Re-Organizing Organizational Accounts of Function*

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Abstract

In this paper I discuss a recent theory on functions called Organizational Account. This theory seeks to provide a new defintion of function that overcomes the distinction between etiological and dispositional accounts and that could be used in biology as well as in technology. I present a definiton of function that I think captures the intuitions of Organizational Accounts and consider several objections.

1 Introduction

After so many years of vivid discussion on the notion of function, many people think that there is little new to say about it. I disagree and I think the best way to justifiy the claim that this is still an open debate is by discussing a recent and refreshing proposal. I am going to bring forward an original theory which pursues a yearned and ambitious goal: providing a definiton of function useful for the biological and the artificial world and able to unify etiological and dispositional accounts within a common framework. This suggestive proposal is commonly known as Organizational Account.

I think there are many reasons why we should pay special attention to Organizational Accounts. Its most important feature, of course, is that it is meant to unify extant theories of function. As it is well known, up to now two different theories of functions have prevailed in the literature: etiological and dispostional accounts. They have been the only options on the market for many years[1], even though neither of them is completely satisfactory in all respects (Wouters, 2005).

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[1] Of course, this is a simplification of the debate. Nevertheless, our goal here is not to provide a detailed overview of the literature, but just to motivate and situate Organizational Accounts within a general framework. Moreover, as I hope to make clear later, this simplification is going to be very helpful in order to establish the desiderata for any theory on functions (for a more detailed and complex classification, see Wouters (2005)).

Both theories have their own virtues and problems, and nowadays most people assume that there is no common framework in which both could be integrated (Godfrey Smith, 1994). Here is where Organizational Accounts come in: their project is to provide a theory that keep the advantages of both definitions and none (or few) of the disadantages. Needless to say, if Organizational Accounts succeeded in offering a unified theory of functions, that would simplify and improve very much our understanding of the biological and artifical world.

Of course, this is not the first attempt to carry out this project. One oustanding proposal in the same direction tries to subsume both definitions using the concept of 'design' (Kitcher, 1993). However, it is usually argued that this strategy is threatened with circularity, because 'design' seems undefinable without using the notion of function (but see Krohs, 2009).

Another interesting feature of Organizational Accounts is that their proponents have recently tried to formalize in a clear and precise definition some intuitions that many philosophers have been putting forward over the years. People like Christensen and Bickhard (2002) or McLaughlin (2001) have offered accounts based on self-maintained systems, but without providing a precise enough formulation. New work in this tradition (Mossio et al. 2009a, 2009b) has further developped the theory and has suggested specific criteria for function attribution.

Furthermore, some people have applied the organizational definition to the medical discourse (Saborido, 2009). According to this proposal, the normativity found in medical discourse (contained in notions like *health*, *illness*,...) could be explained by appealing to the organizational interpretation of function attribution. This is a very interesting project and its validity heavily relies on the soundness of the organizational proposal. Thus, a satisfactory organizational account could open the door to new perspectives on other domains than biology and technology such as medicine.

For all these reasons I think we should consider very seriously this kind of theories and evaluate whether they can offer a satisfactory explanation of function. This essay is intended to be a contribution to this debate.

In general terms, Organizational Accounts distinguish themselves by basing their proposal on the existence of self-maintained systems. Basically, the idea is that the function of a trait depends on its contribution to the maintenance of the self-regenerated system it belongs to. The theory suggests a new arrengement of some concepts that have been present in the philosophical literature for a long time. On the one hand, the idea that the reference to a system could help to solve the problems of current functional theories has already been exploited by some people (Cummins, 1975; Price, 1998, 2001), but none of them required the system to be self-replicating. On the other hand, the notion of self-maintained system has long history in philosophy dating back to Aristotle (Godfrey-Smith, 1996; McLaughlin, 2001), and in recent years these mechanisms have been intensively studied by theoretical biology, complex systems theory and far-from-equilibrium thermodynamics (Mossio, et al., 2009a, 2009b). So *prima facie* we have good reasons for thinking that the theory on self-maintaining systems is mature enough to serve as a basis for a new sort of

functional analysis. This is the chief motivation of Organizational Accounts.

The paper is structured in four sections. First of all, I am going to motivate the need for a unifying theory of function and set up the desiderata that such definiton must comply with. Secondly, after presenting some key concepts, I am going to outline an organizational definiton of function. Third, I will consider whether the resultant definiton can satisfy the stated desiderata and finally, I will draw some general conclusions about the prospects of Organizational Accounts.

2 The Search for a Unificatory Account

2.1 Etiological and Dispositional Functions

As it is well-known, at least since the 70s there has been an intense debate on the notion of function. One of the main reasons for this interest is the thought that appealing to functions may be useful for explaining some interesting natural phenomena. On the one hand, it is obviously a central notion in some sciences like evolutionary biology, behavioral ecology and physiology (Shettleworth, 2010). In fact, the philosophical debate on the notion of function originated in the area of philosophy of science, when people like Hempel or Nagel sought to clarify the role of this notion in scientific explanation. (Hempel, 1965; Nagel, 1977) Additionally, it has played an important role in philosophy, specially in the philosophy of mind and the philosophy of language. In that respect, many people think that an appropriate definition of function may play a central role in the naturalization of normative properties. Functional discourse may help to explain why hearts *are supposed* to pump blood or livers *are supposed* to filter wastes from blood. More ambitious projects such as teleological theories of representation make use of it in order to explain how intentionality can arise in a world of causes (Papineau, 1987; Neander, 1994; Millikan, 1984). Some developments of these ideas have gone so far as to put forward a theory on concepts and language based on this notion (Millikan, 1984, 2000, 2004). For these theories, a slight difference in the definition of function can generate important differences in our understanding of mind, language and the world. So no wonder the debate on the notion of function has been so active during so many years.

Nowadays, two main accounts stand out: etiological and dispositional theories. In order to assess whether Organizational Theories can solve some of the problems of other proposals, we need first to shortly review the actual state of play.

2.1.1 Dispositional theories[2]

Dispositional theories became famous in philosophy due to the work of Cummins (1975). Philosophers in this tradition think that the function of a device is determined by the contribution it makes to a system, although there is little

[2]Some people call them 'systematic theories' (see, for instance, Wouters, 2005).

consensus as to what this role may be. Some classical proposals are: something useful (Canfield, 1964), good (Sorabji, 1964) or, more generally, contributions to goals of the system (Boorse, 1976). The idea is that the notion of function appeals to the actual workings of the system and to the role the trait plays in this context.

