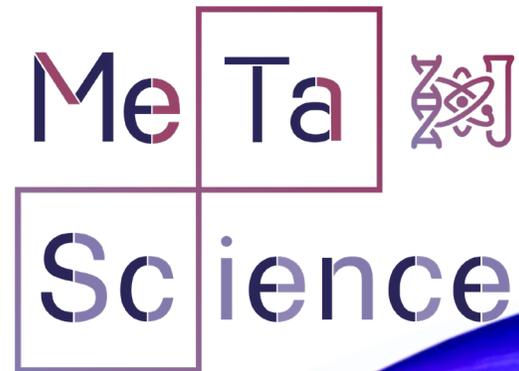


# NATURAL KINDS AND THEIR PROPERTIES

Tuomas E. Tahko

[tuomas.tahko@bristol.ac.uk](mailto:tuomas.tahko@bristol.ac.uk) | [www.ttahko.net](http://www.ttahko.net)



University of  
**BRISTOL**

# WHAT ARE NATURAL KINDS?

- Strongly realist answer: natural kinds are *substantial universals*.
- Natural kind *terms* may be thought to be the set of *concepts* that we use to refer to the *mind-independent* 'joints' of reality.
- These concepts may carve reality to a varying degree of accuracy and sometimes we may be mistaken about whether a concept successfully carves.

# WHAT ARE NATURAL KINDS?

- This is *natural kind fundamentalism* (e.g, Ellis 2001, Lowe 2006, 2015, Keinänen & Tahko 2019).
  - Lowe specifies the idea as follows:

‘What does it mean to describe a certain ontological category as being ‘fundamental’? Just this, I suggest: that the existence and identity conditions of entities belonging to that category cannot be exhaustively specified in terms of ontological dependency relations between those entities and entities belonging to other categories.’

E.J. Lowe 2006. *The Four Category Ontology* (OUP), p. 8.

# NATURAL KIND FUNDAMENTALISM



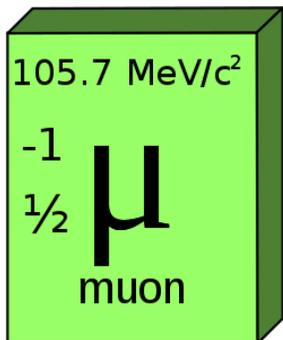
E.J. Lowe 2006. *The Four Category Ontology* (OUP), p. 22.

# KINDS AND THEIR PROPERTIES

- What is the relationship between natural kinds and their properties?
  - This question was central already in John Stuart Mill's discussion of natural kinds.
  - For Mill, it was important that we can distinguish between natural kinds and mere groups of objects characterized by a shared natural property.
  - For example, chemical substances are a plausible example of natural kinds, whereas being *acidic* or *being green and round* are more plausibly merely shared natural properties.

# KINDS AND THEIR PROPERTIES

- While unit negative charge, a certain rest mass, and a half-integer spin characterize all *electrons*, there isn't a similar relationship between greenness, roundness, and all *green and round things*.
  - Consider *electrons* and *muons*, which have the same charge and half-integer spin, but different rest mass.
  - Both *leptons*, but clearly two distinct kinds.
  - Accordingly, when we are giving necessary and sufficient conditions for kind membership, we should first consider the *narrowest kind*.



# KINDS AND THEIR PROPERTIES

- Shared properties are not sufficient for shared kind membership.
  - This is the key thought that motivates the distinction between kinds and their properties: we need to know which clusters of properties are genuine kinds.
  - My view: properties clustered together in members of natural kinds do so *because* they are members of certain natural kinds, i.e., the kinds are *prior to* their properties.
    - What unifies the properties in such a way that they constitute a (member of) a kind? I offer a pluralist answer: there may be many different *methods of unification*.

