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Personification as Epistemic Practice & an explanation for our tendency to essentialize specieshood

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Abstract

Drawing on Charles Darwin's *On the Origin of Species* (1857) [1] and Richard Dawkins' *The Selfish Gene* (1976) [2], we make two arguments. First, personification - attributing intelligence and motivation to biological entity for the sake of explanation - was a core epistemic practice both for Charles Darwin and for 20th century sociobiologists working in the "Modern Synthesis" tradition. Whereas Darwin uses the personification of *Nature* as an epistemic tool, sociobiologists employ the personification of *genes* and *organisms* for the purposes of analysis. We propose that personification is sufficiently distinct from the kinds of knowledge introduced by John V. Pickstone [3] that it deserves its own special category. Second, specieshood continues to be treated as a natural category by academic philosophers and culture at large. This is surprising because biological orthodoxy since Darwin has it as a conventional category. We propose an explanation for this discrepancy, namely that it is due to the perpetuation of an old-fashioned biological explanation for animal altruism (that it is 'good of the species'), rooted in group selection theory.

172 words

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Introduction

If only because they are widely considered the most influential biology books of the 19th and 20th centuries respectively[1], a close reading of Charles Darwin's *On The Origin of Species (1859)* and

[1]The books are placed No. 1 and No. 3 respectively on Science Direct's list of 'Top 10 Most influential popular science books' [4]. Whereas both books are written for the generally educated reader [2, preface], [5], it seems to me reasonable to assume that professional biologists are overrepresented in the readership of these books.

Richard Dawkins' *The Selfish Gene* (1976) would appear to be a good way to reveal the evolving core epistemic practices, or ways of knowing, of professional biologists.

Before arguing for that 'personification' emerges as a key epistemic practice for the two authors, it will help to briefly outline how we understand 'epistemic practice'. John V. Pickstone has proposed three primary ways of knowing in the natural sciences: *natural history* (the describing and classifying of things), *analysis* (explaining complex phenomena by reducing them to simpler constituents) and *experimentation* (controlling phenomena and systematically creating novelties) [3].

We will illustrate these ways of knowing with several examples from *Origin* and *The Selfish Gene* . First, *natural history* can be illustrated by Darwin's argument that what we are used to calling 'species' is an arbitrary, a human category rather than a 'natural' one:

> 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, or, as they are often called, as geographical races!
>
> — Darwin 1859, *Origin* [1, p. 47]

His argument relies on *natural history* because it is based on his own field observations and various animal and plant catalogues.

Pickstone's *experimental* way of knowing can be illustrated by another one of Darwin's arguments against the essentialization of species-hood. He starts by reminding the reader of the 'standard view' among his contemporaries in natural theology:

> 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.
>
> — [1, p. 182]
> (emphasis mine)

To argue against this view, Darwin brings to bear decades of experimental evidence on plant hybridism, most notably from Kölreuter and Gärtner's experiments on the fertility of plant crosses or 'hybrids'[2]). Darwin concludes 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. Darwin concludes that there is no more reason to think "species have been specially endowed with various degrees of sterility to prevent them crossing and blending in nature", than to think that trees have been specially endowed with the difficulty of being "grafted together" to "prevent them becoming inarched in our forest" [1, p. 208].

To illustrate *analysis* we turn to the Modern Synthesis of biology.

Whereas *Origin* was instrumental in convinced 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 with Julian Huxley has called 'the eclipse of darwinism' [6]. The discovery of the gene and the sequencing of DNA prompted a re-evaluation of the theory a new research programme emerged between the 1930s-1950s, mainly in England and the United States, under various names 'Modern Synthesis', "synthetic evolution, or "evolutionary synthesis", a phenomeon whose institutional nature Jean

[2] offspring whose parents are from different species

Gayon and Phillip Huneman have recently scrutinized [7]. Under this research programme, natural selection was taken to be the dominant driver of evolution, and both the *gene* and the *organism* were entities subject to natural selection [7]. Dawkins' *Selfish Gene* put into vivid words for a popular audience what had mostly been implicit in the mathematical modelling of gene frequencies by biologists working in this tradition [2].

Analysis is characterized by Pickstone as "reducing complex phenomena to simple principles" [3, p. 56]. For instance, how do we explain that animals in the wild tend to form clusters or herds? In 1972 W.D Hamilton published his "Selfish Herd" model [8], a mathematical model that predicts the clustering behavior by simulating prey organisms trying to maximize their own survival by minimize their probability of being attacked. When prey use their neighbors as living shields, groups and herds form, an explanation which relies on very few assumptions about the organisms in question [9]. 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).

Now that we have elucidated Pickstone's ways of knowing using several illustrative examples. we turn to personification. I argue that personification is not merely a literary or didactic device, but as a core part of the epistemic practice of biology both for Charles Darwin and for the neo-Darwinian 'modern synthesis' of sociobiology.

