Proper Functions: Etiology without Typehood

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I Proper Functions

The heart functions as (a) a noise-maker, and (b) a blood pumper. Only (b) is the proper function of the heart.

Question: Under what conditions is *F* the proper of a trait *T*?

Preliminary: That *T* is able to *F* is neither necessary nor sufficient for *F*'s being the proper function of *T*.

Two dominant classes of answer:

Backwards Looking: Facts about proper functions supervene on historical facts. (Millikan 1984; Neander 1991a, 1991b; Griffiths 1993; Godfrey-Smith 1994; Schwartz 1999)

Forwards Looking: Facts about proper functions supervene on modal facts. I.e., what a trait *would* do. (Pargetter and Bigelow 1987; Mossio *et al*, 2009; Nanay 2010, 2012)

Aims of this talk:

A1 To outline the most widely endorsed backwards-looking view, i.e., the type etiological view of proper functions.

A2 To outline and reformulate Nanay's (2010) recent objection to the type etiological view.

A3 To develop and defend a novel backwards-looking view, i.e., the token etiological view of proper functions.

II The Type Etiological View

The Type Etiological View

F is the proper function of the trait type *T* iff.

E1 Previous tokens of the type *T F*-d, and

E2 *T* was selected because those previous tokens *F*-d.

Example:

My heart has the proper function of pumping the blood. This is because (a) previous tokens of the same type (i.e., previous traits of the type HEART) pumped the blood and (b) were selected for blood pumping.

Points to note:

a. Proper functions are attributed to trait types, and only derivatively to trait tokens. This is because proper functions are taken to be defined in terms of selection, and only types are selected. [1]

b. The explanatory force of proper functional ascriptions is understood as an instance of a broader, etiological-explanatory kind.

III Functions & Trait Typehood

Nanay (2010; 2012) has given a strong argument against the type etiological view. The argument is decomposable into three steps:

Step 1 The type etiological view requires a principle to individuate trait types (e.g., hearts, lungs, wings).

Step 2 The only plausible principles of trait type individuation available to proponents of the type etiological view invoke proper functions.

Step 3 If the type etiological view endorses a principle of trait type individuation which invokes proper functions, then that account faces vicious explanatory circularity.

In this section we will focus on *Step 1* and *Step 2*.
Support for *Step 1*:

1. A theory of proper functions is successful only if, in lieu of an error theory, that theory is not wildly revisionary. I.e., that theory should not entail that the proper function of my arms is to pump the blood, or that the proper function of a coloration pattern is to digest food.

2. How traits are typed will affect which proper functions are attributed to traits on the type etiological view. E.g., if my 'heart' is of the trait type WING, then it will have the proper function of enabling flight.

Support for *Step 2*:

The three most plausible methods of trait type individuation are shown to be either unavailable to proponents of the type etiological view, or partly rely on proper functions.

Principle 1: Proper Functional

A trait *t* is of a type *T* if, and only if:

t has the proper function to *F*. (Neander 1991; Burge 1989)

Verdict: Appeals to functions.

Principle 2: Morphological

A trait *t* is of a type *T* if, and only if:

t has morphological properties *M*.

[1] Cf. Cummins (1975); Sober (1984, ch. 5); Dretske (1990); Neander (1991b, 1995).

Verdict: Unavailable. Cannot accommodate *malfunction*. E.g., a malformed eye may share very few morphological properties of non-malformed eyes. So on this view, the malformed eye is not of the type EYE. If so, the malformed eye may not have the proper function of enabling vision (since previous tokens of its type may not have enabled sight).

> **Principle 3: Homological**
>
> A trait t is of a type T if, and only if:
>
> t is a member of the reproductively established family R.[2]

To count as a member of R one must be homologous with another member of R. Two traits t, t' are homologous just in case they are '*derived from the same character in their most recent common ancestor*' (Wagner, 2007).

Verdict: Unavailable. My arm and the wings of ancient birds are homologous, but the function of the my arm is not to enable flight.

Response: We take *recent* homologues.

Reply: The notion of 'recent' must make use of proper functions. We want to say that the eyes of ancient birds are 'recently' homologous with our eyes; yet our arms are not 'recently homologous' with their wings. Since there is no temporal distinction, there must be some other factor at play. Plausibly, this is proper functional: wings and arms, but not eyes have been selected to perform distinct functions.

IV The Argument from Explanatory Circularity

Support for *Step 3*:

Nanay argues as follows:

> As we have seen, the etiological definition of function presupposes an account of trait-type individuation. Now, if we want to avoid circularity, we cannot use the notion of function in order to explain trait-type individuation. When we are explaining function, the claim that x^* (the trait whose function we are explaining) is a token of type X (the traits that have been selected in the past) is part of the *explanans*. Hence, we cannot use the *explanandum* (function) to explain part of the *explanans* (why x^* is of a type X).

Let t be a token heart, and T be the type HEART. Now consider:

> $\mathbf{Q}_1$ Why is the proper function of t to pump the blood?
>
> $\mathbf{Q}_2$ Why is t of the type T?

