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Personification as Epistemic Practice & Specieshood as 'Natural Kind'

1969 words

Abstract

Drawing on Charles Darwin's *On the Origin of Species* (1859) and Richard Dawkins' *The Selfish Gene* (1976), we make two arguments. First, personification - attributing fictitious intelligence and motivation to a biological entity purely for the sake of argument - was a core epistemic practice for Charles Darwin on the one hand, and for the 20th century sociobiologists working in the "Modern Synthesis" tradition on the other. Whereas Darwin made his discoveries by personifying *Nature*, the sociobiologists made discoveries through the personification of *genes* and *organisms*. We propose that personification is sufficiently distinct from the epistemic practices introduced by John V. Pickstone (2004) that it deserves its own special category.

108 words

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Introduction

If only because they are widely[1] considered the most influential biology books of the 19th and 20th centuries respectively, a close reading of Charles Darwin's *On The Origin of Species* (1859) and Richard Dawkins' *The Selfish Gene* (1976) would be expected to reveal the evolving core epistemic practices (ways of knowing) of professional biologists. We first briefly sketch John V. Pickstone's account of epistemic practices (Pickstone, 2004), and then argue that 'personification' as it appears in *Origin* and *Selfish Gene* should be treated as a distinct epistemic practice - a fourth category in Pickstone's typology. Finally, we explore the impact of this epistemic practice on the perpetuation of the idea of a 'species as a natural kind'.

In *Ways of Knowing* (2004), Pickstone proposes three ways of knowing in the natural sciences: *natural history* (describing and classifying), *experimentation* (controlling phenomena and systematically creating novelties), and *analysis* (explaining complex phenomena by reducing them to simpler constituents) (Pickstone, 2004). We give three illustrative examples.

[1] The books are placed No. 1 and No. 3 respectively on Science Direct's list of 'Top 10 Most influential popular science books' ("Top 10 Most Influential Popular Science Books," 2012)

Natural history was employed by Darwin in his argument that what we are used to calling 'species' is an arbitrary category (reliant on human convention) rather than a 'natural' (objectively existing) one. He draws on his own field observations and various animal and plant catalogues:

> How many of those birds and insects in North America and Europe, which differ very slightly from each other, have been ranked by one eminent naturalist as undoubted species, and by another as varieties […]
>
> — Darwin 1859, *Origin* (Darwin, 1859, p. 47)

Darwin argues that the line between "species" and a "varieties" is subjective and inconsistent, suggesting that these categories are not fixed, as was commonly held at the time. We can illustrate the *experimental* way of knowing with another example from Darwin. He starts by explaining the 'standard view' among his peers:

> The view generally entertained by naturalists is that species, when intercrossed, *have been specially endowed with the quality of sterility*, in order to prevent the confusion of all organic forms.
>
> — Darwin 1859, *Origin* (Darwin, 1859, p. 47)

To debunk this view, Darwin brings to bear decades of experimental evidence on plant hybridism by Kölreuter and Gärtner, concluding that the "two most careful experimentalists who have ever lived, have come to diametrically opposite conclusions […]", suggesting that intercross-sterility is not a *specially endowed quality*, but an *accidental one* based on the physical incompatibility of reproductive organs.

Lastly, to illustrate *analysis* we turn to the so-called 'Modern Synthesis' of biology. Whereas *Origin* was instrumental in convincing biologists of the reality of *evolution*, it took almost five decades for them to warm up to *natural selection* as the main driver, a period which Julian Huxley has called 'the eclipse of Darwinism' (Huxley, 1942). The discovery of the gene and the sequencing of DNA prompted a re-evaluation of the theory. A new research programme calling itself the 'Modern Synthesis' emerged between the 1930s and 1950s (Gayon & Huneman, 2019). Under this research programme, natural selection was taken to be the sole driver of evolution, and both the *gene* and the *organism* were taken to be subject to natural selection (Gayon & Huneman, 2019). Dawkins' *Selfish Gene* put into vivid words for a popular audience the implicit beliefs held by biologists working in this tradition (Dawkins, 1976).