The main virtue of these theories is that they capture our intuition that a trait's function has something to do with the trait's present performances (Wouters, 2005). This intuition is probably still stronger in artificial devices. If I want to know which is the function of the carburetor I just need to observe how it contributes to the general working of my car. Nothing about the history of the motor seems to be relevant here. Without doubt, this is dispositional theory's main appeal.

However, there are at least three important problems with this account. First, there seems to be no independent way of choosing one among the different systems (Millikan, 2002). Unless there is an objective way to determine the system of reference, the attribution of function would be arbitrary and observer-dependent, what is at odds with the struggle for objectivity in the biological sciences. And, of course, if function attribution depends on the system that *we* take as relevant for our purposes, this notion can not do the job it is supposed to do in naturalistic projects in philosophy.[3]

Secondly, this theory cannot tease apart accidental form essential effects (Wright, 1973; Millikan, 1989). Noses are useful/confer some good by enabling respiration but also by supporting glasses, and nothing in these accounts prevents the conclusion that both are functions of noses. The worry is that every positive effect that a trait has on the system would be considered a function, and hence the theory is committed to the counter-intuitive claim that if a nose is inadequate for holding glasses, it is failing to fulfill one of its functions. For dispositional accounts to be fully satisfactory they should introduce a principled distinction between essential and accidental effects. In this sense, current dispositional theories are too liberal; they include too much.

Finally, they rely too strongly on the actual state of the trait. Suppose there is a malformation in a particular kidney, such that it can not filter wastes from blood any more. In this case, the kidney does not contribute to any goal of the system, but we still want to say that its function is to filter wastes from blood (this is what entitles us to say that it is *malfunctioning*). In this sense, dispositional theories are too restrictive because they exclude too much.[4]

[3] Searle (2007) claims that the notion of function is essentially observer-dependent and seems to be happy with this conclusion. However, notice that this is at odds with the fact that scientists *discover* the function of traits, or with the *disagreements* in the scientific community about what the function of a trait *really* is. On the other hand, on this view the notion of function becomes useless for naturalistic projects in philosophy, because it cannot ground normativity or teleology. According to Searle, the more we can say about normativity is that it is a fundamental (and mysterious) property of some parts of the world (conscious beings) that is somehow transferred to the rest of the biological and technological world (Searle, 1984).

[4] Of course, there are some ways of dealing with these problems and in this paper I am going to consider some of them. My claim here is just that these are concerns for extant dispositional theories. Those are questions that require a satisfactory answer.

Because of these problems, many people think dispositional theories cannot do the work they are supposed to do in biology and philosophy, and embrace some kind of etiological account.

2.1.2 Etiological theories

The main idea of etiological accounts is that the functions of devices should be identified with reasons for their existence (Martínez, 2010). The most important contribution to an etiological account of function was Wright's (1973), even if other people suggested similar accounts in the early 1970s (see Ayala, 1970). According to this view, functions are past effects of a trait that causally explain its present existence. Usually, the causal process appealed to is some kind of selection process (the paradigm, of course, being natural selection). So, basically, the idea is that a trait's function is identified with the past effect that explains why the trait was selected for. Thus, on this view functions are selected effects.

There are, at least, three important virtues of these theories. First, the presence of a trait is due to the trait's own effects. That is, a trait's activity accounts for its presence and it is not parasitic on any external goal (what solves the problem of finding a principled way to choose the relevant system). Furthermore, it enables a distinction between accidental and essential effects, the essential activity being the one that ensured the proliferation of past traits of the same type. Supporting glasses is not one of the nose's functions because noses are not there due to this performance. Third, it can deal with malfunction because it clearly distinguishes a trait having a function from a trait performing it. The former is determined by the trait's evolutionary history, while the later depends on its current performances. Finally, a trait's activity explains why a trait exists. A trait's function is F because the fact that past trait's did F explain why the actual trait exists.

However, etiological theories suffer from a major problem that some people have labeled as *epiphenomenalism*.[5] (McLaughlin, 2001, p.163; Christensen and Bickhard, 2002; Mossio et al., 2009a). The problem is that etiological theories base function attribution on the trait's causal history, and for this reason the trait's current activity is superfluous. If we want to find out what is the lung's function, we would probably look at what lungs actually do in our body. We would see that they enable respiration, so we would conclude that this is their function. Why they came to be here seems completely irrelevant for function

[5] Of course, this is not the only objection that has been raised against etiological theories of function. But there are two features that make this objection salient. First, both defenders and foes agree that this is a consequence of the theory (even if they disagree on whether it should be considered a problem or not). Secondly, most people agree that, according to a certain intuition, the actual performances of the device to some extent matter in function determination. Other objections fail to accommodate one of these features. For instance, in respect to the first point, there is no agreement as to whether etiological theories fail to account for *exaptations* (traits that evolved for one reason but changed their function at some point) (Krohs, 2009). On the other hand, some objections rely on intuitions that are far less clear, for example the arguments based on swampmen (Boorse, 1976; Davidson, 1987)

attribution. As we said before, this is precisely the intuition that dispositional theories have in their favor. And, as Godfrey-Smith (1994) and Griffiths (2005) point out, this is not an intuition we can just get rid of, because some sciences like anatomy or physiology determine function from this perspective.

2.1.3 Current state of play

Nowadays it is commonly agreed that both notions of function can play different and complementary explanatory roles (Godfrey-Smith, 1994). Both approaches have an intuition in their favor and some unsolved problems. As people usually understand this distribution of explanatory tasks, the etiological definition is adequate for explaining why a device *has a function*, while dispositional theories focus on why a device *functions as* something. The first notion is the interesting one in evolutionary biology and philosophy, while the second one in sciences like anatomy or physiology.

In this context, organizational accounts have been presented either as a vindication of dispositional theories (Christensen and Bickhard, 2002) or as a third alternative to the debate that would be able to unify the two definitions into one (McLaughlin, 2001). In the last years, different proposals have been offered within this conceptual framework. I m going to focus on Mossio's et al. (2009a), because it is the most recent and elaborated version of this approach.

2.1.4 Function in Artifacts and Cultural Practices

Most part of the debate on the notion of function has been concerned with its biological usage, but newly efforts have been devoted to clarify function attribution in technology and cultural practices (Krohs and Kroes, 2009). At the moment, it is controversial whether extant theories developed in biological contexts can be satisfactorily applied to social institutions and technology (Vermaas and Houkes, 2003).

In this debate, Organizational Accounts offer an innovative approach that might be able to overcome the gap between living beings and others systems, because they focus on a shared feature: the fact that biological, technical and social entities retain their integrity over time (Krohs and Kroes, 2009b). The crucial point is that in those domains the integrity of certain entities is ensured by a feedback mechanism. In living systems and cultural practices the process of recovery and self-repair is internal, while in artifacts an external element is needed for maintenance (the action of humans), but in all of them there is a regenerating process in which the parts and the whole are mutually involved. The main idea of Organizational Accounts is that in these domains the process of self-regeneration determines the function of the parts taking part on it. So the existence of self-maintaining structures underpins the presence of functional roles.