Personification as Epistemic Practice

Darwin personifies *Nature* and *natural selection*[3]. Dawkins, on the other hand, personifies *genes*[4] and *organisms*[5].

Both Darwin and Dawkins are at pains 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

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* (30th Ann. Ed.) Prologue p. xi [2]

Gillian Beer has argued from the following passage that Darwin's personification of Nature is more than merely metaphorical:

[3] "*Nature* acts uniformly and slowly during vast periods of time on the whole organisation, in any way which may be for each creature's own good" [1, p. 199] or "*natural selection* is continually trying to economise in every part of the organisation" [1, p. 113] (emphasis mine)

[4] Calling a gene 'selfish' is an example of this, as we have seen

[5] The personification of organisms is a bit trickier to understand. We do not mean the attribution of motivations and desires that the animal *clearly already has*. So saying 'the animal is hungry' is not a personification in the Dawkinsian sense. Instead, we attribute to the organism the motivation of increasing the chance that her genes are promulgated

> 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* [1, 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"), he uses the familiar to make the novel intelligible to a Victorian audience. Personification is therefore a didactic tool, but it is also more. We have to remember the moral objections that Victorian audiences had in accepting evolution by natural selection. Evolutionism was an obvious threat to the "assumption that all manifestations of nature are aspects of a relationship between God and Man" [5]. A common sentiment, was that evolution threatened human dignity by reducing "morality to a mechanical process" [10]. Personifying Nature, therefore, helped soften the moral blow by maintaining the 'awesomeness' of creation - replacing a real, active God with a personified, metaphorical Nature.

We have seen that personification was used by Darwin both as a didactic tool and a rhetorical device. Why do we call it an epistemic practice, then? Because reasoning from analogy with an active human selector was a key insight that led him to formulate his theory in the first place.

Pickstone points out the connection between the breeding of pedigree animals for money and the emergence of Darwinian selection, Pickstone, citing Desmond and Moore's autobiography of Darwin [11], arguing convincingly for the influence of commercially-driven experimentation as a key driver for biology in the 19th century [3, 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, *Ways of Knowing* [3, 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 than a purely metaphorical one, is spot on. Darwin's everyday practice as a biologist led him to personify Nature. In this case, we can view the personification of Nature as an epistemic practice typical of 19th century biology which has fallen out of favour (giving a way to the personification of *genes* and *organisms* as we shall detail below).

It may be suggested that *personification*, if it is an epistemic practice, should be seen as a sub-set of analysis. But this view is problematic: for *analysis* requires the breaking down of a complex phenomenon into simple, constitutive parts which are taken to be real. But Darwin (and Dawkins, as we shall see) do not literally believe in the reality of the motivation and intelligence that they attribute to the objects of their personification. This makes it a distinct practice deserving of its own category in the typology of scientific epistemic practices. We will next see how personification-as-epistemic practice reappeared in the 1960s "Modern Synthesis".

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 (taken to be 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, *The Selfish Gene* [2, Introd. p. xii]

To give a concrete example, the biologist W.D Hamilton, working in the ‘modern synthesis’ tradition, attributed “to the genes, temporarily, intelligence and a certain freedom of choice”, in a paper on the sterility of worker ants [9]. Thus, the *personification of genes* becomes a way of quickly arriving at the result of a mathematical calculation without having to slog through it long-hand.

But Dawkins does not just personify genes; organisms are also given motivations and intelligence *purely for the sake of argument*. On page 168 of the *Selfish Gene* we find the following representative 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 run should die gracefully and willingly. He can benefit his genes most by doing so.
>
> — Dawkins 1977, *The Selfish Gene* , [2, 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* reasoning 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.
>
> — Selfish Gene, p168

So, both Darwin and Dawkins use personification as an epistemic practice as biologists and as a didactic tool for their readers. Whereas Darwin was carefully anticipating the perceived incompatibility of evolution and Victorian Morality, Dawkins does not have these sensitivities to modern-day moral objections to Darwinism. But the practice of personification is kept because it is a key tool to making sense of the biological world.

The essentialisation of specieshood

Now that we have introduced personification as a key epistemic category in both Darwinian and the Neo-Darwinian paradigms, let us explain why specieshood appears to keep being essentialized despite there being no good reason for this from orthodox biology, and what this has to do with altruism.

Biology tells us ‘species’ are conventional categories

As we have seen, Darwin has argued that species are conventional, vague, human categories. It formed a core part of his *Origin of Species*. Moreover, the very definition of a species is unclear. The most commonly taught high-school version is “groups of organisms that can mutually interbreed”, but this definition of species only applies to a small fraction of sexually reproducing life. This

contestation is not problematic for biology. There is no major research program to discover "what is a species, really?". Just like a doctor does not need an exact definition of "brain" in order to perform brain surgery, neither to biologists. A key characteristic of a conventional category is that it is an actor's category: readily understood by the actors that use it.