# KINDS AND THEIR PROPERTIES

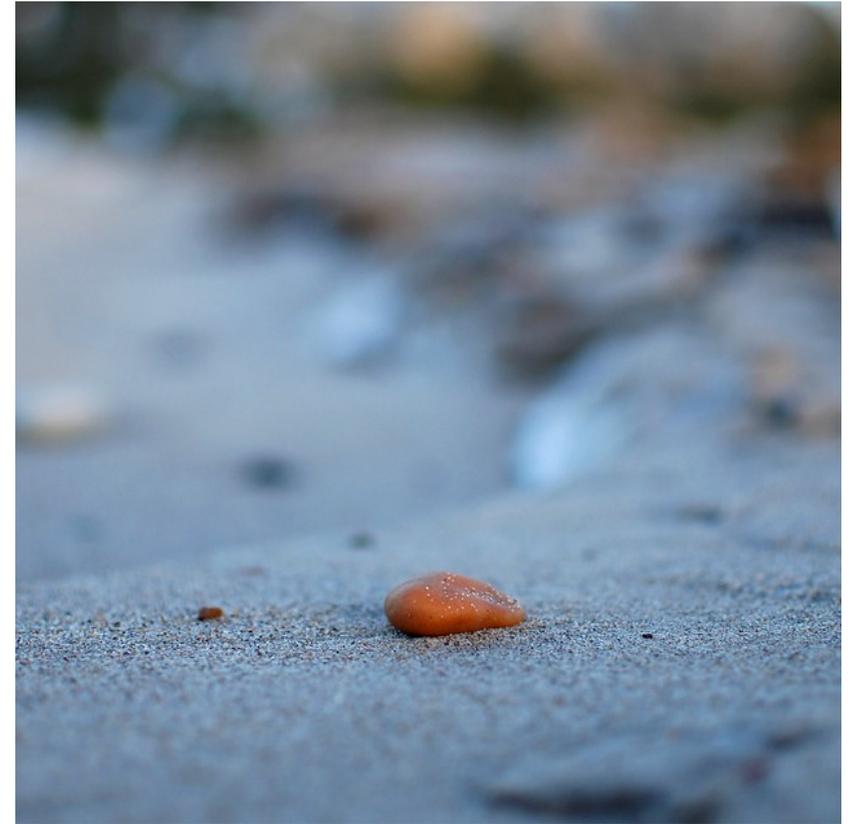
- I understand universals as *instantiated* (sometimes labelled 'Aristotelian' instead of 'Platonic').
  - The instantiated universals are multi-located where their members are.
  - What about kinds that have no actual members?
  - Strictly speaking, they do not exist, but we can often state the identity-conditions for (members of) the kind.
  - We may say that, were an entity of kind  $K$  to come into existence, it would have such and such properties *because* it is a member of kind  $K$ .

# THE MIND-INDEPENDENCE CRITERION

- I've previously said that natural kinds 'reflect natural divisions in mind-independent reality' (Tahko 2015: 796).
  - But there are many supposed cases of *mind-dependent* kinds: *Einsteinium*; psychological kinds such as *depression*; social kinds such as *money*, and so on.
  - My understanding of the mind-independence criterion is not very strict: all we need is a criterion that prevents purely *conventional kinds*, kinds whose identity-criteria are decided merely on the basis of arbitrary preferences.

# THE MIND-INDEPENDENCE CRITERION

- So, what would be a clearly mind-dependent kind?
  - Consider Cornwall-rocks or *C-rocks*.
  - Based on a loose set of aesthetic properties, such as relative roundness and a reddish hue.
  - The only necessary property is that these rocks are to be found on a specific beach in Cornwall (no matter how they ended up there).



# THE MIND-INDEPENDENCE CRITERION

- Khalidi (2016: 228) has helpfully listed four ways to understand the mind-independence criterion:
  - (1) Mind-dependence of the kind vs. its instances
  - (2) Causal vs. constitutive mind-dependence
  - (3) Contingent vs. necessary mind-dependence
  - (4) Mind-dependence vs. theory-dependence

# THE MIND-INDEPENDENCE CRITERION

- Khalidi himself thinks that (1)-(4) are all problematic. Instead, he proposes a fifth formulation:

(5) Mental sustenance vs. initial manifestation

- The distinction can be specified in terms of whether the instances of the relevant kinds require human mental activity to *sustain* them as members of those kinds.