In this respect, McLaughlin (2001), for instance, sees a strong correlation between function attribution and the existence of self-maintained systems:

> If cultural practices, social institutions and some new organic traits are not the product of natural selection, but do indeed have functions, then there must be some feedback mechanism other than natural selection that (re)produces them. Or more neutrally: *if we attribute functions to such entities, we are committed to the existence of some such feedback mechanism.* (p. 141, italics are mine)

This paper is going to focus on biological cases because this is the primary motivation of Organizational Accounts (and, of course, because of limitation of space), but it is important to keep in mind that many of the arguments and conclusions of this essay could be applied to the debate on functional attributions in other domains such as social institutions and technology.

2.2 Desiderata

It is time to give a precise formulation of the desiderata that any unificatory theory must comply with. Arguably, for Organizational theories to play this role, they should incorporate the main virtues of etiological and dispositional accounts and none of the disadvantages (or, at least, less disadvantages than either theory). So the desiderata that such accounts should satisfy are the same goals that those functional theories pursue. Let us formulate them in detail.

First, the most important features a definition of function must account for are the teleological and normative dimension. These were the original desiderata of functional theories and hence are non-negotiable conditions for a satisfactory account. They consist in the following:

(Tel) A trait's function plays an important role in explaining the trait's existence (McLaughlin, 2001, p.168; Mossio et al., 2009; Nagel, 1977, p.291)

When we are attributing a function to a trait, we are pointing at some activity that explains why the trait exists.[6] It is not just some important performance, but one that helps to account for the very existence of the trait. (Tel) intends to capture this dimension.

The second desideratum concerns normativity:

(Norm) A trait's function determines a criterion against which the activity of the trait is normatively evaluated. (Wouters, 2005, p.133-4; Mossio et al., 2009a, p. 814; Krohs and Kroes, 2009)

Function attributions are normative. A trait's function is something a trait is supposed to do, in the sense that livers *are supposed* to filter wastes from blood. If a liver fails to perform this activity, it is not working properly, it is

[6] It could be argued that only etiological theories are committed to (Tel). This is true only if Organizational Accounts are considered a version of a dispositional theories, but, in this case these theories lose much of their original appeal. On the other hand, if, as has been recently claimed, Organizational Accounts are *unificatory* theories, they cannot leave aside this important aspect of etiological theories.

malfunctioning. The right theory of functions has to explain why traits have normative properties.

Arguably, (Tel) and (Norm) are the main desiderata of all theories of functions. Any candidate must account for the truth of (Tel) and (Norm) in an objective and principled way. We will see later that this is the reason Organizational Accounts introduce the notion of self-maintained system.

Notice that, besides (Tel) and (Norm), there are also two more specific goals that Organizational Accounts seek to achieve. If they want to be unificatory theories, they should solve the most important problems of etiological and dispositional theories. This special role adds two further constraints.

On the one hand, by appealing to what traits currently perform, dispositional theories are able to solve the main problem of etiological theories: epiphenomenalism. So the third desideratum is the following:

(Epi) The trait's function is determined by the trait's current performances. (Christensen and Bickhard, 2002; Mossio et al.. 2009)

On the other hand, one of the main virtues of etiological theories is that they give a principled way of distinguishing between essential and accidental effects. Consequently, Organizational Accounts need to satisfy the following desideratum:

(Acci) A trait's function is appropriately distinguished from a trait's accidental effects. (Wouters. 2005, p.134; Wright, 1973)

Proponents of Organizational Accounts want to offer a unitary account that be able to satisfy all these desiderata. After about 40 years of vivid discussion on this topic, no theory has yet been able to fulfill all of them. If that could be finally achieved, it would suppose not only a great support for this theory, but also an important step forward in philosophy and science. Let us see whether this promising account can achieve this ambitious goal.

3 The Organizational Account

3.1 Key Notions

As I said before, the chief innovation of these accounts consists in putting forward a new element: self-maintained systems. Proponents of this view claim that the notion of self-maintained system is a well-established concept in some scientific disciplines, such as biology and thermodynamics. That is especially important in this context, because a common goal of functional accounts in philosophy is to *naturalize* teleology and normativity and, obviously, a category that has been borrowed from these sciences has the credentials for taking part in the naturalistic project.

Before presenting the definition of function offered by Organizational Accounts, three central concepts need to be explained: Organizational Closure, Self-maintaining System and Organizational Differentiation.

Organizational Closure A system is *Organizationally Closed* when there is a circular causal relation between some macroscopic pattern or structure and the microscopic dynamics and reactions (Mossio et al. 2009a, p.824). Basically, the idea is that organizationally closed systems are characterized by a feedback mechanism, which consists in the fact that the effects that the system has help to regenerate the parts that produce or maintain this effect. A clear example is the flame of a candle. Some microscopic reactions of combustion generate the flame, and the flame in turn contributes to the existence of the microscopic reactions that generate and maintain it alive.[7] Notice that in organizationally closed mechanisms, the activity of the system is a necessary but not sufficient condition for the maintenance of the system. For example, in the case of the candle, oxygen and wax are also required for regenerating the flame.

Self-Maintaining System *Self-maintaining* systems are organizationally closed systems. A paradigmatic case of self-maintaining system is the living being. Living organisms contribute to maintaining a continuous exchange of energy and matter with the environment, and this constant exchange with the environment contributes to the maintenance of their organization (in this case, to keep the organism alive). (Mossio et al., 2009a, p.824). In other words, a self-maintaining system is a system that remains identical to himself by a process of self-replication and self-reparation (McLaughlin, 2001, p. 182).

In fact, as we said, the notion of self-maintained system is an old idea that tracks back to Aristotle. But organizational accounts give it a new twist that might yield a useful notion for our current purposes.

Organizational Differentiation A system is *organizationally differentiated* when it is possible to distinguish parts that contribute in different ways to the self-maintenance of the system. For instance, the idea is that hearts, livers and lungs are differentiated parts of the body that help to regenerate of the organism in different ways. Because the human body has many different parts in this sense, we can say it exhibits organizational differentiation. In constrat, if every part of the system contributes in the same way to its reproduction, then the system is *not* organizationally differentiated. This concept is going to be important in the definition in order to avoid some counterexamples that have been suggested in the literature.[8]

As I said in the introduction, the existence of self-maintained systems is the original motivation for Organizational Accounts (McLaughlin, 2001; Christensen and Bickhard, 2002). The existence of such systems is one of the empirical assumptions of Organizational Accounts, and the one that underpins this

[7] Mossio et al. claim flame and Bénard cells are examples of what they call 'dissipative structures'. In order to avoid unnecessary terminological complexities, I will avoid presenting terms that do not make any substantive contribution to the theory.