As we have seen, Pickstone defines *analysis* as "reducing complex phenomena to simple principles" (Pickstone, 2004, p. 56). We can illustrate this with the following example from the 'Modern Synthesis': how do we explain that animals tend to form clusters or herds? In 1972 W.D Hamilton published his "Selfish Herd" model (Hamilton, 1971), a mathematical model that predicts the clustering behavior by simulating prey organisms minimizing their own probability of being attacked. When prey use their neighbors as living shields, groups and herds form, with very few assumptions about the organisms in question (Hamilton, 1972). Hamilton is said to use *analysis*, in the Pickstonian sense, because he has explained a complex behavior as a natural consequence from a simple rule (an organism's desire for self-preservation).

While Pickstone's three categories are remarkably well-suited to cover a large portion of epistemic practices in biology, we will next show that a careful reading of *Origin* and *Selfish* reveals *personification* to be a distinct, fourth epistemic practice.

Personification as Epistemic Practice

Darwin personifies *Nature* and *natural selection*. Dawkins personifies *genes* and *organisms*. Both are careful to stress that we should not take their personification *literally*:

> So again it is difficult to avoid personifying the word Nature; but I mean by Nature, only the aggregate action and product of many natural laws, and by laws the sequence of events as ascertained by us.
>
> — Darwin, *Origin of Species* 3rd Ed. (Beer, 2009)

Dawkins is more forceful:

> Personification of genes really ought not to be a problem, because no sane person thinks DNA molecules have conscious personalities, and no sensible reader would impute such a delusion to an author.
>
> — *Selfish Gene* (Dawkins, 1976, Prologue)

The fact that these personifications are taken to be metaphors by their authors has probably contributed to them being neglected in existing accounts of epistemic practices in biology. Nevertheless, Gillian Beer has argued that the following passage reveals Darwin's personified Nature to more than merely metaphorical (Beer, 2009):

> as man can certainly produce great results by adding up in any given direction mere individual differences, so could Nature, but far more easily, from having incomparably longer time at her disposal
>
> — *Origin of Species* (Darwin, 1859, p. 64)

Nature appears to be endowed by the agency to "produce great results". By comparing Nature to a human breeder ("as man can certainly produce great results… so could Nature"), Darwin uses the familiar to make the novel intelligible to a Victorian audience. Personification is therefore not merely a literary metaphor, but a didactic tool. But it is more than a merely *didactic* tool, too: Victorian audiences had moral objections to accepting evolution by natural selection, which was a threat to the "assumption that all manifestations of nature are aspects of a relationship between God and Man" (Beer, 2009). A common sentiment was that evolution threatened human dignity by reducing "morality to a mechanical process" (Chronicle, 1846). Personifying Nature, therefore, was a *rhetorical tool* which helped soften the moral blow by maintaining the 'awesomeness' of creation - replacing a real, active God with a personified, metaphorical Nature.

So personification was a literary device, a didactic tool, and a rhetorical device. This is not yet enough to justify calling it an 'epistemic practice'. However, Pickstone has convincingly argued that reasoning from analogy with an active human selector was a key insight that led Darwin to formulate his theory. Citing Desmond and Moore's biography of Darwin (Desmond & Moore, 1991), Pickstone highlights the influence that commercially-driven human selection had on Darwin (Pickstone, 2004, p. 30):

> In Britain from 1750, cattle and sheep were changed radically as breeders sought marketable characteristics and faster growth. […] the theory of evolution by natural selection […] can be shown to have built on this shift in breeding technology.

— (Pickstone, 2004, p. 30)

If analogies with human selection are how Darwin stumbled upon his theory in the first place, then Beer's suggestion that Darwin's theory "needs" a more strongly personified nature is spot on. Darwin's personification of Nature allowed him generate valuable knowledge about her, and thus should be viewed as an epistemic practice.