On the type etiological view, our explanation of $\mathbf{Q}_1$ will include:

> $\mathbf{E}_1$ Because t is of the type T.

Now $\mathbf{Q}_2$ is part of the *explanans*. Moreover, to explain $\mathbf{Q}_2$ we must say:

> $\mathbf{E}_2$ Because the proper function of t is to pump the blood.

In short: the proper function of a trait explains why it is of a certain type, and its being of a certain type explains why it has a proper function.

Objection: Even still, proponents of the type etiological view are not obviously committed to *either* proper functions explaining trait types *or* trait types explaining proper functions. They are mere *definitions*. We might have, as Lewis (1983, p, 197) puts it, a '*tight little family of interdefinables*'. Compare:

> [T]his circle is acceptable, like the modality circle where possibility and necessity are interdefined. Likewise, property identity is defined in terms of event identity, and event identity is defined in terms of property identity. These cases are not vicious; rather, they are indicative of families of interrelated fundamental concepts. (Molnar, 2003, p. 61)

As Lewis notes, when faced with vicious circularity one has three options:

> (a) 'Quine the lot'!
>
> (b) Pick a primitive.
>
> (c) Break in from the outside.

Response: Neander and Rosenberg (2012) have given a reply that can be construed as an attempt at taking option (c). They argue that facts about both trait type individuation and function attributions supervene on facts about *lineages*. Lineages are first individuated; then they are parsed by selection pressures. That gives us proper functions *and* trait types.

Reply: Lineages must be individuated by proper functions. He writes:

> Take as an example my heart. It is on the same lineage as my mother's heart. But when we say so, we already identify an organ in my mother's body as a heart: as a token of the type that my heart is already a token of. . . (Nanay 2012, p. 624)

Response: But it has not been shown that no candidate works, and at worst (b) is a live option.

V The Regress Argument

If Nanay is correct, and proper functions enter into the individuation of trait types, a worse argument looms. First we assume:

> There exists a finite number of tokens of some trait type.

We then note that if the type etiological view is correct, then:

> *Previous Token* For any token trait t of a type T, the proper function of t is to F only if there exists a token trait t' of the type T, such that t' is less recent than t.

Finally, we note that, since proper functions enter at least partly into the individuation of trait types:

> *Function Individuation* For any trait type T, there exists an F such that any token trait t is of the type T only if the proper function of t is to F.

These two principles jointly imply that for any trait type, if there exists a token of that type, then there exists an infinite number of tokens of that type. But *ex hypothesi* there are a finite number of tokens of some trait type.

[2](Amundson and Lauder 1994: 99-100; Millikan 1984: 23ff)

VI Etiology without Typehood

We now propose a novel etiological theory of proper functions, which avoids the regress. Instead of making use of natural selection and biological types, we make use of *inclusive fitness* and *comparative similarity*.

> *Fitness* An organism's survival and reproduction.
>
> *Inclusive Fitness* An organism's fitness combined with the survival and reproduction it causes to distinct organisms, where the survival and reproduction is weighted by the organism's relatedness.
>
> a. Inclusive fitness is there, amongst other things, to accommodate altruistic behaviour.
>
> b. Inclusive fitness is sometimes attributed to traits, strategies, lineages, populations, etc. But primarily it is attributed to individual organisms. (Cf. Birch 2017).
>
> c. We should distinguish between *realised* fitness and *expected* fitness. The latter is conceived of in dispositional/probabilistic terms. We are concerned with expected fitness. (Cf. Mills and Beatty, 1984; Sober, 1984; Okasha, 2006).

On the view we now defend, the proper function of a trait is a disposition of the most similar trait of an ancestor, that both manifested and conferred an inclusive fitness advantage to that ancestor, which has not resulted in an equally or more recent ancestral disadvantage to inclusive fitness.

> *The Token Etiological View*
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> F is the proper function of a token trait t of an organism O if, and only if:
>
> 1 there exists an ancestor O' of O, such that the most similar trait t' to t of O' manifested a disposition to F, and the disposition to F bestowed a fitness advantage on O' and;
>
> 2 there exists no equally or more recent ancestor O'' of O such that the most similar trait t'' to t of O'' is disposed to F and that disposition bestowed a fitness disadvantage on O''.

Some points to note:

> a. We require that the disposition manifest so that it played a (token) causal role in survival or reproduction.
>
> b. Proper functions are attributed to the traits of individual organisms, and thereby non-derivatively to trait tokens. As a result, traits can be typed using their proper functions.
>
> c. The third condition serves to accomodate function loss.
>
> d. Since we make use of *comparative* similarity, malformed traits can bear proper functions. Moreover, we need not specify a degree of similarity required.
>
> e. With respect to the kind of similarity, like Lewis (1973; 1979) we shall determine this *post hoc*, drawing on our judgements of proper functions. Moreover, we shall allow that the relevant kind of similarity shifts with context. Nevertheless, they appear to include factors such as:
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> (1) Morphology
> (2) Bodily Position
> (3) Dispositional Properties
> (4) Genetic Properties

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