[8] Mossio *et al.* (2009a, p. 826) claim that for a system to be organizationally differentiated, another condition that needs to be met is that their parts should be created or maintained by the system. I am not following them here, because if that were true, C3 in OA would be redundant (see below). It would state a condition that is already included in C2.

innovative and suggestive proposal.

3.2 Organizational Definition of Function

The assumption that there are closed and differentiated self-maintained systems is what enables these philosophers to put forward an original definition of function. Basically, the idea is that a trait T has a function if, and only if, it is subject to organizational closure C in a differentiated self-maintaining system S. The most specific version of the organizational definition we have (due to Mossio, et al., 2009a, 2009b) is the following:

(OA)

A trait T has a function iff:

(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 is organizationally differentiated

C1 and C2 define the adequate relation that T should have with the system. In order for a trait T to have a function, it should contribute to the existence of the system and, at the same time, the system should maintain T. For instance, the liver has a function because it contributes to keeping the organism alive, and in turn the organism regenerates it.

On the other hand, C3 is added in order to avoid certain counterexamples related to physical processes. For instance, using one of Ruse's (2003) examples, if the existence of a self-maintained system sufficed for function attribution, a water-circle could be considered a self-maintained system whose parts have functions. That is, without C3 we could conclude from C1 and C2 that the drops in a water circle have a function because they contribute to maintenance of the circle and, in turn, the circle keeps the drops rotating in it. C3 prevents this conclusion by appealing to certain differentiated parts. In contrast to living organisms (and artifacts), water-circles do not have differentiated parts and for this reason they lack functions.

The importance of OA relies on the fact that it seeks to formalize several ideas that different philosophers have brought into the debate over the years. Nevertheless, I think this definition has a couple of technical problems that need to be amended before the theory can be adequately assessed. Let me present my objections to OA and a new formulation of the definition that I think expresses better the ideas encoded in Organizational Accounts.

3.2.1 A reformulation of the definition

The first and most obvious difficulty with OA is that the definition tells us what should be the case in order for T to have *a* function, but not *which* is T's function. As it stands, the definition gives us no clue as to how to

determine what should be the case for T to have a particular function. For instance, hearts comply with all the conditions stated above and, accordingly, we can conclude that hearts have a function, but we do not know *which* it is. Obviously, Organizational Accounts intend to give certain conditions for attributing particular functions to traits. Take for instance what Mossio et al. say just after presenting OA:

> "Accordingly, a heart has a function of pumping blood since pumping blood contributes to the maintenance of the organism by allowing blood to circulate, (...)".

This conclusion can *not* be drawn from the fact that hearts satisfy all conditions in OA, because there is no variable in the definition that corresponds to 'pumping blood'. I do not think this is a serious problem for the proposal, because it can easily be solved with just a small change in the definition. But unless this modification is made OA will be clearly unsatisfactory.

The second problem is that C3 is not linked to C1 and C2 in the appropriate way. In particular, to say that S is organizationally differentiated does not imply that T is one of the parts in which S is differentiated. If we do not introduce this constraint in the definition, we could end up ascribing functions to undifferentiated parts, and hence enabling the sort of counterexamples that C3 was supposed to prevent.

To see that, consider Ruse's example of the water-cycle that motivated the addition of C3. The idea was that, even if a water-circle is a self-maintained system (because it satisfies the principle of Organizational Closure), we do not want to claim that every drop has a function. This was the reason that impelled us to add the constraint that the system should be organizationally differentiated. Now, suppose that somewhere in the water circle there is a stick and big leaf. Both keep being there because of the action of the water-circle and at the same time their being there contributes to the maintenance of the circle. The stick and the leaf are differentiated parts of system and hence, according to OA, they would have a function in the water circle. This is not a problem for Organizational Accounts. After all, it is not implausible to say that the stick and the leaf have the function of keeping the water circle alive. However, what *does* seem implausible is to say that because the system is organizationally differentiated (by the stick and the leaf), the drops have a function. But nothing in the definition precludes this conclusion. The problem is that C3 does not capture the idea expressed in Organizational Accounts, because there is no connection between the fact that S is organizationally differentiated and the fact that T is one of the parts in which S is differentiated. For C3 to avoid the water-circle counterexample,[9] a link between the differentiation of the system and the trait should be established.

[9] I take it that the problem they want to solve here is that, as Wouters (2005) points out, we do not attribute functions to physical processes such as falling stones, water circles, candles and so on (Saborido, personal communication). If this intuition is right, the distinction that needs to be drawn is between purely physical and biological or artificial processes, and I doubt that anything like organizational differentiation can do this job. There is no reason we should expect physical processes to be less differentiated than biological processes and, in fact, it

Finally, if we want our definition to be precise and complete, it should incorporate the idea that O is organizationally closed. Nothing in the definition refers to the constraint that that O should be a closed organization, even though this is a condition that defenders of Organizational Accounts explicitly require. Additionally, once we introduce this condition, it follows from C1* and C3* that S is a self-maintained system.

For these reasons I suggest to slightly modify (OA) so as to get the following definition:

(OA*)

A trait T has a function F[10] iff:

(C1*) T'*s performance of F* contributes to the maintenance of the organization O of S.

(C2*) T is produced and maintained under some constraints exerted by O

(C3*) *O is a closed organization.*

(C4*) S is organizationally differentiated *and T is one of the parts in which S is differentiated.*

I think the revised definition helps to deal with the problems pointed out above. First, there is a place for the specific performance of the trait ('F' in OA*). That is, whereas OA allowed us to conclude that hearts have *a* function, OA* entitles us to say that *the* function of hearts is F (some particular activity). Notice that to achieve this result, a modification of C1 was required. The crucial difference between C1 and C1* is that by adding 'T's performance of F' C1* makes clear that the function of a trait is its specific contribution to the self-regeneration of the system. So it is T's performance of F (and not just the fact that T contributes to O in S) that explains why F is the function of T.

Secondly, concerning the water-circle example, I think C4* captures better the reply suggested by supporters of Organizational Accounts. Certainly, OA precluded the attribution of functions to drops in a water-circle that is not differentiated in parts, but I argued earlier that OA falls short of fully solving the problem: once the water-circle has some parts (say, a stick and a leaf) it follows from OA that *drops* have functions and that is exactly what C3 was suppose to avoid. The slight modification I have included consists in the requirement that

is not difficult to find examples of physical processes that exhibit this kind of differentiation (see the example above). Even worse, I suspect that many biological systems to which we attribute functions are not differentiated in the appropriate way. Many cells may contribute *in the same way* to the organization of the system and nevertheless we want to say that they have a function. It could be argued that, strictly speaking, no two cells contribute in exactly the same way to the maintenance of the system, but then the same argument would apply to drops: strictly speaking, no two drops contribute in exactly the same way to the water circle.

