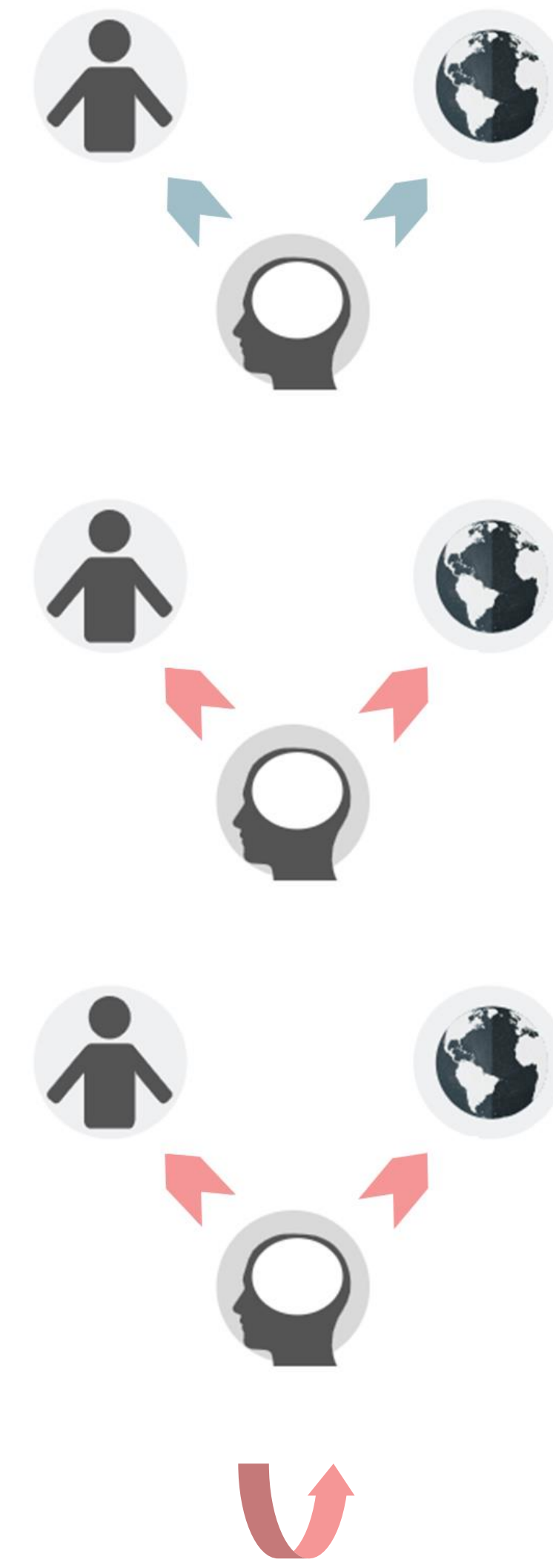# From a cognitive philosophical point of view

Trond A. Tjøstheim, Maximilian K. Roszko, Andreas Stephens

LUND UNIVERSITY

Summary

- Since its beginning, Western philosophy has tended to use **rationality** to try to understand reality and the human condition

- Through the more historically recent development and adoption of **scientific methods**, where empirical evidence is seen to defeat intuitions, it has been possible to develop models that better predict and explain the world

