

# The Organizational Account of Function is an Etiological Account of Function

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**Abstract** The debate on the notion of function has been historically dominated by dispositional and etiological accounts, but recently a third contender has gained prominence: the *organizational account*. This original theory of function is intended to offer an alternative account based on the notion of self-maintaining system. However, there is a set of cases where organizational accounts seem to generate counterintuitive results. These cases involve *cross-generational* traits, that is, traits that do not contribute in any relevant way to the self-maintenance of the organism carrying them, but instead have very important effects on organisms that belong to the next generation. We argue that any plausible solution to the problem of cross-generational traits shows that the organizational account just is a version of the etiological theory and, furthermore, that it does not provide any substantive advantage over standard etiological theories of function.

**Keywords** Function · Organizational account · Etiological account · Cross-generational trait · Epiphenomenalism

## 1 Introduction

Our everyday talk and the regimented discourse of sciences such as, most notably, biology, is shot through with teleology. We describe artifacts and natural devices as being *supposed* to do such and such, or having the *function* of behaving in thus and so a manner. This is in apparent tension with the idea that there are no final causes—

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not if they are supposed to be essentially different from, and not supervene on, efficient causes. Philosophers have proposed several accounts of function which try to reconcile the former appeals to teleology with the latter scruples about causation.

Theoretical efforts in this direction have traditionally taken two alternative approaches. On the one hand, *etiological theories*<sup>1</sup> propose to unpack the teleology in functional talk in terms of *explanations of the existence* of the functional device. So, for example, a prototype corkscrew is *supposed* to uncork bottles because it has been designed to uncork bottles: the relevant intentional states of the industrial designer in the process of constructing the prototype are, it is to be supposed, directed to that particular goal, and they explain the existence of the prototype. In the more important case in which there are no designers with intentional states—for example, when dealing with natural devices such as wings or beaks—the most popular elaboration of the etiological insight<sup>2</sup> appeals to the causal contribution that past instances of the device in question have had in the existence of present instances of the device. So, the wings of a certain bird B are *supposed* to help it fly in virtue of the following fact:

The Etiology of Wings: The actual existence of B's wings is explained by wings having helped B's ancestors to fly in the (comparatively recent) past.

In general, the main tenet of the etiological account of function, as we will be understanding it throughout the paper, is the following:

Etiological Function: A trait T has the function of producing an effect of type E in an organism O if and only the following fact contributes, in the relevant way, to a causal explanation that T is in O: T has contributed to the fitness of O's ancestors (in the comparatively recent past) by producing effects of type E.

While this is plausibly regarded as the common core to the most prominent among extant etiological accounts of the function of natural devices, particular theories will fill in details in different ways.<sup>3</sup>

On the other hand, *dispositional*<sup>4</sup> *theories* (defended, among others, by Cummins (1975) and Bigelow and Pargetter (1987)) suggest that function attributions are grounded on the causal role of the putatively functional device in a certain system. Simplifying, in Cummins's *systemic* approach the function of a wing is to be identified with its contribution to the bird's ability to fly. For other authors, the functional device is to make a contribution to the survival of the creature who

<sup>1</sup> The foundational insight is mainly associated with Wright (1973), but was also suggested independently by other authors in the 70s, such as Ayala (1970).

<sup>2</sup> See, among many others, Godfrey-Smith (1994), Millikan (1984, chap. 2; 2002), Price (1998).

<sup>3</sup> One can see many of the differences among these accounts as stemming from the different possible unpackings of "... in the relevant way" in the definition. In particular, *Etiological Function* is compatible with, but not committed to, a selected-effects theory of function.

<sup>4</sup> We follow Mossio et al. (2009) and Saborido et al. (2011) in using the *dispositional* label for this other tradition. Other authors have talked of *systemic* approaches to refer to closely related accounts. We also follow Mossio and colleagues (and others such as Allen 2009; Davies 2001) in adopting this coarse-grained perspective on the function debate, as taking place between two main opposing camps—dispositional and etiological. Our discussion does not interact in any substantial way with this choice; thus, we believe, the dialectically most prudent option is to respect the terms in which the proponents of the view we are criticizing have chosen to frame it.

possesses it (Bigelow and Pargetter 1987), or to certain goal-states of those creatures (Boorse 1976).