# THE MIND-INDEPENDENCE CRITERION

- Khalidi thinks that while (5) does provide a way to distinguish social and psychological kinds from cases such as artificial elements, it does not provide a good ontological account for distinguishing real or genuine kinds from *ersatz* kinds.
  - The problematic kinds (he mentions *fairies*) do not cease to be when there are no human minds to sustain them, because they were never real kinds to begin with:

‘there are no instantiations of such kinds because there is nothing in reality that would correspond to the specifications or characteristics that members of those kinds are posited to have’ (Khalidi 2016: 242).



# PROJECTIBILITY TO THE RESCUE?

- But Khalidi does have a criterion of ‘reality’ for kinds in mind.
  - He defends a ‘causal criterion of reality’ for kinds, which amounts to the idea that natural kinds are clusters of causal properties or ‘nodes in causal networks’ – this is tied to *projectibility*.
  - A projectible law needs to have ‘the ability to be confirmed by observation of positive instances’ (Kim 1992: 11).
  - Kim argues that psychological states aren’t projectible in this sense and hence that there are no special science laws concerning them, whereas Fodor (e.g., 1997) insists that ‘pain’ and ‘believes that P’ ‘express real states, about which all the available evidence suggests that there are real laws’ (Fodor 1997: 150).

# PROJECTIBILITY TO THE RESCUE?

'If I want to know whether there is a real kind *fairy*, I am primarily concerned with the question as to whether there is a group of individuals, all of whom share such properties as: smallness of stature (relative to humans), aerial flight, disposition to live in woodlands, ability to perform magic, and so on. They may not all have the exact same set of causal properties, but there must be enough similarity among them to participate in the same or similar causal processes. Accordingly, the categories that correspond to these kinds are projectible, feature in inductive inferences, and figure in scientific explanations (whether in the natural or social sciences).'

Muhammad Ali Khalidi 2016. 'Mind-Dependent Kinds.' *Journal of Social Ontology* 2: 223–246, p. 243.

# PROJECTIBILITY TO THE RESCUE?

- If a kind may be ‘conjured’ by the mind willy-nilly, then even *C-rocks* qualify: one may predict whether a given rock is suitable for my rock collection based on its location and its properties (either circular or reddish).
  - Khalidi is of course aware of this issue and he tackles it head on by discussing the cases of *race* and *witch*.
  - Khalidi thinks that *witch* was a real social kind in the same way that *race* is a real kind now, and it may cease to be a real kind in the same way that witches have ceased to be a real kind.
  - But is this really the result that we wanted?



# PROJECTIBILITY TO THE RESCUE?

- What exactly differentiates kinds like *race* and *witch* from my *C-rocks*?
  - ‘The difference would seem to be based on how widespread the effects are and how robust, longlasting, and entrenched the causal profile. If the category in question only affects the behavior of a single person, leading to minimal social influence, then there is little reason to regard it as a social kind’ (Khalidi 2016: 243).
- The move that Khalidi makes here is not a new one: the relative *entrenchment* of a natural kind predicate has been proposed as a criterion for ‘reality’ before (e.g., Antony 2003).
  - But even spurious kinds like *tooth fairy* would seem to qualify!

# METHODS OF UNIFICATION

- The core of the problem concerns the role of the *method of unification* for kinds.
  - This method itself needs to be mind-independent and this is really what the mind-independence criterion for the ‘reality’ of natural kinds amounts to.
  - The HPC theory is one example. We could have such methods for psychological or social kinds as well.
  - But the cases I’ve discussed above would seem to lack them: the *tooth fairy* could just as well have a different causal profile. So, there is one important type of robustness that it lacks, namely, *counterfactual robustness*.