Despite these difficulties, I am going to grant for the sake of the argument that a more detailed conception of differentiation could deal with this sort of counter-examples.

[10] Every time I introduce a modification in the definition, I am going to write the changes in italics, so as to make the contrast easier to localize.

T (the trait we are attributing a function to) should be one of the parts in which S is differentiated. That is: while C3 claims that items that belong to systems with differentiated parts can have functions, C4* states that only differentiated parts themselves can have functions. So, according to OA*, the leaf and the stick have the function of keeping the water-circle alive, but drops do not. I think this is the reply that supporters of Organizational Accounts were willing to give, and the reasons OA* is a better formulation of this view than OA.

This is why I think this definition is much more precise that the one offered by Mossio et al. (2009a, 2009b) and, at the same time, it captures better the intuitions they aimed at.

3.3 Why is it a Promising Account?

Now that we have a definition that captures the main ideas of Organizational Accounts, we can appreciate why this proposal might achieve the desiderata that we set up at the beginning. On the one hand, OA* seems to satisfy (Tel) because, according to C1*, T's performance contributes to the maintenance of the system and according to C2* the system explains why T exists. So the loop that teleology requires between a trait's performance and the trait's existence seems to be accounted for (McLaughlin, 2001, p.163). Functional traits exist because by performing their function they help the organism to survive, and for this reason the organism maintains them. Crucially, the theory achieves this goal without appealing to any far-removed historical causal relation, but just to the fact that the particular trait is currently maintained by the system to whose maintenance it contributes. So the theory avoids the problem of epiphenomenality that affects etiological theories, conserving its benefits. On the other hand, because OA* makes use of an objective and well-defined notion of self-maintained system, it provides an observer-independent criterion for function attribution.

On the other hand, Organizational Accounts seem to be able to account for the normativity we find in functional discourse. A trait fails to fulfill its function when it satisfies C2*, C3* and C4* but not C1* (Mossio et al., 2009a). That is, a trait malfunctions when it is a differentiated part of S that is maintained by the system, but does not perform F. Hence, the definition offers an explanation of what it is for a trait to fail to perform its function. If this is confirmed, they will satisfy (Norm) as well.

Therefore, on a first approximation it seems that Organizational Accounts are good candidates for unifying extant theories of function, due to the fact that they base function attribution on a well-established objective fact (the existence of self-maintained systems) in such a way that they satisfy the two most important desiderata of functional theories, namely (Tel) and (Norm). Now, after this first assessment, it is time to consider more carefully whether they really achieve these goals, and if they are able to comply with (Epi) and (Acci) as well.

4 Discussion

4.1 Teleology

Let us start by considering teleology. As we saw, one of the non-negotiable constraints of functional theories is that they have to satisfy (Tel). Defenders of Organizational Accounts explicitly claim that they want to capture the idea that a trait's function to some extent explains the existence of the trait. In particular, in OA* the teleological dimension is supposed to be accounted for by conditions C1* and C2*. To make the point clearer, let us unify both theses in a single condition:

If a trait T has a function F, then:[11]

(C1-2) T 's performance of F contributes to the maintenance of the organization O of S *and* O produces and maintains T.

Notice there is small difference between (C1-2) and the conditions that etiological accounts put forward. While in the latter it is the specific activity of the trait what explains its existence, in OA* the trait contributes to the survival of system and the system *as a whole* explains that the trait exists. That is, whereas in the etiological definition the existence of the trait is explained by its selected effect, in OA* the whole organism explains it. Crucially, I think this apparently slight disagreement make a big difference concerning teleology. In short, my objection is that (C1-2) is insufficient for satisfying (Tel).The problem is that even if a trait contributes to the maintenance of the organism, the link organism-trait (the feedback mechanism) is too weak for really capturing the teleological dimension. It is not the trait's own performances what explains the trait's existence, but the activity of the system as a whole(to which trait T may contribute more or less, performing one or different functions). I think OA* could only solve this problem by strengthening C2*:

If a trait T has a function F, then:

(C1-2*) T 's performance of F contributes to the maintenance of the organization O of S and O produces and maintains T *because of T's performance of F.*

My point here is that OA* could satisfy (Tel) only by endorsing (C1-2*). Unfortunately, Organizational Accounts cannot avail themselves of (C1-2*) because the only way to ensure that T's existence is explained by T's performances of F is by claiming that F was the reason T was selected for, and Organizational Accounts explicitly reject selected effect theories of function. For these reasons, I think OA is utterly unable to satisfy (Tel).

Let me explain this point in some detail. Think about ears. Suppose we accept that what explains that someone's ears exist is that they contribute to the maintenance of the organism and that in turn the organism keeps maintaining them. That is, suppose we accept that satisfying (C1-2) is sufficient

[11] Notice that we are only considering necessary conditions.

for accounting for the trait's existence. If that were the case, any part of the body that supports the system would also explain why the ears are there. For instance, from the fact that lungs maintain the organism alive and the organism maintains the ears, it would follow that lungs also explain why organisms have ears. This schema would apply to any thing that helps the system surviving: lungs, heart, mouth, toes or the color of the eyes, all would have the same explanatory status concerning the ear's existence. In fact, things worsen once we take into account the fact that hearts contribute much more to the system's survival than ears. Because the heart's contribution to the maintenance of the organism is much greater than any effect ears have, my heart's pumping blood would be a much more important factor in the explanation of the existence of ears than whatever my ears helps me to do. I think this is preposterous.

From the same reasoning it follows that what explains a trait's existence is the sum of all factors that helped the organism to survive. Consequently, whatever positive effects ears had in the past only have a tiny explanatory relevance in accounting for its own persistence. Thus, (Tel) is unsatisfied because whatever my ears help me to do does not play any prominent explanatory role concerning its existence. That is why satisfying (C1-2) is not enough for fulfilling (Tel). If my ears performances explain why they exist to the same extent that my hair, my toe and hundreds of other parts of the system do, then it is clearly insufficient for (Tel).

