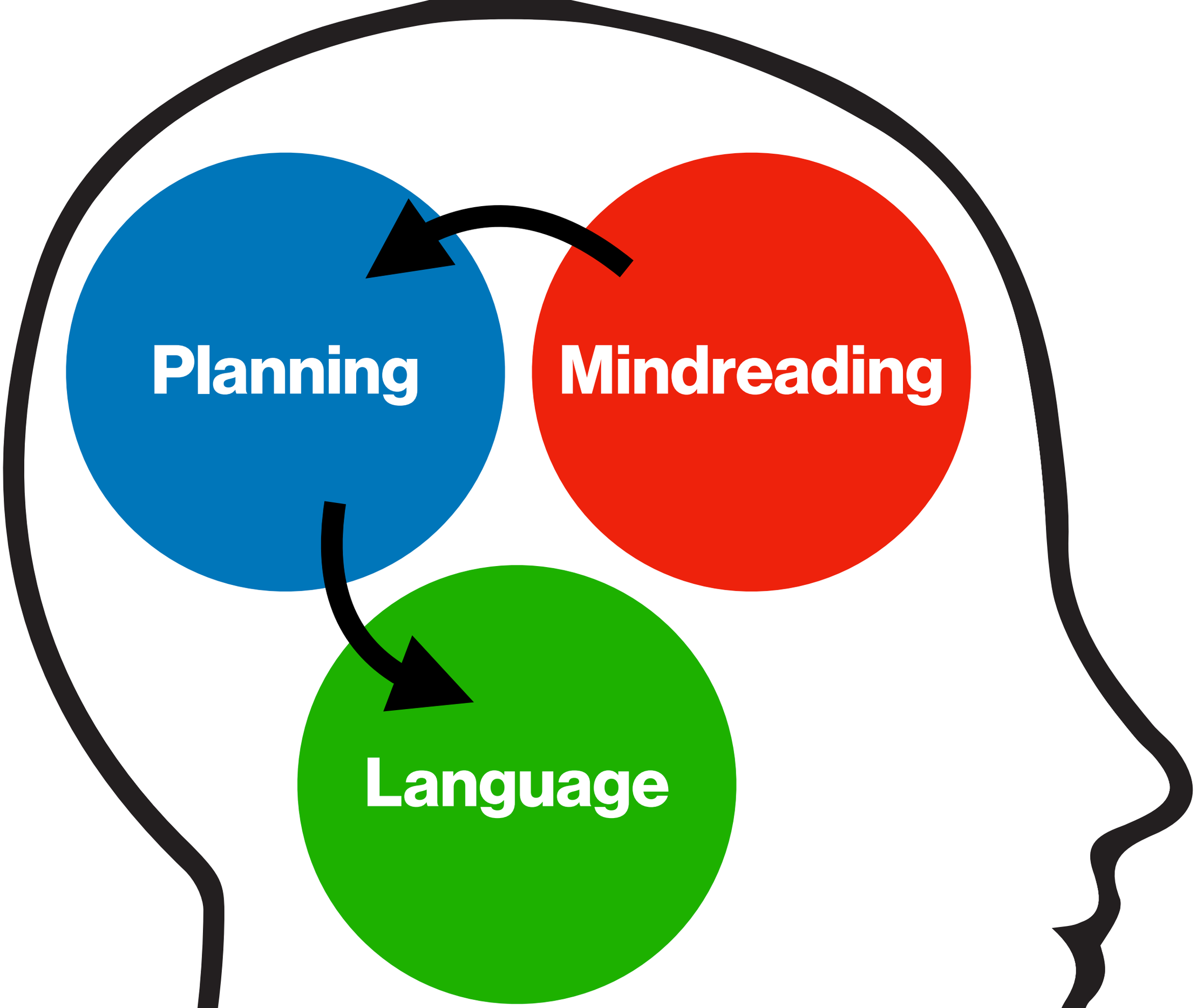
Communicative Superpowers!

Put together the following characteristics of human communication:

- Stimulus independence
- Strategic and cooperative communication
- Huge individual lexicons
- Even bigger shared lexicons from which to choose
- Lexical specialization
- Rampant semantic underdetermination, allowing for expressions with flexible contents

- Together, these properties ***vastly*** increase the expressive power of human communication.
- But each of them depends on our capacity for communication design.

Do we *really* do all this reasoning?