Neither of these approaches has passed unchallenged. Mossio et al. (2009, p. 822) summarize two main complaints against them:

Dispositional theories try to account for functions in terms of current contributions to some target capacity of a system, and discard the teleological dimension, but seem unable to provide fully adequate normative criteria on functional attributions. Etiological theories, on the other hand, try to account for both the teleological and normative dimensions of functions, but are unable to justify how functional attributions may refer to features and properties of the current system being analyzed. (*Ibid.*)

That is, dispositional approaches, by focusing on the contribution of an actual device to an actual system, are seemingly unable to recover the *normativity* implicit in the notion of function. The point, very familiar in the literature on functions, would be that dispositional approaches conflate *having a function* with *functioning as*: a tree stump can *function as* a table, but it does not *have the function* of doing so.<sup>5</sup> This is the *normativity problem*.

On the other hand, etiological theories, by focusing on the performance of past instances of the putatively functional device, make the having of a function independent of the causal powers of the actual functional device—the upshot, implausible for some, being that the function of the device is only indirectly related to what the device actually does. This is the *epiphenomenality problem* (cf. Christensen and Bickhard 2002). For instance, the function of Obama's heart is not determined by anything that it actually does or can do; his heart has the function of pumping blood in virtue of belonging to the kind *heart*, which has been selected for pumping blood. As a consequence, the capacities of Obama's heart are irrelevant for ascribing it a function.<sup>6</sup>

Recently a third contender, the *organizational account* has gained prominence in the debate, with a promise to solve both the normativity and epiphenomenality problems. In this paper we discuss and criticize the version of the organizational account put forward by Mossio, Saborido and Moreno in their (2009, 2011). We argue that if this version (OA, henceforth) is to solve the problem of normativity in

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<sup>5</sup> For more on this distinction see, e.g., Millikan (1989), Neander (1991), Davies (2001, p. 76), Wilson and Craver (2006, p. 97).

<sup>6</sup> As we read it, this objection differs from Davies' (2001, chap. 5), who argues that the etiological theory of functions is committed to the existence of *non-causal abstract entities* and that this assumption is in tension with naturalism. In contrast, the epiphenomenality problem points out that on this approach the function of an entity does not depend on what that entity does or can do. Thus, according to the etiological theory, a token trait has a function in virtue of something that is not directly related to that particular token. Whether this other entity that grounds the function attribution is abstract or not, and whether it is compatible with a metaphysical interpretation of naturalism is a different question altogether. We would like to thank an anonymous reviewer for suggesting this connection.

cross-generational traits raised by Delancey (2006) in the manner defended in Saborido et al. (2011), then OA is an etiological theory of function, in the sense made explicit in the definition above.<sup>7</sup>

We will, first, quickly introduce OA (Sect. 2) and the challenge presented by cross-generational traits (Sect. 3). After that, in Sect. 4 we will show that the kind of solution advocated in Saborido et al. (2011) effectively turns OA into an etiological theory. In Sect. 5 we chart some of the similarities of OA with other etiological accounts—in particular, in Sect. 5.1, that it falls prey to the epiphenomenality problem<sup>8</sup>—and some of its differences—in particular, in Sect. 5.3, that it seems to be committed to a very awkward locus of functional attribution for cross-generational traits. We finish the section by showing that, in fact, the conclusion that OA is an etiological account generalizes beyond the cross-generational case. Section 6 is the conclusion.

## 2 The Organizational Account of Biological Function

Mossio, Saborido and Moreno suggest that the only systems with function are those which present what they call *organizational closure*, that is:

[T]he interplay between a set of mutually dependent structures acting as constraints, each of which makes a specific and distinct contribution, [realizing] self-maintenance by maintaining the boundary conditions at which the whole organization, as well as its various structures, can exist. (Saborido et al. 2011, p. 593)

Two main ideas are deployed here: first, the locus of functional attributions is *self-maintaining systems*: those that, in Saborido and colleagues' turn of phrase, "make a difference for [themselves]" (*ibid.*) in that they are a precondition of their own existence. Second, this process of self-maintenance must work through the interaction of parts of a complex whole, which both enables and constrains the activity of the parts: on the one hand functional parts of a system cannot do any old thing if they are to contribute to the maintenance of the system; and, on the other hand, these same parts would be unable of doing anything, if it wasn't for the support provided by the other parts.

