

# Natural kinds and concepts: a broadly pragmatist account

Ingo Brigandt  
University of Alberta  
[www.ualberta.ca/~brigandt](http://www.ualberta.ca/~brigandt)



## Overview

- Part 1: An account of natural kinds
  - No purely metaphysical account, but study of the purposes for which natural kind concepts are used
- Part 2: An account of scientific concepts
  - Pragmatist theory, defended in terms of fruitfulness in understanding how concepts work in science
- Coda: A naturalistic approach to philosophical concepts
  - Construing philosophical concepts in analogy to scientific concepts, apply above account of concepts

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## Natural kinds

- Traditional aim: metaphysical account of what a natural kind is, which distinguishes natural kinds from other kinds, in particular nominal kinds
- Natural kind defined by intrinsic property (essence), which accounts for the other properties kind members share: captures kinds in physics and chemistry
- Natural kinds as homeostatic property clusters: accommodates heterogeneity of biological kinds

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## Functional kinds

- Functionally defined kinds are multiply realized and do not share many (intrinsic properties): Not natural kinds according to most definitions
- Functional kinds (in ecology, physiology, economics, social science) still figure in scientific generalizations and explanations (due to stable relations between member of functional kind and members of *other* kinds)
  - meet one hallmark of natural kinds or reason for using notion of natural kind

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## From metaphysics to epistemology

- Not counting how many properties are co-instantiated by a kind, but assessing:
  - What **inferential and explanatory aims** underlie the use of scientific / kind **concept** ?
  - How well does a kind concept (scheme of individuation + knowledge about the kind) meet the inferential and explanatory aims? (see Richard Boyd on 'accommodation')

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## From metaphysics to epistemology

- No clear-cut metaphysical boundary between natural kinds and other kinds: a functional kind can be scientifically important, which is not to be assessed in terms of how 'natural' it is
- No purely metaphysical account of natural kinds, and no unique classification scheme for the world: There are various **theoretical or intellectual goals** that we (not nature) have, and different classifications / kinds may be needed to meet different goals

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## A pragmatist approach to natural kinds

- Pragmatist in its rejection of purely metaphysical and naïve realist account of kinds, and its inclusion of goals of intellectual activity
- Naturalistic in that only overarching philosophical theory is that natural kinds have to be philosophically studied based on the empirical details pertaining to each kind (empirical properties of kind, scientific goals that scientists pursue and meet by studying kind and using kind concept)

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## Part 2: An account of scientific concepts

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## An account of concepts

- A theoretical biological concept consists of three components of content:
  - 1) the concept's *reference*
  - 2) the concept's *inferential role* (sense)
  - 3) the *epistemic goal* pursued by the concept's use
- Different such semantic properties of a term fulfill different philosophical functions.
- A term can historically change in any of them.

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## Epistemic goals of concept use

- Epistemic goal: The type of knowledge (certain kinds of inferences, explanations, discoveries) a central scientific concept is intended to deliver, given its usage by a research community
- Examples:
  - Natural selection: Explanation of adaptation
  - Classical gene concept: Prediction of patterns of phenotypic inheritance across generations
  - Molecular gene concept: Explanation of how genes bring about their molecular products (gene function)

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## Epistemic goals of concept use

- The epistemic goal of a concept accounts for rationality of semantic change:

A change in a term's inferential role (definition) and possibly related change in reference is rational if the revised inferential role meets the term's epistemic goal to a higher extent than the previous inferential role.
- Reference and inferential role: different purpose, account for how a concepts supports successful practice

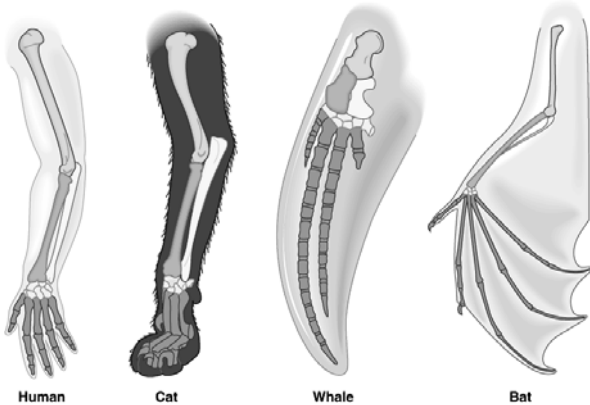
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## The molecular gene concept

- 1970s: Unique structural definitions of genes
- Now: Complex and differing definitions of which structural elements are genes
- Despite change of definition (inferential role): Epistemic goal is still to account for how genes produce their molecular products (gene function)
- Semantic change rational: reflecting improved knowledge of structural basis of gene function

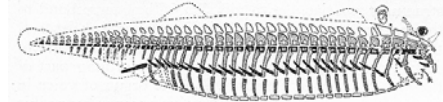
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## The homology concept



## The homology concept

- **Post-Darwinian** definition: Two structures in different species are homologous in case they are derived from the same structure in the common ancestor.
- Different **pre-Darwinian** accounts: same developmental law governing different species, or appeal to blueprint in the mind of God.