Planning
Mindreading
Language

Mindreading

Q: Do we really do all of this mindreading in the course of a normal conversation?

A: Yes!

...sometimes!

...it's complicated!

I intend to say something about Andrés.

I intend to say something about Andrés.

he/him

Andrés

Andrés Soria Ruiz

the guy who wrote that cool paper about scale structures for “good”

the guy who invited me to give a talk in Lisbon

A philosopher of language at the Universidade NOVA de Lisboa

I intend to say something about Andrés.

I believe that my addressee is actively thinking about Andres with me right now.

he/him

Andrés

Andrés Soria Ruiz

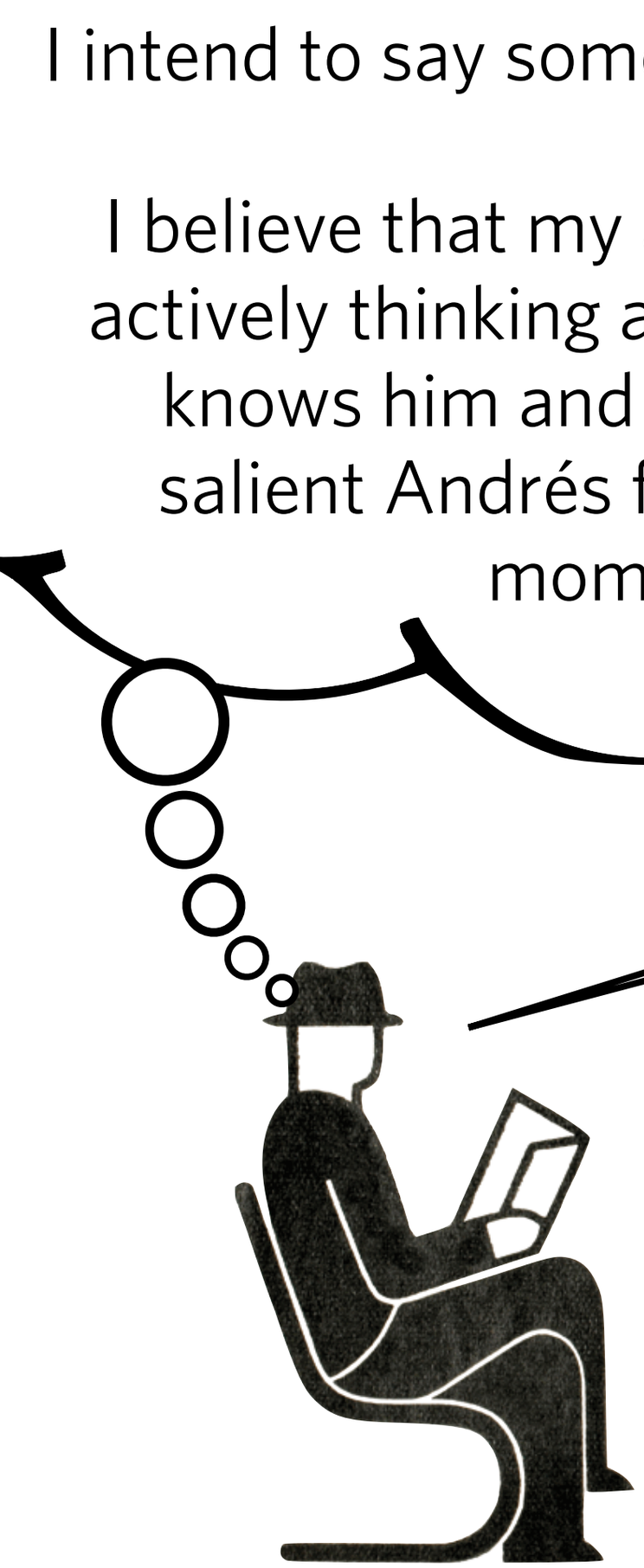
the guy who wrote that cool paper about scale structures for “good”

the guy who invited me to give a talk in Lisbon

A philosopher of language at the Universidade NOVA de Lisboa

I intend to say something about Andrés.