<sup>7</sup> Mossio and colleagues are happy to acknowledge the etiological dimension of OA (see, e.g., Mossio et al. 2009, p. 836). Nevertheless, this etiological dimension is limited to the fact that the performance of a functional trait in an individual help explain the maintenance of the trait in *the very same individual*—by helping to prevent the individual from disappearing, for example. We, on the other hand, are using "etiological function" in its most prominent, distinctly historical sense, as made clear by the definition in page 2 of this paper. The claim is that OA is an etiological account in *this* sense.

<sup>8</sup> We should probably point out that we do not regard the epiphenomenality problem as particularly pressing—we are, that is, happy to accept that a device can fail to perform the function it has; this is plausibly the case with flawed corkscrew prototypes, or congenitally defective kidneys, for example.

Our point, here and throughout the paper is, merely, that OA is no better off than other prominent etiological accounts in this or any other respects.

According to these authors, the most common examples of systems in organizational closure are biological systems, also the natural *locus* for the attribution of function. Saborido and colleagues suggest that a trait type is functional iff it is part of a self-maintaining system in organizational closure:

Organizational Function: A trait type T has a function if, and only if, it is subject to organizational closure C in a differentiated self-maintaining system S.

This definition implies the fulfillment of three different conditions. Accordingly, a trait T has a function if and only if:

C1 T contributes to the maintenance of the organization O of S;

C2 T is produced and maintained under some constraints exerted by O;

C3 S realizes organizational closure. (Mossio et al. 2011, p. 594)

Certainly, it seems that OA warrants functional attributions to many biological traits in a way that fits our intuitions. For instance, OA can explain that the kidney is a functional organ: kidneys contribute to the overall self-maintenance of the human organism by filtering waste from blood, they are maintained by the very same organism they contribute to, and finally, the human organism exhibits the kind of organizational closure that is required for satisfying clause C3. The fact that OA seems to correctly identify functional devices in many central cases lends strong support for it and encourages a more careful consideration of its merits and demerits.<sup>9</sup>

### 3 The Cross-Generational Problem

Unfortunately, there is a set of cases where OA seems to generate counterintuitive results. These cases involve *cross-generational* traits, that is, traits that do not contribute in any relevant way to the self-maintenance of the organism carrying them, but instead have very important effects on organisms that belong to the next generation. A prominent example of a cross-generational trait is sperm. Indeed, arguably, the sperm of a organism O does not contribute to the maintenance of O—although it is, of course, crucial for the very existence of the following generation—and this in its turn means that condition C1 in *Organizational Function* is not satisfied. As a consequence, OA has the very counterintuitive consequence that sperm does not have any function—see Delancey (2006).

<sup>9</sup> A minor problem with the definition given in *Organizational Function* is that it doesn't comment on *which* is the function of, e.g., kidneys—it only entails that they have one (*pace* their suggestion that it warrants the claim that the heart has the function of pumping blood.) We will assume that modifying Saborido and colleagues's definition so as to ground the relevant type of *which* claims would not prove too difficult. For more details, see Artiga (2011).

Notice that this problem can be extended, beyond the kind of traits considered in Delancey (2006), those most obviously linked to reproduction, to others that also have their main positive effect in later generations. Take, for example, action-inhibiting calls in greylag goose parents, which aim at preventing premature attempts to fly from their youngsters (Avital and Yablonka 2000, p. 117). Such behavior is, arguably, of no use to the adult bird itself, but is important in getting fledglings to survive through the flying learning process. An implausible consequence of OA is that such behavior would serve no function.<sup>10</sup> In general, organizational accounts fail to attribute functions to *any* trait whose contribution is realized in individuals other than the bearer of the trait.