In contrast to Organizational Accounts, Etiological Theories endorse (C1-2*) because they resort to natural selection, and it is commonly agreed that they can account for (Tel) (though see Davies, 2001). Once we incorporate natural selection, things change dramatically; traits proliferate in a population because they were selected over competitors. Therefore, organisms have a trait due to the specific trait's contribution to enhancing fitness. The fact that hearts pumped blood does not explain why ears were selected; that is why etiological theories overcome this problem. Unfortunately, Organizational Accounts dispense with natural selection (because they want to avoid epiphenomenalism) and hence cannot complete the loop that is needed for fulfilling (Tel).

In other words, if we stick to (C1-2) we cannot explain why organisms maintain ears by appealing to what they do. But, if that is true, what implications does OA* have concerning the existence of a trait? That is, why does my body maintain my ears if it is not because they have certain positive effects on the system? If, as Organizational Accounts suggest, we restrict ourselves to the perspective of the individual (that is, without appealing to evolutionary history), I think the only possible answer is that my body maintains my ears because they happen to be there. I do not see any other reason we can appeal to in this case. A proof of that is that my body would keep maintaining my ears even if they stopped performing *any* activity (for instance, in deaf people). But again, if my body maintains my ears just because they are there, then (Tel) is not satisfied. This is another way to see why (C1-2) falls short of satisfying (Tel).

So I doubt that Mossio et al (2009, p.825) are right when they claim:

> In this sense, organizational closure provides a naturalized ground-

> ing for a teleological dimension: to a question 'Why does X exist in that class of systems', it is legitimate to answer 'Because it does Y'.

Certainly, (C1-2) does not imply that the trait is there because it does Y, and (C1-2*) does not fit into Organizational Accounts. Therefore, I conclude that Organizational Accounts are unable to explain Teleology.

Now it is time to consider normativity.

4.2 Normativity

I think that Organizational Accounts not only fail to satisfy (Tel) but also (Norm). In fact, I suspect this is the main reason why any Organizational Account cannot do the job it is supposed to do.

The problem shows up when trying to state what it is for a trait to malfunction. According to the supporters of OA:

> Dysfunctions appear whenever a trait fails to adequately perform its primary and/or secondary function. A dysfunctional trait is a trait that fits [C2*], [C3*] and [C4*] but fails to fit [C1*]. (Mossio et al., 2009a, p.833)

The main reason this idea cannot work is that OA* establishes the conditions for function *possession*, not for a trait's *fulfilling* its function. OA* states the criteria that any trait must comply with in order to *have* a function. From that, it follows that if a trait does not fit C1*, it would not have a function. And, of course, if a trait does not have a function, it cannot malfunction either. Therefore, if we accept OA* and a trait does not satisfy C1*, then a trait lacks a function, which is to say that it cannot dysfunction.

This objection is familiar to Dispositional Accounts and affects any theory that bases function attribution on some contribution to the system. The usual way of explaining malfunction is by saying that the trait fails to contribute to the system in the appropriate way, but if we assume that function possession is determined by contribution, it follows that the important distinction between a trait not having a function and a trait failing to fulfill it collapses.

Again, notice that this is not a problem for etiological theories, because they clearly differentiate having a function from performing it. On this view, function attribution is determined by history, while failure to carry out the function depends on the trait's current performances. That is how they differentiate what Organizational Accounts are unable to do. Sure, in so doing etiological accounts make the actual performances of the system irrelevant for function attribution (that is what motivates the objection of epiphenomenalism). But if this distinction is not clearly drawn, (Norm) cannot be satisfied.

I think this confusion illuminates a problem that is much deeper than may seem at first glance. Mossio et al. try to solve this difficulty (without mentioning it) by appealing to the fact that functions belong to a particular regime of self-maintenance. Right after the last quote, they write:

> Dysfunctions are defined in relation to a specific regime of self-maintenance in a specific class of self-maintained systems. Hence, to interpret some neutral or deleterious effect of a trait as dysfunctional, the current organization of the individual has to belong to a specifiable regime of self-maintenance in a class of self-maintaining systems in which the function of the trait is defined. (Mossio et al., (2009a, p.833)

Here they seem to be offering a *new* condition for dysfunction, that has something to do with a class of self-maintaining systems. This is clearly a novel constraint, because nowhere in OA did they appeal to *classes* of self-maintaining systems that should be differentiated from *individual* organizations. Let us take a look at this proposal.

In the new version, there is a distinction between individuals and classes. I understand Mossio's quote as suggesting something like a distinction between types and tokens among self-maintaining systems. For convenience, let us use capital letters for types (for instance, 'S' for type-systems) and lower class letters for tokens ('s' for token systems). I interpret the new proposal as stating the following:

(OA)**

A trait t has a function F iff:

(C1**) t's performance of F contributes to the maintenance of the organization o of s.

(C2**) t is produced and maintained under some constraints exerted by o

(C3**) o is a closed organization.

(C4**) s is organizationally differentiated and t is one of the parts in which s is differentiated.

*(C5**) s belongs to a particular class of self-maintaining systems S.*

Now, we my wonder why the appeal to a class of self-maintaining systems S helps to explain anything. Of course, it would be of little help to claim that t has function F *in virtue of s belonging to S*. If OA* were stating that, S would be doing all the explanatory work. We would still owe an explanation of why traits that contribute to a system s which belongs to S have a function at all.

I take it that the solution to the problem of distinguishing malfunctions from lack of function cannot be solved by appealing to types of self-maintained *systems*. In my opinion, a more plausible view would resort to a distinction between *trait*-type and *trait*-tokens (Godfrey-Smith, 1994). The idea is that the function of a trait-token can be determined by its belonging to a trait-type, and the trait-type has a function because it satisfies something like OA*. This is, of instance, Schlosser's view (1998, p. 316): "a function can be ascribed to an individual X1 (t1) only insofar as it can be treated as a token of a type X

(t)" I think this is a far more plausible answer to the normative concern, and one that deserves careful examination.[12]

I think appealing to a type/token distinction is the most plausible way to explain dysfunction within Organizational Accounts. Without it, the definition will never be able to distinguish having a a function from failing to perform it. This was a foreseeable drawback of OA* as was previously presented. So we need to reformulate the proposal again in order to include this amendment.

4.2.1 A Type/Token Worry

Let us consider again OA*. For the moment, let us put dysfunctional traits aside and concentrate on functional traits. Our present concern is to explain normativity, that is, the fact that a trait t can malfunction. Arguably, a trait t can dysfunction only if it has a function (here is where all this discussion started), and in the previous section we suggested that a particular trait t has a function if it belongs to a certain type T. Let us try to develop this proposal in more detail:

(OA*)**

A *trait t* has a function F iff:

(C0***) *t belongs to T*

(C1***) T's performance of F contributes to the maintenance of the organization O of S.

(C2***) T is produced and maintained under some constraints exerted by O

(C3***) O is a closed organization.

(C4***) S is organizationally differentiated and T is one of the parts in which S is differentiated.