I believe that my addressee is not actively thinking about Andres but knows him and he is the most salient Andrés for them at the moment.



he/him

Andrés

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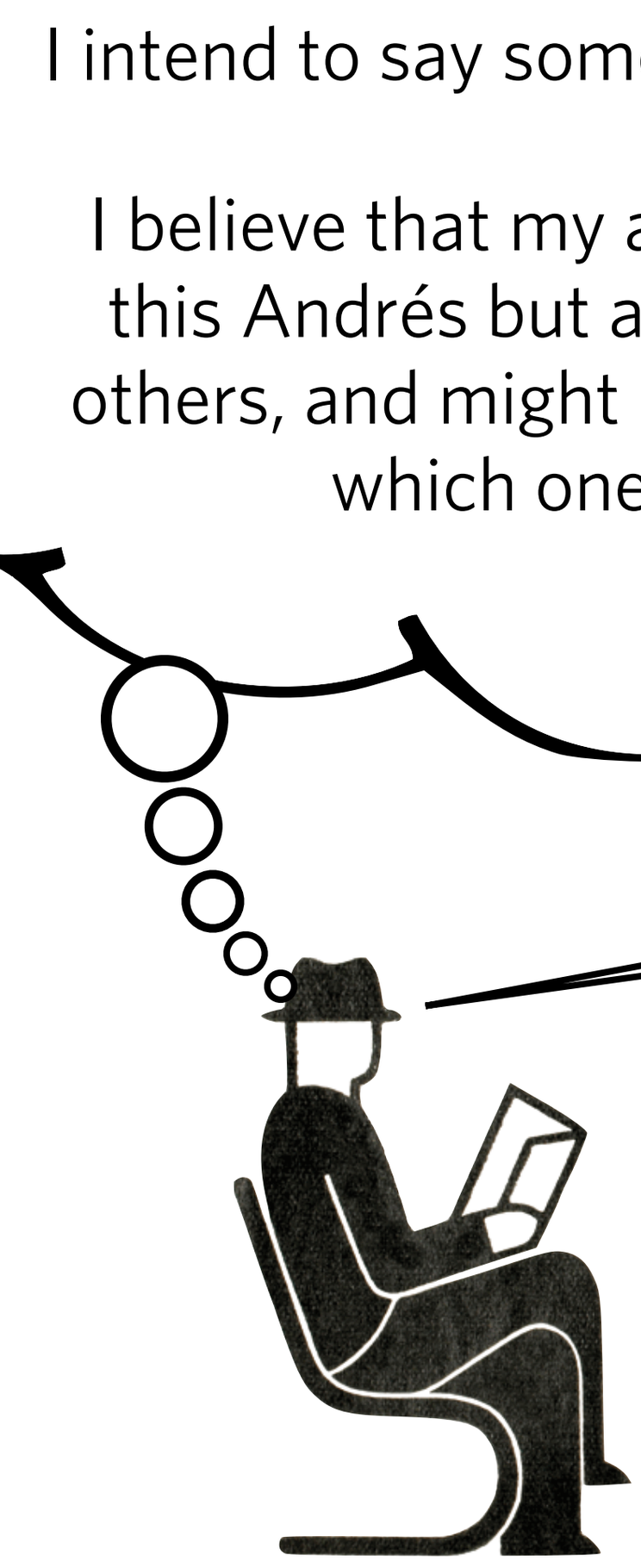
I intend to say something about Andrés.

I believe that my addressee knows this Andrés but also knows some others, and might not be able to tell which one I intend.



he/him

Andrés

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A philosopher of language at the Universidade NOVA de Lisboa

I intend to say something about Andrés.

I believe that my addressee knows Andrés's paper but might not remember his name.