It may be suggested that *personification*, if it is an epistemic practice, should be seen as a sub-set of analysis, since it is employed as a tool to explain complex phenomena. But this view is problematic: all cases of *analysis*, as understood by Pickstone, require the breaking down of a complex phenomenon into simple, constitutive parts *which are taken to be real* (Pickstone, 2004). But Darwin clearly did not literally hold a personified view of Nature. It is the use of *useful fictions* to come to grips with reality that makes personification a practice quite distinct from Pickstonian *analysis*.

We will next see how personification-as-epistemic practice reappeared in the 1960s 'Modern Synthesis', with the *gene* and *organism* replacing *Nature* as the thing being personified. By the 1960s biologists needed tools to navigate the complex, mathematics-heavy turn of the modern synthesis. Personification was one of these tools. Thus, Dawkins states that "natural selection for selfish genes tends to favour cooperation among genes", ascribing to genes (the basic unit of heredity) the (anthropomorphic) quality of *cooperation*. For Dawkins, personification of this kind is not "just a quaint didactic device":

> "[in] Darwinian calculations of altruism and selfishness […] it is very easy to get the wrong answer. Personifying genes, […] often turns out to be the shortest route to rescuing a Darwinian theorist drowning in muddle".
>
> — (Dawkins, 1976, Introd. p. xii)

To give a concrete example, the biologist W.D Hamilton attributed "to the genes, temporarily, intelligence and a certain freedom of choice", in a paper on the sterility of worker ants (Hamilton, 1972). Thus, the *personification of genes* becomes a way of quickly and reliably arrive at the result of a long mathematical calculation without having to explicitly go through with it.

Dawkins does not just personify genes; organisms are also given fictitious motivations and intelligence *purely for the sake of argument*. In describing the death-throes of the runt of a litter, Dawkins presents the following argument:

> As soon as a runt becomes so small and weak that his expectation of life is reduced to the point where benefit to him due to parental investment is less than half the benefit that the same investment could potentially confer on the other babies, the runt should die gracefully and willingly. He can benefit his genes most by doing so.
>
> — Dawkins 1976, *The Selfish Gene* , (Dawkins, 1976, p. 168)

Dawkins does not describe the *actual* mental state of the runt when he says "the runt should die gracefully and willingly". And yet, the effects of gene selection are such that we can *pretend* that the runt is a rational actor attempting to optimize the chances of passing on his genes. Dawkins explains that this *personification of the organism* is mental short-cut for the following argument, which relies on the *personification of the gene*:

> A gene that gives [the runt] the instruction, "Body, if you are very much smaller than your litter-mates, give up the struggle and die" could be successful in the gene pool, because it has a 50 per cent chance of being in the body of each brother and sister saved.
>
> — (Dawkins, 1976, p. 168)

So, sociobiologists working in the 'Modern Synthesis' tradition personify organisms by giving them the fictitious intelligence and motivation to rationally calculate the maximum chances of passing on their genes. They personify genes in attributing to them what Dawkins terms 'selfishness' - i.e the motivation and intelligence to maximize their own chances of survival. Both instances of personification, like the one employed by Darwin, enable them to make discoveries and explain biological phenomena - they are thus distinct ways of knowing.

Conclusion

Through the lens of Pickstone's epistemic practices, we have seen that personification is far more than a didactic metaphor. Personifying Nature allowed Darwin to view the similarities between artificial breeding and natural selection, and let to the formation of his radical theory. For Dawkins and the sociobiologists of the Modern Synthesis, the personification of genes and organisms serves as a rigorous analytical shortcut—a way to navigate complex mathematical probabilities by treating biological entities as rational actors. These uses of *personification* cannot be reduced to Pickstone's category of *analysis*, as they have the distinctive quality of using *useful fictions* to making discoveries about the world.

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