Philosophers insist that species are natural kinds

In *Why Classify?*, Richards points out that the view of Darwin's unfinished *Natural Selection* "seemed to be at odds" with philosophers in the mid-twentieth century on their view of species. Mid-twentieth philosophers saw species as natural kinds [12]. But there is no need, as Richards does, to dig through Darwin's unfinished manuscripts to understand what he thought about species. Darwin also says it explicitly: "there is no fundamental distinction between species and varieties" [1, p. 205]. In fact, as we have discussed, it is only a slight exaggeration to say it is a central thesis of *Origin*.

Popular biology insists that species are natural kinds

It is not just mid-twentieth century academic philosophy that maintains species essentialism. Public engagement of biology is still built on the reification of the species concept. In the Amsterdam Museum *Micropia*, gullible visitors are told that there are between 10million and 100million species on the planet, without any expectation that such a wild range of uncertainty might be a sign that at the level of microbes, specieshood ceases to be a useful analytical category. Calls to conservation are also guilty of reifying specieshood. Indeed it is hard to conceive of wildlife protection without a 'list of endangered species'.

Why is this happening?

Altruism is explained analytically by the modern synthesis school in a similar way: Consider the following apparent paradox for Darwinian Evolution: If a honeybee stings an intruder, the bee loses its barbed stinger and dies. Why would natural selection perpetuate this altruistic, self-sacrificial trait when it is clearly terminal to the individual organism? Wouldn't the effects of natural selection wipe out such altruistic organisms in favour of their selfish cousins? A commonly-held resolution to this problem[6] is that in this case we should consider natural selection to be acting at the *species*-level: A species of bee with that includes altruistic, suicidal 'kamikaze' fighters is more likely to survive than a species without them. But mathematical modelling of beehives found that there is no evidence for species selection: beehives are always vulnerable to being overrun by less altruistic individuals (because they reap the protection of the hive without paying the cost of defense [13]). John Maynard Smith proved that for species selection to work, species have to be so isolated and go extinct so fast that it almost never happens in nature [14].

So, how does the "Modern Synthesis" explain altruism in bees? John Maynard Smith coined the term 'kin selection' to explain this [2]. The key is to look at natural selection not from the species-level but from the point of view of the *gene*. The bees shares many genes with their hivemates. Genes which will create kamikaze-like behavior in their 'vehicle bees' will more likely be passed on than genes that do not [15]. The key measure is 'coefficient of relatedness *r*'. An altruistic behavior will proliferate in a population of bees when $rB > C$ (B is the benefit to the recipient and C is the cost to the actor), that is, when it increases the chances of the perpetuation of an individual genes - even if that means the death of the organism: One reason given why bees have these self-sacrificial tendencies is a genetic quirk called haplodiploidy. Bees actually share more genetic material with their sisters than with their offspring. From a 'selfish gene' perspective, a worker bee is actually "reproducing" more effectively by dying to save three sisters $(3 \times 0.75 = 2.25)$ than she would be

[6] This problem is nearly identical to the prisoner's dilemma from game theory

by staying alive to have four daughters ($4 \times 0.5 = 2.0$). We reiterate that this is a Pickstonian case of *analysis* - we have reduced a complicated social relationship in a bee hive to a necessary consequence of a simple genetic regularity

It has to do with altruism - explanations of altruism as "group selection" act as an essentialising force, perpetuating the idea of the "species as a natural kind". It was only the gene-centered view of evolution that cleared this up and again removed the need of the species as an important analytical ("natural" category). Nevertheless, the considerable pushback from philosophers and culture at large against the Modern Synthesis as expressed by the *Selfish Gene* explains why group selection, with its essentialization of the species, is still kicking around as an alternative to orthodox, gene-centric explanations

Species selection was largely abandoned by the "Modern Synthesis" school in the 1960s [1], and yet, I argue, its deceptive simplicity and common-sense appeal is a key reason why the 'species' concept continues to be treated as a 'natural kind' in academic philosophy and popular culture. After all, if the *species concept* is an essential category for understanding such key traits as human and animal altruism, then it must be a 'natural category' - it must 'cut nature at the joints', to use Plato's phrase[7] [12].

Conclusion

Through the lens of Pickstone's "Ways of Knowing," we have seen that personification is far more than a didactic metaphor. For Darwin, personifying Nature allowed for a transition from the familiar world of artificial breeding to the radical agency of natural selection, effectively softening the moral blow of a non-teleological universe. 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.

Furthermore, the persistent essentialization of specieshood reveals a significant disconnect between biological orthodoxy and broader intellectual culture. While Darwinian analysis effectively dissolved the species as a "natural kind," treating it instead as a conventional category of human convenience, the concept remains reified in philosophy and public discourse. We have argued that this persistence is fueled by the deceptive appeal of group selection. Because "for the good of the species" explanations provide a comfortable moral framework for altruism, they inadvertently perpetuate the essentialist idea of the species as a 'natural kind'.

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