he/him

Andrés

Andrés Soria Ruiz

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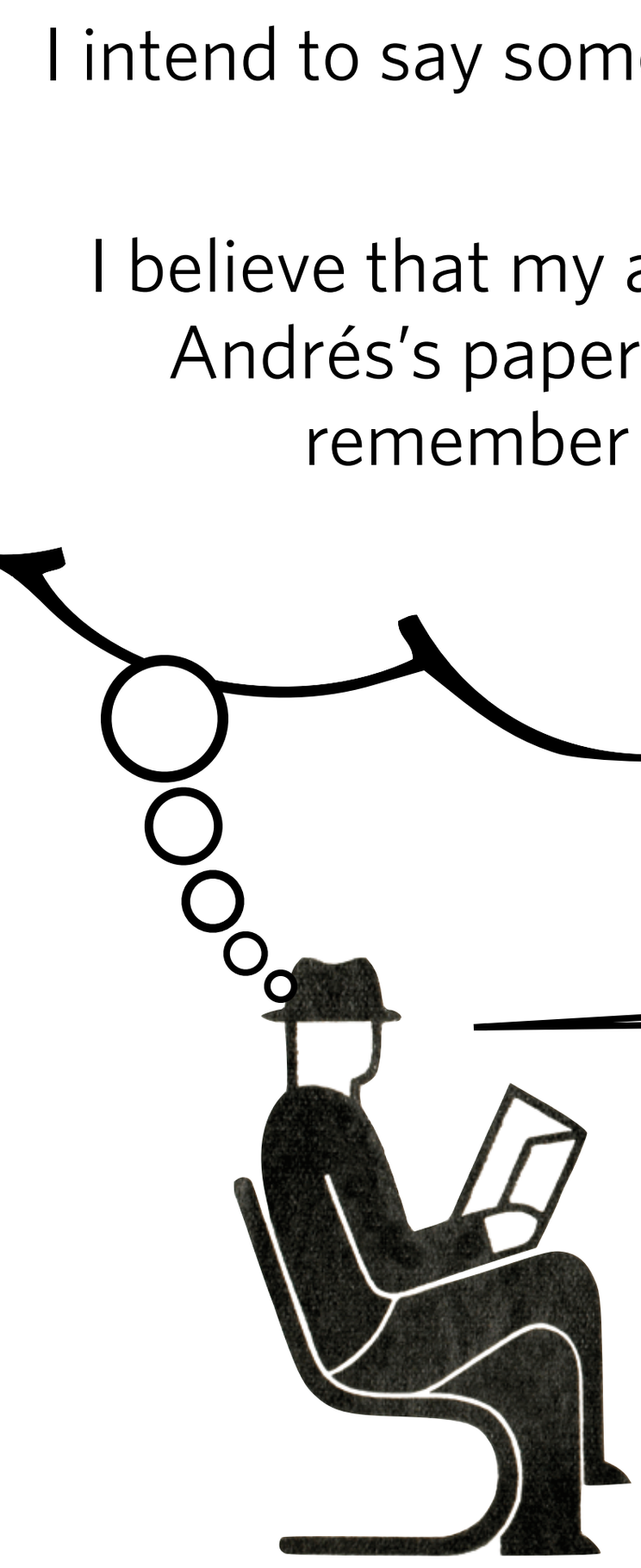
the guy who invited me to give a talk in Lisbon

A philosopher of language at the Universidade NOVA de Lisboa



I intend to say something about Andrés.

I believe that my addressee knows that someone invited me to give a talk in Lisbon but doesn't know much more about them.

he/him

Andrés

Andrés Soria Ruiz

the guy who wrote that cool paper about scale structures for "good"

