

Similarity and the Necessity of Origin

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This is a final draft of an article in Logique et Analyse
*** Please cite the published version.***

Abstract

Recently, *similarity theories* have gained popularity as empiricist epistemologies of non-actual possibilities (Roca-Royes, 2007; Hawke, 2011, 2017; Leon, 2017; Roca-Royes, 2017; Dohrn, 2019). Such theories suggest that one gains justification for the belief that this glass could break because one knows (or has a justified belief) that there is a relevantly similar glass that did break. Similarity theories rely on ordinary knowledge of actuality in order to explain our knowledge of non-actual possibilities. However, such theories run in to trouble when it comes to explaining issues related to the *necessity of origins*. In this paper, I will present the problem in detail and present a fully general solution that relies on the temporal order of the relevant similarity relation.

Keywords: Epistemology of Modality; Possibility; Similarity Reasoning; Necessity of Origins; Arrow of Time.

1 INTRODUCTION

Consider the following line of reasoning:

Dweezil Zappa and I are both human. Dweezil Zappa has the property ‘plays-guitar-well’. So, given similarity reasoning, it is possible that I have the property ‘plays-guitar-well’. Or, in other terms, it is possible that I play the guitar well.¹

This line of reasoning seems perfectly acceptable and to provide us with justification for the belief that it is possible that I play the guitar well.²

Similarity-based epistemologies of non-actual possibilities suggest that this kind of similarity-reasoning is the basis for (most of) our knowledge of non-actual possibilities (Roca-Royes, 2007;

¹Note that we could make the similarity between me and Dweezil Zappa arbitrarily strong by adding properties such as ‘composed-of-atoms’, etc.

²It might be tempting to interpret this example as concerning *ability* modals (e.g., I can play the guitar), but let me stress that the proposed epistemology is of *metaphysical* modality. So, for the rest of the paper, whenever I talk of ‘possibility’ and the like, I mean ‘metaphysical possibility’. Thanks to a reviewer for urging me to stress this.

Hawke, 2011, 2017; Leon, 2017; Roca-Royes, 2017; Dohrn, 2019; Schoonen, n.d.). The general description of the crucial similarity reasoning goes as follows: we know some object, x , has a particular property, P . From this, we deduce that that same object, x , has yet another property, $\Diamond P$ (by the actuality principle: whatever is actual, is possible).³ Then, we extrapolate that another, relevantly similar, object, y , also has that property, $\Diamond P$. This is the crucial *Similarity Argument*:⁴

Similarity Argument (SA):

- P1. x has property P .
- C1. x has property $\Diamond P$. (actuality principle)
- P2. x and y are relevantly similar relative to property P .⁵
- C2. y has property $\Diamond P$. (from C1 and P2)

The crucial premise here is premise 2: *relevant* similarity relative to the property of interest. Let's call this the *similarity judgement*. A well-known problem for theories of similarity (of any kind, e.g., in counterfactual conditional semantics; scientific representations; analogy; etc.) is that "[a]ny two things share infinitely many properties, and fail to share infinitely many others" (Lewis, 1983, p. 346; see also Goodman, 1972; and Morreau, 2010). The challenge this raises for theorists relying on (SA) is that they need to develop a notion of *relevant* similarity that distinguishes between good and bad instances of the similarity argument (cf. Hartl, 2016 for a related discussion for similarity-based epistemologies of modality).

1.1 THE 'PROBLEM' OF THE NECESSITY OF ORIGINS

In this paper, however, I want to focus on a *different* problem. Assuming that similarity-based epistemologies of modality can provide a clear and good account of what relevance is, which arguably they can (cf. Roca-Royes, 2017; Schoonen, 2022), such theories have problems with the *necessity of origin*.