### 3.1 The Reply

The original proponents of OA are alive to this difficulty, and have offered a solution in their Saborido et al. (2011). Since, as we have seen, the core problem is that there does not appear to be any organization *O* such that sperm contributes to the maintenance of *O* and *O* produces and maintains the sperm in question, the most obvious fix consists in finding an organization that could play this role:

... the organization of the ‘encompassing system’ composed by a reproducer and a produced system itself fits the characterization of a self-maintaining organization. The process of reproduction, in this sense, simply constitutes one of the functions through which the organization succeeds in maintaining itself beyond the lifespan of individual organisms. Since the encompassing system composed by the producer and reproduced organism possesses a (temporally wider) self-maintaining organization, reproductive traits are subject to organizational closure, and their functions are correctly grounded in the organizational account. (Saborido et al. 2011, p. 600)

In other words, the idea is that there is, after all, an organization that underpins the attribution of function to cross-generational traits: the “encompassing system” which includes (at least) the system that carries the trait and its offspring in the following generation. To a first approximation, then, an encompassing system includes a set of organisms of different generations of a single lineage.<sup>11</sup>

Sperm, for instance, contributes to the maintenance of the encompassing system that includes a set of organisms of different generations in the lineage, including the one that actually carries the sperm, and at the same time this encompassing system

<sup>10</sup> Saborido et al. (2011) do not consider this kind of social traits in their discussion.

<sup>11</sup> This appears to be Saborido et al.’s (2011, p. 600) own gloss on encompassing systems: “The crucial point is that the organization of the system constituted by the conjunction of the reproducing and reproduced organisms (in this specific case, a minimal lineage with two elements) has exactly the same status, in terms of self-maintenance, as that of the individual organisms”. It should be said that identifying an encompassing system with a lineage does not necessarily entail that one is interpreting the lineage as a set of ‘successive systems’, as opposed to an extended self-maintaining system, even if the second interpretation leads to its own problems, as we discuss in the sequel. We would like to thank an anonymous reviewer for prompting us to clarify this point.

produces and maintains the sperm.<sup>12</sup> By appealing to systems over and above the individual organisms, OA can provide an elegant reply to the objection from the existence of functional cross-generational traits.

An important feature of this proposal is that it avoids distinguishing two different kinds of functions, ones attributed to cross-generational traits and the other to the rest. Similar proposals within the organizational framework, like Delancey's (2006) 'splitting account', fail to meet this desideratum. Saborido and colleagues' encompassing systems are self-maintaining systems in the very same sense that organisms are, since both exert a causal influence on the maintenance of (at least part of) their own conditions of existence. As a result, a more unified and simple account emerges, and this is a clear advantage over rival proposals within the same paradigm.

Unfortunately, under closer scrutiny this solution is less satisfactory than it seems at first sight. As we will be suggesting presently, once the OA is supplemented with encompassing systems, it emerges as yet another etiological theory of functions—and one that does not provide any substantial advantage over other prominent solutions in this well-established paradigm. The remainder of this paper argues for this claim.

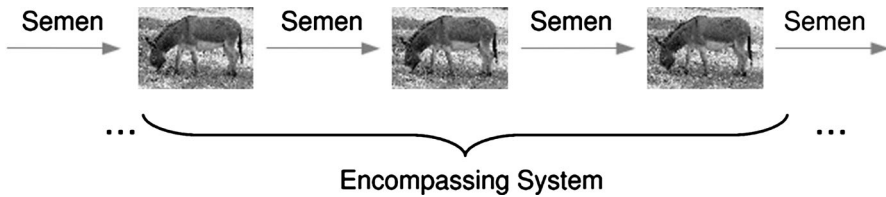
#### 4 Organizational Accounts and Cross-Generational Functions

Saborido and colleagues' solution to the cross-generational problem reveals that, in fact, OA is not an alternative to, but a particular version of, the etiological family of theories of function. To see this, consider which is the fact that grounds a function attribution to semen according to OA (see Fig. 1).

In the figure, the token of semen marked in lighter grey comes from a certain contemporary donkey. According to the proposal we are currently investigating, this semen has a biological function in virtue of the fact that *it* (more on the reference of this pronoun below) has contributed to the maintenance of the organization of the encompassing system constituted by the lineage of donkeys whence it belongs. Presumably the relevant "organization" here is the lineage itself, that is, the set of donkeys as organized in relations of parenthood; and semen contributes to the maintenance of this organization by ensuring the reproduction of further (semen-producing) donkeys.