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## The homology concept

- Despite advent of evolutionary definition (change in inferential role):  
Epistemic goals are still (1) systematic morphological descriptions of several species, and (2) the classification of species
- Phylogenetic account accepted: provided a more effective way to pursue the traditional goals
- No switch to 'incommensurable' Darwinian concept

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## The epistemic goal of a concept

- Traditional accounts: Concept consists in definition (intension, inferential role), embodying certain beliefs about the referent.  
My account: Also takes into consideration what scientists try to achieve by using those definitions (and revising them) = epistemic goal → more pragmatic aspect
- Epistemic goal pursued by a term's use is a **semantic** property of a term, as it accounts for rationality of semantic change and variation.

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## The epistemic goal of a concept

- Epistemic goal as non-truth-conditional aspect of meaning:
  - not an **explicit** propositional belief of an *individual* scientist, but constituted **implicitly** by the how an overall *community* uses a term
  - not a belief **about states of the world** (not even desire as to how the world studied by science should be like), but **goal about scientific knowledge** (desire as to what a scientific community should achieve)

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## A pragmatist theory of scientific concepts

- Conceptual content is **implicit in practice**: Brandom's variety of pragmatism
- Epistemic goal as non-truth-conditional aspect of meaning: **not only** the function of concepts in **representation**
- Epistemic goal as (epistemic) value in science: **no strict fact-value distinction** as theme in classical pragmatism

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## A pragmatist defense of the account of concepts

- Is epistemic goal really a *semantic* property?  
Epistemic-semantic and semantic-pragmatic distinction less important than phil. need to study epistemic goal
- My 'theory' of concepts is not defended as a metaphysical (or even the only) account of what a concept really *is*, but in terms of this **model's** fruitfulness for studying how concepts *work* in science. Different semantic properties of a term are to be recognized as they fulfill different philosophical functions.

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## Challenging reductive naturalism

- Reductive naturalism (defining philosophical notions in terms of alleged 'scientific' vocabulary) is not science-based naturalism
- For science does not offer theory reduction and there is no privileged vocabulary or level of explanation. Instead: study interrelation and interaction of entities on different levels of organization.
- Example: evolutionary developmental biology

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## Challenging reductive naturalism

- 'Explanation' in philosophy:  
Defining philosophical term ('*knows that p*') by means of necessary and sufficient conditions
- Explanation in biology:  
Aim is not definition of 'life', but gaining partial insight into causal workings of *life phenomena*  
→ philosophy of science: understanding interplay of normative, cognitive, and social aspects of *knowledge production*

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## A naturalistic defense of the account of concepts

- No *a priori* need to reduce normative or intentional notions (e.g. 'epistemic goal')
- Instead: Ascribe different components of content to actual terms, explain what philosophical insights this ascription yields, and study the interrelation between the different components
- Aim should be to shed light on the relations among phenomena referred to by philosophical concepts and phenomena studied by the natural, cognitive and social sciences

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## Coda: A naturalistic approach to philosophical concepts

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## Traditional approach

- Analyzing philosophical concept by one's intuitions as to how it applies to various (hypothetical) scenarios
  - 'cause', 'reference', 'knowledge'
- Weak problem: Counterexamples to every analysis. No single account covers all cases.
- Strong problem: Different persons may have different intuitions about one and the same case.
  - Machery, Mallon, Nichols & Stich (2004) on reference

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## A naturalistic approach

- Real problem: Erroneous assumption that we have already understood the philosophical phenomenon addressed by the concept and just have to make explicit the concept grasped
- Naturalistic solution: Apply above account of scientific concepts to philosophical concepts

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## A naturalistic approach

- Philosophical concepts are technical terms, introduced for particular philosophical purposes: in analogy to epistemic goal of scientific concept
  - 'knowledge': understanding aspects of doxastic states
  - 'reference': accounting for an agent's verbal and intentional behavior involving interacting with objects
- Judging an analysis not in terms of how it conforms to intuitions, but how account meets the concept's **philosophical goal**.

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## A naturalistic approach

- Above account of the concept of 'concept' was defended in these terms, with reference to the different **philosophical goals** addressed by different components of a concept
- Contra some **experimental philosophers**: Surveying the intuitions of *many* persons is as misguided as armchair philosophy if one is not clear about the *philosophical goal* that determines which data about term use is relevant and how it is to be interpreted.

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## Beyond intuitions

- First step for philosophical analysis: Get clear about philosophical goal pursued
- To meet a philosophical goal it may turn out that
  - pluralistic or context-sensitive philosophical account is needed
  - different accounts or different concepts are to be introduced / distinguished
  - several related but distinct goals are involved

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