The (alleged) problem of the necessity of origins arises if we assume, with Kripke (1980) and Putnam (1973, 1975), that one's origins are necessary. That is, the sperm cell s and egg cell e from which an organism o originates have to necessarily be *that* sperm cell and *that* egg cell (i.e., s and e), for otherwise o would not have been o . There are interesting questions about why these features of the origin and not, for example, the location of the origin are thought to be held necessarily, but we focus on issues related to why origin rather than development (cf. Mackie, 1998).⁶ Given that, the necessity of origins has it that necessarily I have the parents that I do – i.e., I could not have had any different parents.

However, consider the following line of reasoning, very similar to the example used above to characterise the similarity-based theories:

Dweezil Zappa and I are both human. Dweezil Zappa has the property 'son-of-Frank-Zappa'. So, given similarity reasoning, it is possible that I have the property 'son-of-

³I will use ' $\Diamond P$ ' as sloppy notation for ' $\lambda z. \Diamond P(z)$ ': an object being such that it could possibly have property P .

⁴Note that this is an instance of the more generic argument: x has a property, x and y are relevantly similar with regards to that property, thus y also has that property.

⁵Strictly speaking, the relevance should be to property $\Diamond P$, however, we can skip the actuality inference and focus directly on similarity with respect to embedded property.

⁶Although the former question will come back in the form of an objection to the proposal discussed here in Section 3.1.

Frank-Zappa'. Or, in more contentious terms, it is possible that I have different origins than I actually do.

The above reasoning is “epistemically defective” (Roca-Royes, 2017, p. 236). Call this case (**Bad**). The reasoning in the case mentioned before, call this case (**Good**), on the other hand, seems perfectly acceptable. Yet, according to the similarity-based epistemologies of possibility, in both cases beliefs in the conclusion seems to be justified. In both cases, we need the judgement that Dweezil and I are both human, which is true. We need the judgement that Dweezil has the property that is being extrapolated, i.e., respectively, ‘son-of-Frank-Zappa’ and ‘plays-guitar-well’, which is true. And, finally, we have the extrapolation judgement to objects that are relevantly similar to Dweezil. This explains in a very elegant way why we are justified to believe that it is possible that I play the guitar well on the basis of Dweezil Zappa playing the guitar well. However, there is nothing in the account that would ‘block’ this kind of reasoning in (**Bad**). That is, in Roca-Royes’ terms, there is no “symmetry-breaker” (2017, p. 236) (or so it seems). Call this the *Problem of the Necessity of Origins*.⁷

Let me mention two things to stress the severity of the problem.

First of all, a note on the epistemic defectiveness of (**Bad**). Assuming that one has one’s origins by way of necessity, it follows, on the epistemological side of things, that we can never know that someone has different origins than the ones they actually have (as knowledge is factive). However, things are worse for similarity theorists, as for them the problem is deeper and on the justification side of things (so it is not the factivity of knowledge that gets the problem of the ground).⁸ Similarity theorists, for the most part, are engaged in explaining the knowledge of *ordinary* agents of *ordinary* possibilities (cf. Hawke, 2011, 2017; Leon, 2017; Roca-Royes, 2017 and I agree, Schoonen, 2020). As a result, even if it were possible to have different origins, this is not the kind of modal knowledge that they take to be in the purview of their theories (cf. Roca-Royes, 2017, p. 223). This is why, for most similarity theorists, (**Bad**) is epistemically defective, because, at best, it might be true but not something we should want the theory to predict as knowable for ordinary agents (cf. Roca-Royes, 2017, p. 236); at worst, it is actually impossible, in which case the theory would predict something false.⁹

⁷Roca-Royes is of course very much aware of the problem of the necessity of origins and she addresses it as follows.

I shall use ‘*qualitative anchor*’ to describe those φ ’s (appearing in true grounding principles) capable of playing the epistemic role of allowing us to (groundedly) transition to a given *de re* possibility. [...] The problem with the possibility [of Malala having different origins] is that, in searching for a potential qualitative anchor, we would need to go so far back in time that we would lose Malala altogether and, with her, we would lose also any qualitative character she’s ever had. (2017, p. 237, original emphasis)

In this suggestion, Roca-Royes is aware of the “temporal order” and tries to account for this by appealing to what she calls a ‘qualitative anchor’. Some have argued that her solution is arbitrary and not independently motivated (Dohrn, 2019, p. 2468). Regardless of whether this is true, I believe that the proposal in this paper is both more general, and highlights more clearly the independent nature of the solution – i.e., it highlights the fact that it is not merely some *ad hoc* solution.