Now I am going to present two serious drawbacks of this proposal. The first one has to do with the definition itself, and the other with its failure to fulfill the desiderata presented above.

4.2.2 Justifying Type's Performances

The first worry is caused by the introduction of the type/token distinction. When we thought that 'T' in C1 referred to a token, it was easy to understand what it is for a trait to perform F. When considering *my* heart, we clearly

[12] Indeed, something in the previous discussion should have lead us to think that there was something misleading about OA*. Consider Mossio et al first definition of dysfunction: a dysfunction occurs, when a trait T fails to fit C1. Now, this idea suggests that T in C1 is referring to a token because only tokens can malfunction. However they usually seem to be interpreting T as a type. In fact, when they introduce OA they explicitly say that T in OA is a type (Mossio et al., 2009a, p.828). This was a more subtle sign that there was something misleading about OA*.

know what it is for it to pump blood. However, once we move to types, things become more complicated. The question now is: what justifies C1***? What kind of evidence can be provided in favour of the claim that hearts (type) pump blood? I only see two possible answers, and no one is available to Organizational Accounts.

One proposal is to claim that T is said to perform F when actually *most* existing Ts perform F. So, if most hearts (token) pump blood, we can conclude that hearts (type) pump blood (Godfrey-Smith, 1994, p.7). I do not think this solution can work in any theory of functions, and specially in Organizational Accounts. First, as Millikan (1984, 1989) has repeatedly pointed out, interpreted in this way C1***, makes the wrong predictions. To use one of her examples, spermatozoids have the function of fertilizing ova, even though extremely few of them achieve this goal. Because most spermatozoids do not perform this activity, from OA*** we would get to absurd conclusion that the spermatozoids's function is to not fertilize ova. Clearly, something has gone wrong.

Furthermore, notice that even if there were no counterexamples and function attribution could be based on the activity of most exemplars, Organizational Accounts could not make use of it, because they would fail to satisfy (Epi). As we saw, the intuition leading to Organizational Accounts is that the current performances of the particular trait are decisive in function attribution (the function of *my* carburetor is determined by what *it* does in my car). However, if we interpreted C1*** in the way suggested, my heart's function would be determined by its belonging to a type T, and T would have a function due to the fact that *most* ts perform F. That is to say, the function of my car's carburetor would be to F only if most of the actual carburetors in the world perform F, and in that case my carburetor's function would be determined by facts about far-removed cars. In brief, the problem is that the more we rely on statistical notions the less function attribution depends on the trait's current performances. So defining a type's function by looking at what most exemplars do undermines one of the main motivations of Organizational Accounts.

The second possible solution appeals to history: T performs F iff past ts performed F. But this solution is not available to Organizational Accounts for obvious reasons. On the one hand, if we read 'past ts performed F' as *most* ts performed F, we would face the same problems as before. If, on the other hand, we interpret the explanans as stating that *the past ts that accounted for the selection of T* performed F[13], we would be offering a sort of etiological account and, again, we would face the problem of epiphenomenalism.

4.2.3 Epiphenomenalism Again

Now, notice where we have ended up. Defenders of OA refuse etiological accounts because they fall prey to epiphenomenalism, that is, the problem that

[13] In fact, Krohs points out this is how types are fixed in biological entities: "In the biological designing process as described within the neo-Darwinian paradigm, fixing of the types is brought about in the processes of evolution. The mechanism of evolutionary change is that of natural selection of spontaneously occurring mutations." (Krohs, 2009, p.78)

what my particular trait performs is superfluous in function attribution. However, we have just seen that, if we want to account for the normative dimension of functions, we need to distinguish between a trait malfunctioning and a trait not having a function at all. As I argued, the only way to do it is by introducing a type/token distinction, so that a particular trait t malfunctions when it belongs to T (type). So at the end my particular t has a function if it belongs to a type-T. In turn, T's function is going to be determined by the performances of other ts. Now, if the function of our particular t is determined by its belonging to a type-T and T's function is determined by the performances of other ts, the problem of epiphenomenalism reappears. My trait would have a function not because of its own merits, by just because it is an instance of a certain type.

The result is a dilemma. If Organizational Accounts want to account for normativity and hence want to distinguish between malfunctioning and not having a function, they need to make use of the type/token distinction and once they do that, they suffer from the same problem that they were trying to avoid: epiphenomenalism. So, either Organizational Accounts accept epiphenomenality as an unavoidable implication, or they would be utterly unable to explain normativity. In fact, I think the generality of the argument suggests a more broad conclusion: probably, both desiderata cannot be satisfied at the same time.

4.3 Essential and Accidental Effects

The last challenge we will consider is whether Organizational Accounts can provide a principled distinction between essential and accidental effects. As we saw, this is an important distinction because without it the analysis would attribute functions to traits that, intuitively, they do not have. Mossio et al. are aware of this drawback[14] and suggest a possible solution. To understand their proposal we need to introduce a new concept:

Regime of Self-maintenance A Regime of Self-maintenance is each possible specific organization that an individual member of a class can adopt without ceasing to exist or losing its membership of the class.

The idea is quite simple. Given that self-maintaining systems are to a great extent maintained by their own activity, they can sometimes change their internal organization without disappearing as a self-maintained system. Each possible organization of the system constitutes a specific regime of self-maintenance.[15]

The key point is that not all regimes of self-maintenance determine the same kind of functions. There are more basic and more complex regimes of

[14] It is worth pointing out that some people like Christensen and Bickhard (2002) do not even mention this problem and hence do not try to provide a solution. This is a significant omission, because it is well known that this difficulty is one of the most important objections to similar accounts (Wright, 1973).

[15] Of course, a first worry we may have is how can we distinguish the properties 'being a different *regime* of self-maintenance' from 'being a different self-maintained *system*' without appealing to evolutionary conditions. For the sake of the argument, I will grant there is a principled and objective way to distinguish them.

self-maintenance. The *primary* function of a device is its contribution to a basic regime, while the *secondary* function is its contribution to a more complex regime. The idea is that primary functions roughly correspond to essential effects, while secondary functions correspond to accidental effects.[16] We saw that one of the desiderata for any satisfactory theory of functions is to distinguish effects that are essential and effects that are merely accidental; Organizational Accounts try to fulfill this desideratum by differentiating primary from secondary functions. Their strategy is to provide a principled distinction between different levels of primacy among functions, and then to establish a correlation between, on the one hand, primary function and essential effects and, on the other, secondary functions and accidental effects. This is how Organizational Accounts seek to satisfy (Acci).