Of course, for semen to have a function, it cannot be that it contributes to the maintenance of the encompassing system only *once*. As Saborido and colleagues rightly point out (in the clause C2 of their definition of function, quoted above) the trait in question must be produced *and maintained* by the very system the existence of which the trait helps to maintain. Thus, to have a function, a trait should be maintained by the system partially in virtue of its past contributions. As Saborido et al. (2011, p. 598) suggest:

<sup>12</sup> In the definition provided in Mossio et al. (2009), a self-maintaining system also requires *organizational differentiation*, i.e., that 'the system itself generates distinct structures contributing in a different way to self-maintenance (Mossio et al. 2009, p. 826). However, it is debatable whether encompassing systems also satisfy this requirement. Take a lineage of birds: what are its functionally differentiated parts? Individual birds, maybe? In any event we will not press this issue any further.



**Fig. 1** An encompassing system

In our account, functional traits are those traits that, by being subject to organizational closure, contribute to the maintenance of an organization, which in turn exerts some causal influence on the production and maintenance of the traits.

For this reason, they admit that this proposal entails that some time is required for a cross-generational trait to acquire its function («[A]scribing functions to traits or parts requires the consideration of a system that realizes self-maintenance during a period of time long enough for organizational closure to be observed.» Saborido et al. 2011, p. 598). In the application of this idea to encompassing systems, this can only mean that the semen in question must have contributed to the maintenance of the donkey lineage also in earlier generations: in no other way the contribution of semen to the encompassing system can happen for “a period of time long enough for organizational closure to be observed”. In summary, the fact that grounds a function attribution to donkey semen according to OA is something like:

Function Grounding OA:

- (C1) Donkey semen has contributed to the maintenance of the organization of a donkey lineage (by aiding donkey reproduction across generations),
- (C2) Semen is maintained and produced by this organization (say, its way of being a lineage, in which some individuals are parents or offspring of others.<sup>13</sup>)

That is, the fact that warrants our attribution of function to a cross-generational trait such as semen is that semen has contributed to donkey reproduction in the past (C1) and this, in turn, explains that semen exists (C2). This is exactly the kind of function-endowing fact that etiological theories of biological function postulate. Witness *The Etiology of Wings*, as modified for the donkey-semen case:

The Etiology of Semen: The actual existence of this donkey’s semen is explained by semen having helped the donkey’s ancestors to reproduce in the (comparatively recent) past.

The upshot is that the appeal to encompassing systems turns OA into an etiological theory of function.

<sup>13</sup> Again, the claim about organizational differentiation is disputable, but we will simply grant it for the sake of the argument.



## 5 Similarities and Differences Between OA and Other Etiological Accounts

### 5.1 The Epiphenomenality Problem

A corollary from the conclusion of the last section is that OA seems to fall prey to the epiphenomenality problem. As we have seen, cross-generational traits have function in virtue of the fact that previous instances of the trait in the same encompassing system have contributed to the maintenance of the system in question. This is compatible with the trait-instance to which we are currently interested in attributing function *not* having contributed to the maintenance of the encompassing system in the relevant manner. In other words; whether a particular instance of semen contributes to the maintenance of the encompassing system is irrelevant for attributing a function to it.

It is not an accident that, according to OA, an instance of a cross-generational trait does not have to contribute in order to be deemed functional: instances of a cross-generational trait in an encompassing system play the same role that time-slices of a trait instance play in individual organisms (see Sect. 5.4), and OA, very sensibly, does not claim that *every* time slice of a trait instance must contribute to the maintenance of the organism that hosts it for the trait to be functional. Otherwise, the theory would be unable to account for malfunction, since it would be impossible for a trait to have a function and fail to contribute to a system (this point is discussed in more detail in Artiga (2011)). It is unclear what would be a principled reason to apply a different policy in the cross-generational case.