# METHODS OF UNIFICATION



- A psychological kind like *depression* may seem to lack an objective method of unification, as it is defined in DSM-5 on the basis of psychological and somatic symptoms as opposed to their causes.
- There is also an element of arbitrariness, because in order to be diagnosed with depression, the individual must be experiencing five or more of the eight diagnostic symptoms associated with depression during the same two week period, and at least one of the symptoms should be either (1) depressed mood or (2) loss of interest or pleasure.

# METHODS OF UNIFICATION

- Arbitrary as it may seem, there could yet be an objective method of unification that underlies the mutual occurrence of the symptoms (or there could be several, *narrower* kinds).
  - It's notoriously difficult to accurately diagnose conditions like depression and we do not truly know (all of) its causes.
  - If we are unable to identify the method of unification, we are not in a position to determine whether something is a natural kind or not.
  - The upshot is that in the case of *depression* it may be best to remain agnostic – it could end up being similar to *race* or *witch* in that the causal profile associated with it is ultimately based on convention rather than an objective method of unification.

# KINDS ARE PRIOR TO THEIR PROPERTIES

- Let's put these ideas to use in my preferred neo-Aristotelian framework: a general, formal ontological account that is applicable to all cases of unification, i.e., the *why* of unification rather than the *how*.
- Substantial universals or kinds are associated with a given set of properties because the kind unifies these properties.
  - Hommen puts this nicely: 'kinds represent unified ways of being—both in an individual and in a collective sense: they account for the modal and temporal stability of character both within single particular objects and across what we then call different members of the same kind.' (Hommen forthcoming: [3].)

# KINDS ARE PRIOR TO THEIR PROPERTIES

- Compare this with Oderberg's *unity problem*:

'if the essence is a group (set, bundle) of properties, what holds those properties together? Why, in the case of a  $K$  with putative essential properties  $F$ ,  $G$ , and  $H$ , are those properties always and only found together in the  $K$ s, assuming that the essential properties specify what a  $K$  is such as to distinguish  $K$ s from every other kind of thing?'

David Oderberg 2011. 'Essence and Properties.' *Erkenntnis* 75: 85–111, p. 90.

# KINDS ARE PRIOR TO THEIR PROPERTIES

- So, what is the link between the essence of a kind and the essential properties definitive of the kind?

'In some sense, the human kind can even be *defined* or *characterized* in terms of these [essential] attributes. But it is one's being human which *grounds* one's having these characteristics, not the other way around. Thus, kinds represent *unified ways of being*—both in an individual and in a collective sense [...].'

David Hommen Forthcoming. 'Kinds as Universals: A Neo-Aristotelian Approach.' *Erkenntnis*, p. 3.

# KINDS ARE PRIOR TO THEIR PROPERTIES

- Here is Oderberg's take on the issue:

'Having a capacity for humour is an essential property [. . .] of human beings, and in this sense we can say it flows *from the essence* of human beings to have a capacity for humour. But the *essence* of being human is to be a *rational animal*, and humans have a capacity for humour *only because* they are rational animals.'

David Oderberg 2007. *Real Essentialism*. Routledge, p. 49.

# KINDS ARE PRIOR TO THEIR PROPERTIES

- Oderberg suggests that the properties that '*flow*' from the essence of a particular object belonging to a given kind are caused by and originate in the *form* of that kind (2011: 99–103; cf. Lowe 2015: 67).
  - Oderberg's picture follows neo-Aristotelian *hylomorphism*, where the distinction between *form* and *matter* is central (Koslicki 2018).
  - On this picture, as Lowe puts it: '[A]n individual substance possesses a certain *form*, which constitutes its *essence*, from which 'flow' by necessity certain features of the substance, which are its *properties* in the strictest sense of the term.' (Lowe 2015: 67.)
- On my view, form is to be identified with the essence.