Of course, all the work is being done here by the notion of complexity. Essential effects are contributions to *basic* regimes of self-maintenance. Therefore, until we get an independent way to distinguish different levels of complexity, we will not be able to differentiate essential from accidental effects. The problem is that no one in this tradition provides any criterion for drawing this distinction. Actually, the only possible strategy I can think of consists in correlating levels of complexity with evolution, so that the more basic the organization, the older it is in evolutionary terms.[17] But, of course, these approaches cannot rely on evolution in order to establish a criterion for complexity, because then our definition of function would necessarily appeal to far-removed historical facts and epiphenomenalism would reappear again. So we still owe a non-historical criterion for teasing apart basic and complex organizations.

Indeed, even if we grant that such a criterion can be established, the problem remains untouched for Organizational Accounts. The reason for that is that the distinction between primary and secondary functions is a difference in degree (that corresponds to the degree of complexity of regimes of organization), and hence secondary functions are still functions. That means that accidental effects count as functions, so that, for instance, one of the nose's functions would be to support glasses. So, on this view, if someone's nose cannot hold glasses for whatever reasons, we are committed to saying that the nose is failing to comply one of its functions. That does not satisfy (Acci) and seems, to say the least, counter-intuitive.

In fact, this counter-intuitive conclusion becomes a real problem once we remember that function is supposed to explain teleology, that is:

> (...) all functional attributions to a trait T, be they primary or

[16] "In particular, the concept of primary function would correspond to the etiological notion of *proper* function" Mossio et al. (2009a, p.833) And also:: "For instance, the heart has the primary function of pumping blood (...). In contrast, the heart might have the secondary function to, say, make a characteristic noise (...). Similarly, the nose has the primary function to warm and humidify air, whereas it may have a secondary function to support eyeglasses (...). (Mossio et al., 2009a, p.831).

[17] Sometimes they seem to be suggesting something along these lines: '*it is likely* that the basic organization in which trait T is subject to closure is in fact the oldest in evolutionary terms, if compared to more complex organizations involving a higher number of constraints and constitutive processes' (Mossio et al. (2009a, p 834) italics are mine).

> secondary, provide an answer to both the question 'why T?' and the question 'what is T for?'. (Mossio et al., 2009a, p. 832)

So the theory entails that the fact that noses support glasses explain why noses exist. I think this conclusion is absurd. I take as an obvious fact that supporting glasses does not play any role in explaining why noses exist. This is too big a bullet to swallow. Indeed, I think this is a general problem for all theories that try to satisfy (Tel) without fulfilling (Acci). If you want the notion of function to explain why a trait is there, make sure your definition is not too liberal, because then any effect of a device will explain its existence. And this is not just counter-intuitive, but blatantly wrong.

Defenders of Organizational Accounts draw many other distinctions between functions, that does not help to clarify the point. Among others, they distinguish:

1. Primary from secondary functions
2. Relevant from irrelevant effects: depending on whether the trait contributes or not to maintaining the organization of the system
3. Systematic from accidental effects: depending on the frequency of the contribution.
4. Functional versus useful contributions: useful traits contribute but are not created or maintained by the system (in the sense that the sun contributes to the maintenance of the plant without having a function)

But none of these distinctions captures the difference between essential and accidental effects. Both enabling respiration and sustaining glasses can be primary, relevant, functional (in the sense of 4) and systematic functions of the nose.

I take it that the failure to give principled reasons for distinguishing essential from accidental effects is a general concern to Organizational Accounts. Because they base function attribution on contributions to a system, any contribution to the maintenance of the organization can easily satisfy the criterion for being a function. This worry gets stressed by the fact that they also want their theory to satisfy (Tel), so that any contribution to the system explains why the trait exists. Therefore, we can conclude that Organizational Accounts are unable to satisfy (Acci).

4.4 Unificatory Account

From the arguments provided above, I think we can draw an important conclusion concerning the unificatory project of Organizational Accounts. As we saw, some supporters of these theories claim that they intend it to integrate the two dominant views of function into a unique conceptual framework (McLaughlin, 2001; Mossio et al., 2009). They suggest that their definition of function can satisfy at the same time the intuitions in favor of etiological and dispositional theories. However, I doubt that would ever be possible and I have given some

reasons in favor of this skeptic view. In particular, I think there is a genuine tension between, on the one hand, (Norm), (Tel) and (Acci) and, on the other, (Epi) that is going to threaten any attempt to unify both accounts. This tension is manifested in two apparently true intuitions that no theory can satisfy at the same time, namely the ones that result from the following question: is what the trait (token) currently performs relevant for function attribution? Dispositional Theories answer affirmatively and Etiological Theories negatively. Relying on this intuition, Dispositional Theories can satisfy (Epi), but they have problems with (Norm), (Tel) and (Acci). In contrast, Etiological Theories fulfill (Norm), (Tel) and (Acci), which are intuitive properties of functional attribution, but only at the price of failing to fulfill (Epi).

Crucially, Organizational Accounts want the capture the intuition that what the trait actually performs is decisive in function attribution. The point I am trying to make here is that this is probably the reason they cannot utterly satisfy (Tel), (Norm) and (Acci). They want to keep the chief intuition in favor of Dispositional Theories and that is why they fail to capture the main virtues of Etiological Accounts. The conclusion is that even if a satisfactory Organizational Account can be worked out in detail, I doubt it will ever be able to unify all theories of functions. In fact, I think the arguments provided so far are general enough for suggesting that this ambitious project is probably impossible to carry out.

5 Conclusions

The previous discussion suggests that Organizational Accounts are utterly unable to carry out the yearned project of unifying etiological and dispositional theories within a unique definition of function. Even after repeatedly reorganizing the definition so as to get the best version of an Organizational Account we have been able to come up with, the resulting theory faces serious objections. In particular, it is unable to account for teleology, normativity and the distinction between essential and accidental effects.

Indeed, as we saw in the introduction, these are exactly the problems that dispositional theories typically have. I think the great number of similarities between organizational and dispositional accounts show that it is an approach closely related to the latter (Christensen and Bickhard, 2002). In fact, it could be regarded as new and refined version of a dispositional theory that can offer a solution to the problem of finding a non-arbitrary way to pick up the relevant system (see introduction). But, unfortunately, it cannot deal with the major problems of dispositional accounts, namely teleology, normativity and the distinction between essential and accidental effects. Or so I have argued.

Consequently, even if a satisfactory Organizational Accounts could be developed, we would still need etiological theories, the only approach we have that can account for (Tel), (Norm) and (Acci), even if they fail to satisfy (Epi).

I hope I have also been able to provide some support for the claim that any theory seeking to satisfy all desiderata stated above will face serious objections.

Probably, we will have to learn to live with two definitions of functions. I think that, unfortunately, this is the best we can get.

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