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Personification as Epistemic Practice & The Persistent Essentialisation of 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 analysis - 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 used similarly employed the personification of *genes* and *organisms*. 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 that this discrepancy is due to a perpetuation of old-fashioned biological explanations for human and animal altruism (for the 'good of the species'), combined with a philosophical and moral aversion to the orthodox gene-centric explanations for it (kinship theory and reciprocity).

153 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 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.

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

Before arguing for 'personification-as-way-of-knowing', it will help to briefly outline how we understand the term. 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 by reducing them to their simpler constituents) and *experimentation* (controlling phenomena and systematically creating novelties) [5].

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: In his chapter on Hybridism [1, Chapter 8], Darwin draws on results from Kölreuter and Gärtner on the fertility of the plant crosses or 'hybrids' (offspring whose parents are from different species). 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. Darwin concludes by saying 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].

We have illustrated two of Pickstone's categories (*natural history* and *experiment*) using Darwin. 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 (alternatively called), a new research programme emerged between the 1930s-1950s, mainly in England and the United States, under the names 'Modern Synthesis', "synthetic evolution, or "evolutionary synthesis" [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" [5, 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, with 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).

Another example of *analysis* from the "Modern Synthesis" is the explanation of altruism. Consider the following puzzle 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[2] is that in this case we should consider that natural selection is operating 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 [10]). 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 [11].

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 [12]. 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 'seflish 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 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

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.

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

[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)

Personification as Epistemic Practice

Darwin personifies *Nature* and *natural selection*[3]. Dawkins, on the other hand, personifies *genes*[4] and *organisms*[5]. That personification is used as a didactic tool to make complex ideas simpler to understand, is not in dispute. After all, both *Selfish Gene* and *Origin* are written primarily for educated general readers[6], not professional biologists - although it is reasonable to suppose that professional biologists are overrepresented in the readership of these books. Instead, I argue that personification is used as an *analytical* way of knowing ("breaking down a complex phenomenon into a simple principle") by which professional biologists make discoveries and come to understand the world.

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]

In her introduction to the 2009 reprint of Darwin's *Origin of Species*, Gillian Beer argues that Darwin *needs* a strongly personified view of Nature, going beyond a metaphorical one [4]. This is evident, for example, in the following passage:

> 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". Indeed, if we are to believe Darwin's words, the observations of human selection on animals left a deep impression on him. Reasoning from analogy with an active human selector was a key insight that led him to formulate his *natural selection theory*. It is not merely a didactic device, but a way of knowing.

By pointing 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

[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

[6]We don't shy away from saying that they are both works of popular science. However, we have to concede that, while some of *Origin of Species* has the lyricism that made the popular *Voyages of the Beagle* (1839) [13] a huge success, other sections mirror his dense technical writing in *The Structure and Distribution of Coral Reefs* (1842) [14] or the *Study of the Cirripedia* (1851) [15]

Darwin [16], has argued that the influence of commercially-driven experimentation was a key driver for biology in the 19th century [5, p. 30]

> In Britain from 1750, cattle and sheep were changed radically as breeders sought marketable characteristics and faster growth. Sheep […] were machines for turning grass into money; they could be redesigned to do so more efficiently. And that new mutability of domestic animals was well known both to Charles Darwin […] both the theory of evolution by natural selection and Mendel's work on inheritance can be shown to have built on this shift in breeding technology.
>
> — Pickstone 2004, *Ways of Knowing* [5, p. 30]

A central part of the *Origin of Species* is to draw analogies between artificial selection and natural selection. 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. 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" [4]. A common sentiment, which we will illustrate with a 1846 Irish newspaper article review of a pre-Darwinian book on evolution, was that it reduced "morality to a mechanical process" [17]. Personifying Nature, therefore, helped soften the moral blow by maintaining the awesomeness of creation - replacing a real, active God with a personified, metaphorical Nature.

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).

While Nature is elevated with metaphorical agencies, Darwin's organisms stay blissfully ignorant of their role in evolutionary change. Darwin does not personify organisms because the motivations and intelligence he attributes to them are all real, not hypothetical. We will see that the case is different for Dawkins.