- The way we understand reality is mediated by cognitive processes. **Cognitive science** has uncovered how these processes are biased and limited due to the particulars of the system they arise in (e.g. the human brain). It follows that we as cognitive systems do not have objective access to the world. Instead, cognitive systems filter, sample, and interpret information, through a fleshy computer that processes the information with neural codes. These cognitive limitations and biases should be taken into account when modeling reality. In other words, philosophy should be understood as cognitive processes striving to categorize reality
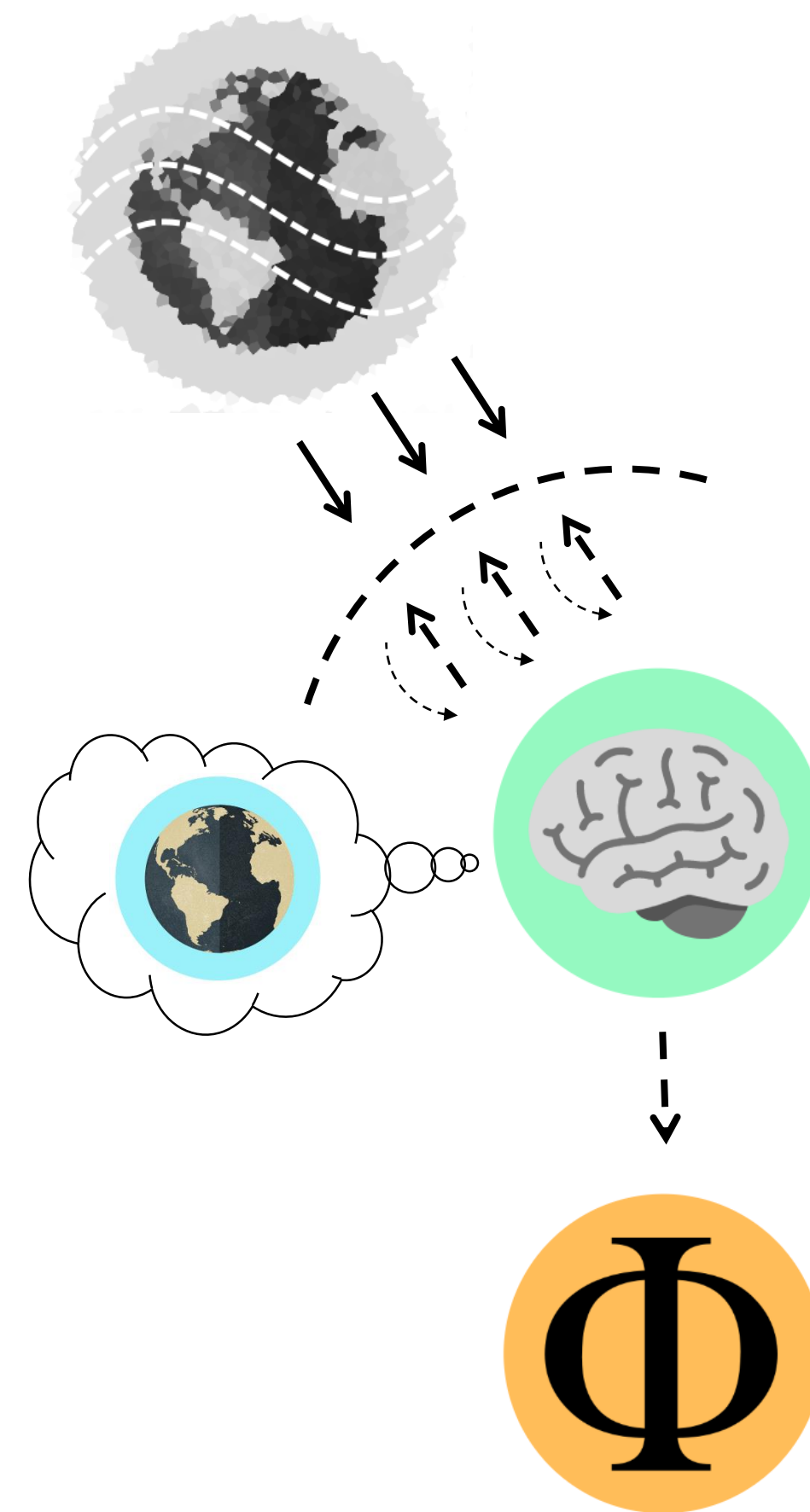
Self-naive investigation

Self-naive modeling

Self-informed modeling

Premises

- Understanding natural phenomena in the world and reality itself requires using our brains

- Brains are bounded (limited) systems, and so have to sample information about the world through sensory organs, and infer what the world (and internal environment) are like

- The particular way human brains infer the world is biased for evolutionary reasons. For example, our sensory systems limit the type of signals we are able to sample, and the structure of our brains limit the type of information-processes we are able to realize

- This means that our *a posteriori* considerations about natural phenomena and reality are influenced by our physical context, and by the sorts of thinking systems that we are. The properties of our minds shape the information and knowledge we focus on, and the theories we generate