# KINDS ARE PRIOR TO THEIR PROPERTIES

- Lowe criticises the hylomorphic picture; consider a hydrogen atom:

‘The form does not, in any sense that I can understand, ‘combine’ with the proton and the electron so as to constitute, together with them, the atom. The only things that do any ‘combining’ are *the proton and the electron*, when the former captures the latter and the latter occupies an orbital around the former. And the only things that *constitute* the atom are, again, the proton and the electron, which are its *parts*, in the perfectly familiar sense of ‘part.’

E.J. Lowe 2015. ‘In Defence of Substantial Universals’. In G. Galluzzo and M.J. Loux, eds., *The Problem of Universals in Contemporary Philosophy* (CUP) pp. 65–84, p. 69.

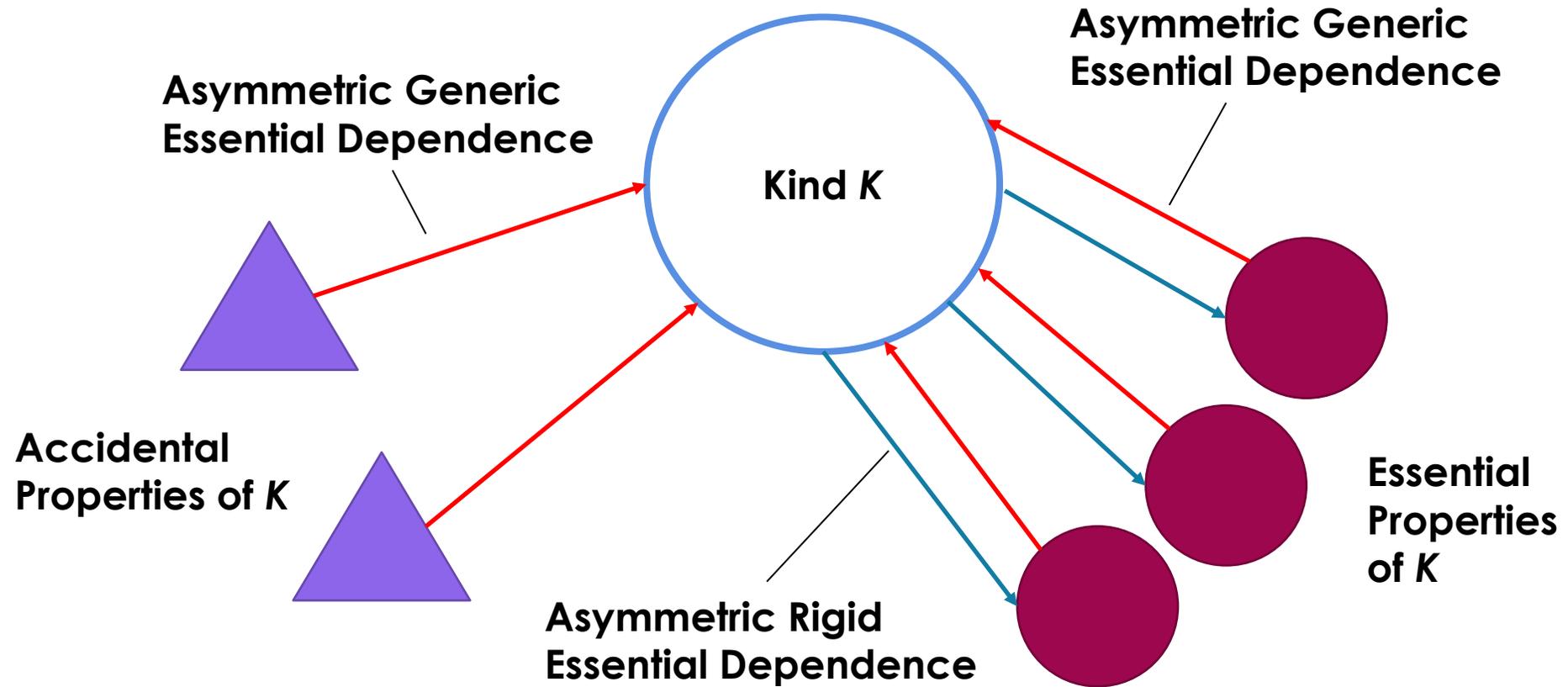
# KINDS ARE PRIOR TO THEIR PROPERTIES

- I develop on this line of thought, employing the notions of **rigid** and **generic essential dependence** (cf. Tahko & Lowe 2016):
  - **(E-RIG)**  $x$  depends essentially for its existence upon  $y$  if and only if it is part of the essence of  $x$  that  $x$  exists only if  $y$  exists.
  - **(E-GEN)**  $x$  depends essentially for its existence upon  $Fs$  if and only if it is part of the essence of  $x$  that  $x$  exists only if some  $F$  exists.
- Both can be symmetric or asymmetric, but we need an asymmetric relation: property universals essentially depend for their existence on there being some kind or other that has these properties either essentially or accidentally.
  - So, charge essentially depends for its existence, in the sense of **(E-GEN)**, on there being some kind, such as *electrons*, that have the property of charge.

# KINDS ARE PRIOR TO THEIR PROPERTIES

- There is an asymmetric generic essential dependence relation (**E-GEN**) between the general kind essence  $K$  (substantial kind universal) and the essential properties that  $K$  unifies.