By the 1960s and 1970s biologists no longer needed to "soften the moral blow" of evolution by natural selection, as it was generally accepted as the main mechanism that explains the evolution of species. Instead, they needed tools to navigate the complex, mathematics-heavy and turn in sociobiology known as the Modern Synthesis of biology. Personification was one of these tools. Thus, Dawkins states that "natural selection for selfish genes tends to favour cooperation among genes", ascribing the (anthropomorphic) quality of cooperation to genes. Thus, he defends his D.W Hamilton's decision to "attribute to the genes, temporarily, intelligence and a certain freedom of choice" in explaining why the sterility of worker ants did can be explained using kin selection [9]. Moreover, he argues that 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]

Thus, the *personification of genes* becomes a way of knowing the answer to the complex mathematics without having to slog through probabilistic calculations involving relative gene frequencies. But

Dawkins does not just personify genes; organisms get the same treatment. 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 run. The runt doesn't *actually* have the motivation and intelligence to rationally calculate which course of action will increase its chances of passing on its genes. And yet, the effects of gene selection are such that we can attribute this intelligence to it for the purposes of *analysis*. Thus, the *personification of the organism* acts as another epistemic short-cut (just like the personification of the gene), allowing the biologist to quickly arrive results that would be more laborious and error-prone to achieve with mathematical modelling. Dawkins explains:

> 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 .

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 [18]. 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?

It has to do with altruism - explanations of altruism as “group selection” acted 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] [18].

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’.

Bibliography

[1] C. Darwin, *On the origin of species*. in Oxford World's Classics. London, England: Oxford University Press, 2008.

[7] The phrase “cutting nature at its joints” comes from Plato’s *Phaedrus*, often used in modern philosophy of biology to discuss whether categories like ‘species’ are objective features of the world or human inventions.

[2] R. Dawkins, *The selfish gene*, 40th anniversary edition. in Oxford landmark science. Oxford, United Kingdom: Oxford University Press, 2016.

[3] "Top 10 most influential popular science books," *New Scientist*, vol. 215, no. 2884, p. 48, 2012, doi: https://doi.org/10.1016/S0262-4079(12)62523-8.

[4] G. Beer, "Introduction," in *On the Origin of Species*, Revised., G. Beer, Ed., in Oxford World's Classics., Oxford University Press, 2009.

[5] J. V. Pickstone, *Ways of knowing: a new history of science, technology, and medicine*, Nachdr. Chicago, Ill: Univ. of Chicago Press, 2004.

[6] J. S. Huxley, *Evolution: The Modern Synthesis*. London: George Allen & Unwin, 1942, pp. 22–28.

[7] J. Gayon and P. Huneman, "The Modern Synthesis: Theoretical or Institutional Event?," *Journal of the History of Biology*, vol. 52, no. 4, pp. 519–535, Dec. 2019, doi: 10.1007/s10739-019-09569-2.

[8] W. Hamilton, "Geometry for the selfish herd," *Journal of Theoretical Biology*, vol. 31, no. 2, pp. 295–311, May 1971, doi: 10.1016/0022-5193(71)90189-5.

[9] W. D. Hamilton, "Altruism and Related Phenomena, Mainly in Social Insects," *Annual Review of Ecology and Systematics*, vol. 3, no. 1, pp. 193–232, Nov. 1972, doi: 10.1146/annurev.es.03.110172.001205.

[10] G. C. Williams, *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought*. Princeton, NJ: Princeton University Press, 1966.

[11] J. Maynard Smith, "Group Selection and Kin Selection," *Nature*, vol. 201, pp. 1145–1147, 1964.

[12] W. D. Hamilton, "The Genetical Evolution of Social Behaviour. I and II," *Journal of Theoretical Biology*, vol. 7, pp. 1–52, 1964.

[13] C. Darwin, *Journal of Researches into the Geology and Natural History of the Various Countries Visited by H.M.S. Beagle*. London: Henry Colburn, 1839.

[14] C. Darwin, *The Structure and Distribution of Coral Reefs. Being the first part of the geology of the voyage of the Beagle, under the command of Capt. Fitzroy, R.N. during the years 1832 to 1836*. London: Smith, Elder, Co., 1842.

[15] C. Darwin, *A Monograph on the Sub-class Cirripedia, with Figures of all the Species*. London: The Ray Society, 1851.

[16] A. Desmond and J. Moore, *Darwin: The Life of a Tormented Evolutionist*. London: Michael Joseph, 1991.

[17] "VESTIGES OF THE NATURAL HISTORY OF CREATION"—AVOWED INFIDELITY.," 1846, [Online]. Available: https://oldnews.vjbe.net/waterford_chronicle/1846/05/review-vestiges.html

[18] R. A. Richards, *Biological Classification: A Philosophical Introduction*, 1st ed. Cambridge University Press, 2016. doi: 10.1017/CBO9781107588233.