- Our *a priori* considerations are also limited and biased, because even if all that can be known can in principle be generated by Turing complete computers, and our brains are such machines, our brains still lack the speed and storage capacities required to know anything but a very small subset of possible considerations. If our brains had quantum computing capabilities, we would be able to comprehend more of the world, because of the radically increased computational capacity

Our bounded brains limit how we perceive and know the world, while our computational capacities and evolutionary neural biases shape, and limit, our theorizing

Conclusion

- Philosophy in general, but in particular the philosophies of mind, epistemology, metaphysics, and language, should be firmly grounded in an understanding of cognitive systems as limited theorizers

- By taking our limits into account, we can pull ourselves by our bootstraps to recognize the deeper patterns of reality, just as our brains already bootstrap their understanding of the sensory signals it samples to produce evolutionarily relevant perceptions

Method

- We suggest that philosophical considerations about the world can be augmented with the help of leading frameworks for modeling cognition. Particularly, we want to highlight *dynamical systems theory*, *control theory*, and *the free energy principle*

- Any investigation into reality needs to respect the dynamical, continuous, and complex aspects of the world we live in. Gracious navigation across multiple levels of physical reality, and employing a pluralistic approach, is therefore necessary for developing rich explanations

Applied cognitive philosophy

Concept and category use in language

The ways humans form categories and concepts about the world are not as discreet as the words used to reference them. *Bottom-up* categories are formed based on exemplar observation and Bayesian updating, and are what underlies intuition. They yield a perception of similarity at the boundaries, which attenuates the further away from the boundary exemplars move. Since these categories are dependent on experience, they cannot efficiently be communicated by language, but can be coarsely approximated with words, or by referring to many examples so long as the recipient have the required experience with those examples, or the necessary imaginative faculties.

Top-down categories are the philosophical mainstay of necessary and sufficient conditions. They have clear boundaries, and are formed by analytical processes utilizing working memory. Due to their discreteness, their definition can be communicated effectively using language.

Since the world is continuous and dynamic, no two persons can have the exact same experience, and hence will not have the exact same bottom-up categories. It follows that a discrete definition of a category can only approximate such a bottom-up category, although giving enough time and words, the approximation can converge to the bottom-up category.

We observe that philosophers attempt to capture natural phenomena with top-down categories. When other philosophers find the initial definitions unsatisfying, they come up with examples not covered by those definitions. We argue that this process will necessarily continue as

long as the original concept is not recognized as a bottom-up one, and that only an approximation can be achieved. Recognizing the nature of the process of concept identification may help convergence. At least it should be recognized that the process is essentially one that will not terminate.

π

Pi is 3! Pi is 3.14!
Pi is 3.1! Pi is 3.1415!
Pi is 3.142!

While top-down categories are like rational numbers, natural phenomena behave as irrational numbers in relation to language

The Generality problem

The generality problem is commonly considered to be a critical difficulty for reliabilism, according to which justification of a belief amounts to being formed by a process that is reliably truth-conducive, and knowledge reduces to reliably produced true belief. The problem is how to determine which belief-forming process type is relevant for a given formed belief (token process), to determine whether it was reliably formed.

A proposed solution to this longstanding problem in philosophy is to look at the cognitive architecture of a given agent forming beliefs. A given belief-forming token process instantiates a uniquely right type of the biological agent's cognitive architecture and background experience. The complex,

dynamic and iterative interaction between the biological agent and the external world makes it reasonable to correlate justifiedness, in the naturalistic sense of ecological rationality, and reliability for belief-formation.

The Gettier problem

The Gettier problem is cause for another longstanding debate in epistemology, that challenges the justified true belief account of knowledge. The problem demonstrates how a person can have justified true beliefs while the reasons for the beliefs are false, which goes against our intuitions about knowledge.

A naturalistic account of knowledge, incorporating both reflective and reflexive processes of human cognition, can elucidate Gettier cases. Epistemic internalist and externalist positions in the debate correspond to central elements of reflective and reflexive human cognitive processes respectively, and overlooked shifts regarding the implicit focus on these processes take place as Gettier cases unfold. Depending on how these shifts are interpreted, the cases will be evaluated with different information in mind, which can result in different intuitions. Therefore, Gettier cases do not need to be viewed as genuine problems; rather, they hinge on how the implicit shifts are interpreted and what information an evaluator chooses to focus on.