the guy who invited me to give a talk in Lisbon

A philosopher of language at the Universidade NOVA de Lisboa

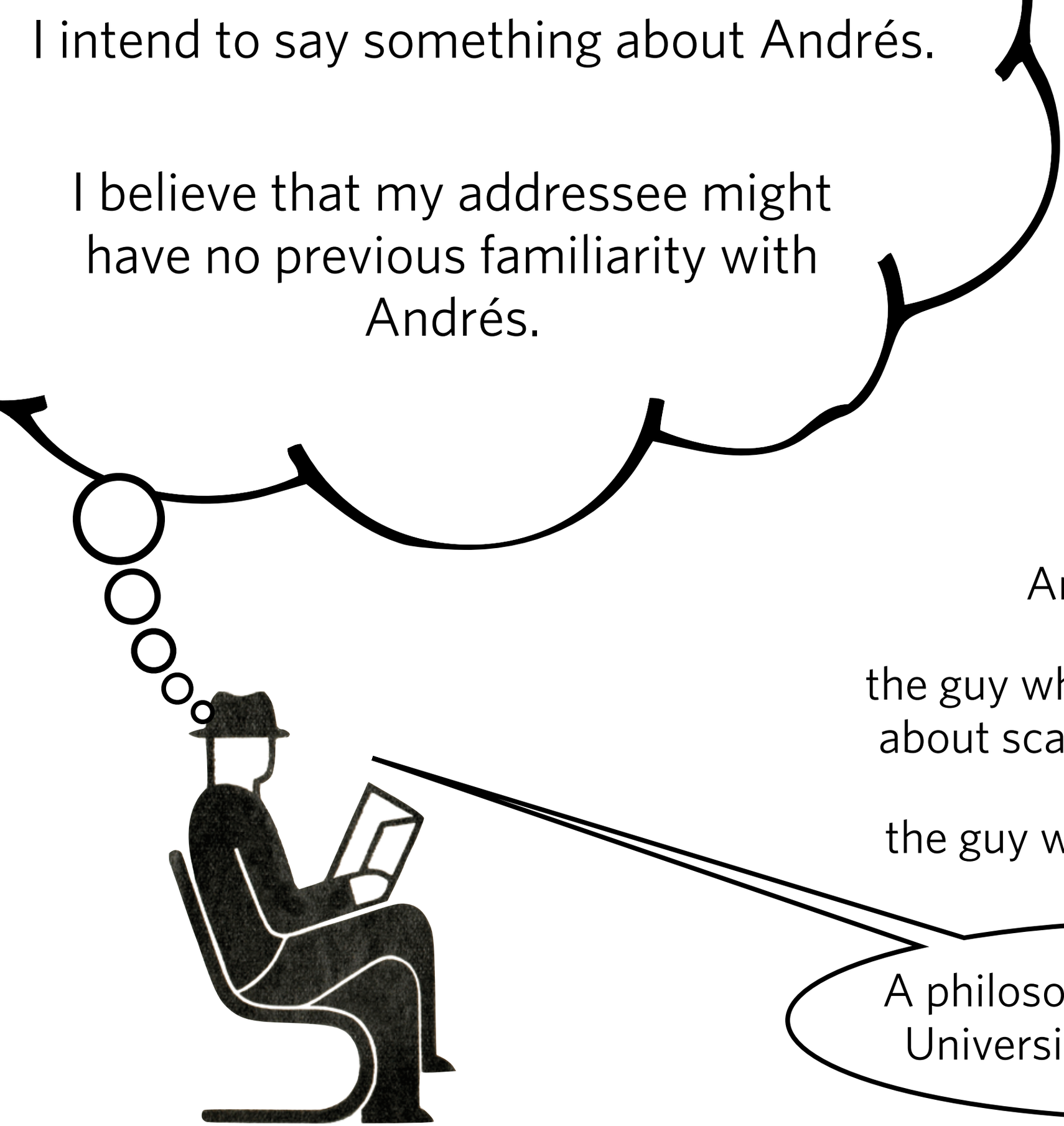
I intend to say something about Andrés.

I believe that my addressee might have no previous familiarity with Andrés.

he/him

Andrés

Andrés Soria Ruiz



the guy who wrote that cool paper about scale structures for “good”