### 5.2 The Size of the Encompassing System

While most popular etiological theories of function (as, say, Millikan's or Neander's versions) appeal to the notion of *selection for* in order to pick out the right set of past instances of a natural trait that are relevant for the determination of function, OA appeals to an *encompassing system*. It might be defended that the size of the encompassing system—that is, the number of generations necessary to ensure that conditions C1 and C2 in the definition above are met—is smaller than the number of ancestors needed to selection for a trait. This, in its turn, would make OA more flexible in its function attributions, and this is perhaps desirable. It is unclear, though, to what extent there is a difference in size here: all the etiological theory demands for a trait T to have the function of doing F is for the fact that Ts do F to have had a non-negligible contribution to the actual existence of Ts. What counts as non-negligible is a vague matter, though, and it is unclear that it amounts to a much bigger number of generation than the notion of encompassing system needs (see Millikan 1993, pp. 46–47). That is, while we do not claim that OA is worse off in this respect than other selected-effects theories, we do claim that it offers no advantage. Neither theory appeals to the whole lineage, and both require a significant amount of time in

order to attribute functions. There is, then, no reason here to choose it against other, well-established contenders.

### 5.3 What Counts as a Functional Trait?

One important difference between standard etiological accounts and OA has to do with the *individuation* of functional traits. Recall, from the definition *Organizational Function*, that according to OA a particular trait T has a function only if (C1) T contributes to the maintenance of the organization and (C2) the organization maintains T in its turn. The main idea behind these conditions is that there must be a causal loop between the particular trait we are attributing a function to and the organization that contains and maintains T. Crucially, this loop must take place at the level of tokens. Organizational accounts want to resist ascribing functions to particular traits in virtue of their belonging to certain types, since they are precisely motivated by the intuition that it is the very activity of the token what determines its function.

Now, a first remark is that *no* single cross-generational token trait T can satisfy conditions C1 and C2. Recall that function attributions require a causal loop between a trait and the conditions that explain its own production and maintenance (see the passage in Saborido et al. 2011, p. 598 quoted above). The problem, however, is that if we focus on a cross-generational trait token, this causal loop is missing: the contribution of the trait does not help to explain its own maintenance, but the maintenance of other token traits of the same type. Suppose, for instance, that we are trying to provide a function attribution to a certain contemporary volume of donkey semen—say, the seminal discharge marked in lighter gray in Fig. 1. While this volume of semen may indeed contribute to the maintenance of the donkey lineage whence it belongs (thus meeting condition C1), it is not “maintained” by the encompassing system because of its own contribution. Consequently, C1 and C2 cannot be satisfied by a single cross-generational token trait. Likewise, the same argument can be applied to other cross-generational traits. The conclusion is that few, if any, cross-generational trait tokens (individual seminal discharges, flight-teaching bird behaviors, etc.) have function.

Since the supporter of the Organizational Theory holds that C1 and C2 specify the conditions for ascribing a function to semen and, at the same time, maintains that function attribution depends on the activity of the token (rather than on its belonging to a certain type), the only option available in order to avoid this conclusion is to claim that the different instances of semen of many individual donkeys constitute the same token. That is, the organizational theorist must hold that the semen of a significant set of donkeys that belong to different generations are numerically the same semen.

This surprising conclusion has an easy explanation: the maintenance of no cross-generational trait is explained (even if partly) by *its own* contribution to the encompassing system, since by definition traits with cross-generational functions have effects only on later generations, and are produced only because of the effects of previous generations. So no particular trait will be able to satisfy conditions C1

and C2 above. If one wants to stick at the idea that function attribution depends on the activity of tokens,<sup>14</sup> the only way OA can provide functions to particular traits is by assuming that the trait that satisfies C1 and C2 is numerically the *same* trait; the semen discharged by different generations numerically the same sperm. In other words, the functional trait token is the scattered individual constituted by *all seminal discharges* in a certain donkey lineage. Similarly, no individual eggshell has function, only the mereological sum of all eggshells in a certain lineage, etc.<sup>15</sup> This way of individuating traits is extremely counterintuitive—outlandish, rather.<sup>16</sup> But it, or something like it, is unavoidable if one insists in linking functional attributions with causal loops in traits whose causal contribution is exclusively forward-looking.<sup>17</sup>