- The kind  $K$  asymmetrically rigidly depends (**E-RIG**) on the essential properties that  $K$  unifies (cf. Lowe's *characterization*).
- Further, the mere *accidents* that are entailed by  $K$ , asymmetrically essentially depend (**E-GEN**) on  $K$ .
  - These properties are not genuinely essential for  $K$ , even though they could be essential for some other kind,  $G$ .

Let's summarise with a picture:



# REFERENCES

30 / 30

- Antony, L. 2003. 'Who's Afraid of Disjunctive Properties.' *Philosophical Issues* 13: 1–21.
- Chakravartty, A. 2007. *A Metaphysics for Scientific Realism: Knowing the Unobservable*. (CUP).
- Fodor, J. 1997. 'Special Sciences: Still Autonomous after All These Years.' *Philosophical Perspectives* 11: 149–163.
- Hommen, D. Forthcoming. 'Kinds as Universals: A Neo-Aristotelian Approach.' *Erkenntnis*. Doi: 10.1007/s10670-019-00105-6.
- Keinänen, M. & Tahko, T.E. 2019. 'Bundle Theory with Kinds.' *The Philosophical Quarterly* 69: 838–57.
- Kim, J. 1992. 'Multiple Realization and the Metaphysics of Reduction.' *Philosophy and Phenomenological Research* 52: 1–26.
- Khalidi, M.A. 2016. 'Mind-Dependent Kinds.' *Journal of Social Ontology* 2: 223–246.
- Koslicki, K. 2018. *Form, Matter, Substance*. Oxford University Press.
- Lowe, E.J. 2006. *The Four-Category Ontology: A Metaphysical Foundation for Natural Science*. OUP..
- Lowe, E.J. 2015. 'In Defence of Substantial Universals', in G. Galluzzo and M.J. Loux (eds.), *The Problem of Universals in Contemporary Philosophy*. CUP.
- Oderberg, D. 2007. *Real Essentialism*. Routledge.
- Oderberg, D. 2011. 'Essence and Properties.' *Erkenntnis* 75: 85–111.
- Tahko, T.E. 2015. 'Natural Kind Essentialism Revisited.' *Mind* 124: 795–822.
- Tahko, T.E. & Lowe, E.J. 2016. 'Ontological Dependence.' *The Stanford Encyclopedia of Philosophy*, E.N. Zalta (ed.), URL = <<https://plato.stanford.edu/entries/dependence-ontological/>>.