the guy who invited me to give a talk in Lisbon

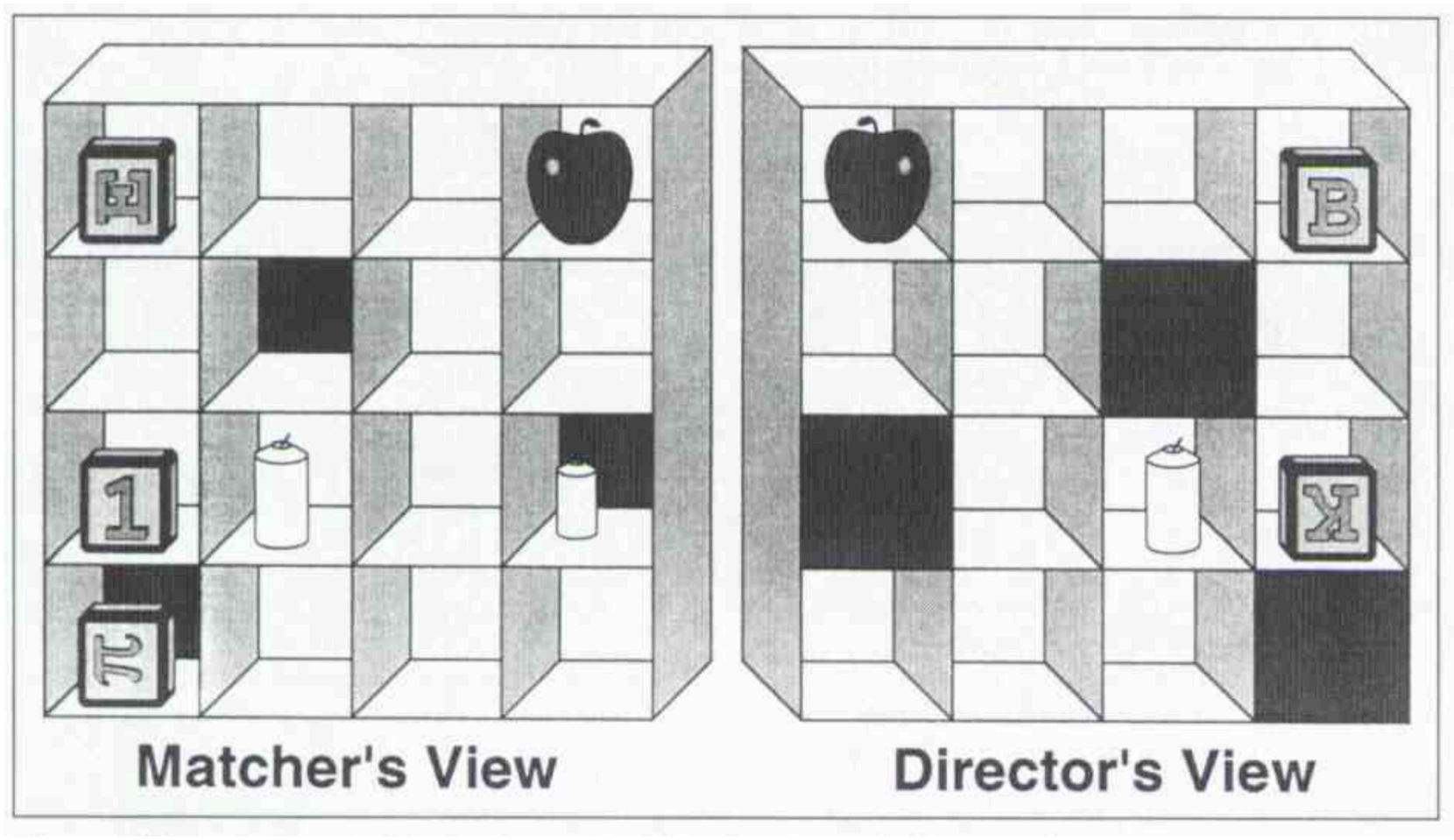
A philosopher of language at the Universidade NOVA de Lisboa

Natural-Language Design

- Noun-Phrase systems in natural language are designed to be used by agents with the ability to combine capacities for advanced mindreading and practical reasoning.
- Does this mean that we always do this practical reasoning, or that children or neuro-atypical people have to be capable of advanced mindreading and planning in order to use them?
- No! It just means that we don't have access to their full communicative potential if we don't engage in mindreading and practical reasoning.
- (See also other semantically underdetermined expressions, indirect speech, gesture, etc.)

The Director Task

Keysar, Barr, and Horton (1998): "The Egocentric Basis of Language Use: Insights From a Processing Approach,"



Director's instructions to Matcher:
"Put **the bottom block** below the apple."

If the Matcher moves the block marked ⊏, then they have reasoned "egocentrically"—i.e., failed to account for the Director's perspective.

The Anchor-and-Adjust Model

Speakers and hearers are often sensitive to others' perspectives.

But not always. Some patterns:

- cognitive load → more egocentric (Keysar 2008)
- Verbal-working-memory deficit → more egocentric (Lin et al 2010)
- Happier → more egocentric (Converse et al 2008)
- Younger children → more egocentric (Keysar 2008)
- Eye tracking studies: everyone is at least partly egocentric at first (Keysar et al 1998)

Theory:
We anchor to our own perspective, and adjust away if we have enough cognitive resources.
(Keysar 2007; Barr 2014; Epley et al 2004)