#### 5.4 Beyond Cross-Generational Traits

We have argued that the appeal to encompassing systems as a means to solve the cross-generational problem for OA turns this account into an etiological theory of function. In fact, there are reasons to think that OA is an etiological theory well beyond its application to cross-generational traits: as we have seen, cross-generational traits are endowed with function by their role in the maintenance of an encompassing system, i.e., the lineage of individuals that produce said traits. We may now note that those traits whose function, OA wants to claim, depends on their role in the maintenance of a single individual—e.g., hearts, kidneys, brains, etc.—also participate in the maintenance of the same lineage-encompassing-system: it is obvious that donkey hearts have contributed to the maintenance of the donkey lineage: without hearts, the individuals which form part of the lineage would not have existed. It is equally obvious that the donkey lineage has maintained and produced hearts: without offspring donkeys there would have been no new hearts, just as there would have been no new semen.

This being so, what is the principled reason to claim that the function of semen is fixed by the encompassing system, but the function of hearts is fixed by the individuals who compose the encompassing system? In the absence of such reasons, and there doesn't seem to be any, considerations of symmetry compel OA to make the function of hearts (kidneys, brains, etc.) dependent on their contribution to the

<sup>14</sup> If the supporter of the Organizational Account makes a distinction between types and tokens and claims that tokens have functions *in virtue of* belonging to certain types, then (1) Organizational Theories would indeed adopt a sort of splitting account, according to which the way cross-generational traits acquire functions differs from the way standard traits acquire them (2) the epiphenomenality problem would even be more pressing.

<sup>15</sup> Also, notice the following asymmetry: only traits with cross-generational functions have to be individuated cross-generationally. So, while my heart is different from my father's heart, my sperm is the same as my father's sperm. This is surely implausible.

<sup>16</sup> And, for behavioral traits such as the one in in geese discussed above, dubiously coherent.

<sup>17</sup> It is worth stressing that the individuation problem is rooted in the etiological aspect of OA. OA is committed to this counterintuitive individuation of traits because one of the conditions for function attribution is forward-looking (C1) while another one is backward-looking (C2).

maintenance of the lineage.<sup>18</sup> This is, in effect, a version of the etiological theory of the function of hearts.<sup>19</sup>

Finally, note that if OA offers a version of the etiological theory for all traits, the epiphenomenality problem would not be restricted to cross-generational traits, but would affect all traits. As a result, one of the main motivations for preferring OA to etiological theories would disappear.

## 6 Conclusions

We have argued that the organizational account defended by Mossio and colleagues is, at bottom, a deployment of the distinctly historical kind of etiological insight that informs many of the best known extant accounts of function. The entry point to this conclusion has been the treatment of cross-generational traits by OA: the notion of encompassing system used to accommodate these obviously functional traits is nothing more than a terminological variant on the notion of lineage exploited by mainstream selected-effects theories. Furthermore, OA can deal with cross-generational traits only by proposing the following, highly contrived locus of functional attribution: the scattered individual formed by the mereological sum of, e.g., all instances of semen, or all instances of certain teaching behaviors. This makes OA less appealing than other etiological alternatives.

We have also argued that the etiological leanings of OA do not just show in its treatment of cross-generational cases: considerations of symmetry militate in favor of giving an etiological unpacking of the function of hearts and kidneys—traits, that is, which OA would want to treat in strict intra-individual terms. OA, in a very substantial range of cases, is an etiological theory of function—and, for example, it falls prey to the epiphenomenalism problem just as much as standard etiological theories do.

If the arguments in this paper are sound, it has yet to be shown that the organizational account provides any substantive advantage over standard etiological theories of function.

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<sup>18</sup> A possible reply by the OA-proponent would be to claim that the function of *individual hearts* is fixed by its role in the maintenance of individuals, but that the function of the *mereological sum of all hearts* in a lineage is fixed by its role in the maintenance of the encompassing system. At first glance, this does not look like a comfortable resting point for the organizational account, although it is perhaps worth exploring.

<sup>19</sup> Note that the OA cannot be considered a ‘forward-looking’ theory of functions (such as Bigelow and Pargetter 1987) because, if we are right, according to the OA the function of a trait depends on the fact that this trait contributed to the maintenance of the lineage *in the recent past*. We would like to thank an anonymous reviewer for making this proposal.

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