The Resource-Rational Model

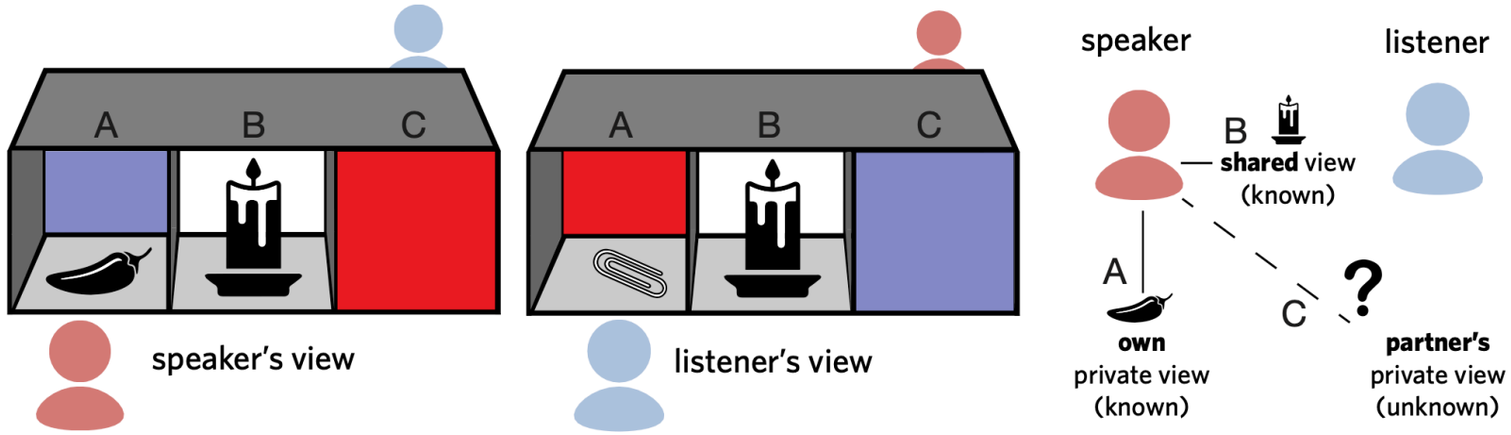
- Eye-tracking studies: Subjects consider both their own and others' perspectives, even early in processing (Nadig & Sedivy 2002; Heller et al 2008, etc.)

- Speakers compensate for uncertainty about addressees' perspective by using more informative descriptions (Hawkins et al 2021)

- Subjects who repeatedly encounter egocentric interlocutors learn to invest more effort in later interactions (Hawkins et al 2021)

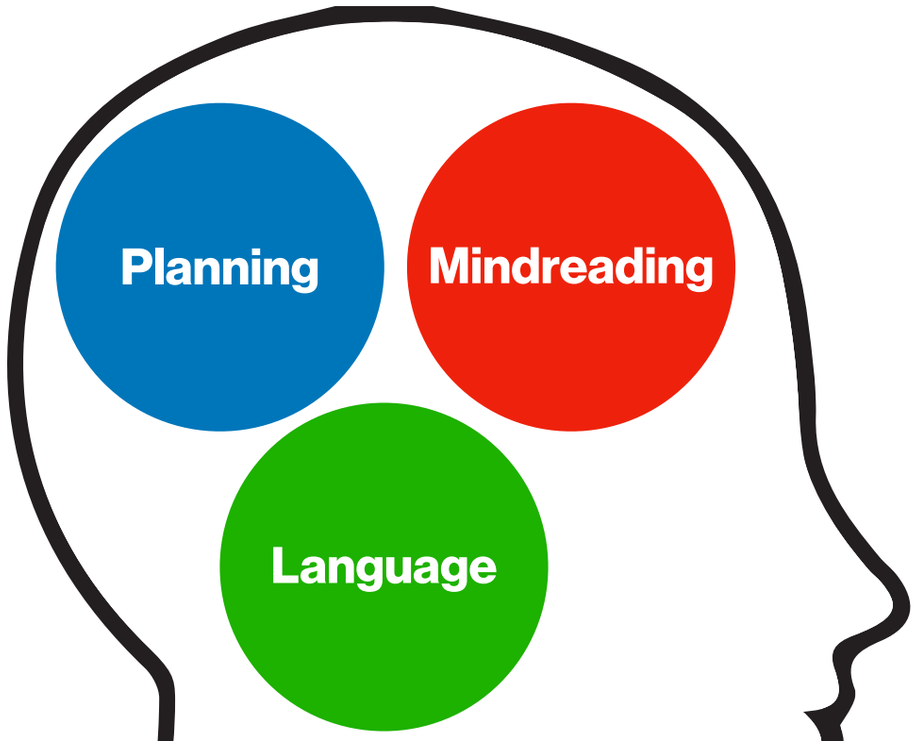
Theory:

We reason not only about others' states of mind, but also about how likely they are to be thinking about our states of mind, and about how much effort will be worth putting into this reasoning. (Hawkins et al 2021)



Conclusions

- Humans design both what we say and how we say it with our addressees and their thoughts in mind.
- We do this by relying on our general-purpose capacities for practical reasoning and mindreading.
- This gives us communicative superpowers!
- Communicative intentions play a central role in this process.



Thanks