Perhaps my solution is merely a way of spelling out what Roca-Royes has in mind in more detail, still, my proposal has the benefit that we don’t need to appeal to the notion of ‘qualitative anchor’ in order to explain the asymmetry between (**Bad**) and (**Good**).

⁸As the problem for the similarity theorists is on the justification side of things, I will sloppily talk of ‘justifiably believing φ ’ and ‘knowing φ ’ interchangeably. In doing so, I follow Fischer (2017, 6-7) in assuming that little turns on the distinction between justified (true) beliefs and knowledge in the epistemology of modality. Thanks to an anonymous reviewer for urging me to clarify this.

⁹This is sometimes known as a form of *modal modesty* or *moderate modal scepticism*. For a general defense of this view, see, e.g., (Van Inwagen, 1998; Strohming & Yli-Vakkuri, 2018).

Secondly, and importantly, this is not merely an instance of trying to explain an interesting asymmetry in similarity theories’ predictions. As mentioned, the **(Bad)** case is a violation of a Kripkean *a posteriori* necessity: the necessity of origins. The significance of such violations can be gauged by looking at the literature on imagination-based epistemologies of possibility. Byrne (2007, p. 130) points out that “imaginability is a guide to possibility only if Kripkean impossibilities are unimaginable.” Similar remarks are made by Gregory (2004, p. 335) and Kung (2010, p. 650). Extrapolating this to *similarity-based* epistemologies, we should conclude that a satisfactory similarity-based epistemology of possibility “dovetails with the Kripke-Putnam thesis about *a posteriori* necessities” (Kung, 2010, p. 650).

The question thus becomes, what is the difference between **(Good)** and **(Bad)** and can similarity-based epistemologies of possibility explain why this is so.

I will argue that, in fact, similarity theorists already have everything they need to account for the difference between the two cases. That is, I will show how to defuse the problem, rather than to solve it (as the problem doesn’t even arise). I will do so, in Section 2, by explicating what ‘relevant similarity’ is and that properly grasping the details of such similarity-based epistemologies gives us all that we need to distinguish between the two cases. I conclude by discussing some potential objections: one suggesting that the proposed solution rules out cases of good similarity reasoning (Section 3.1) and one that questions whether we should rule out judgements of different origins at all (Section 3.2).

2 DISSOLVING THE ‘PROBLEM’

The proposed symmetry-breaker between the good and bad cases of similarity reasoning in the epistemology of modality is the *temporal order* of the relevant properties. In particular, that what makes to objects relevantly similar should temporally precede the property that is being extrapolated through the ampliative reasoning exercise. In this section, I will argue that this is not some *ad hoc* solution, but that this follows from properly understanding what makes good instances of similarity reasoning justified.

In order to properly develop a similarity theory of any kind (e.g., epistemology of modality, possible world ordering, scientific models), one needs to specify what they take ‘relevance’ to be. One way to spell this out in the context of the epistemology of modality is based on kinds (Schoonen, 2020, Ch. 8; Schoonen, n.d.). Alternatively, Roca-Royes (2017, p. 233) focuses on similarity in “categorical intrinsic character” and Hawke (2011, p. 361) notes that “a similarity is relevant to the possibility of *p* if that similarity stands in some kind of causal or determining relation to the advent of the states of affairs that make *p* true.” What these proposals have in common is, in line with the consensus in the field of *analogical reasoning*, that justified similarity reasoning is “essentially a transfer of causal relations between some characters from one side of the analogy relation to the other” (Hesse, 1966, p. 99; see also Gentner, 1983; Davies, 1988; Russell, 1988; Gentner & Markman, 1997; Bartha, 2010; Schoonen, 2022 provides a useful overview).

Let’s make things a bit more specific.¹⁰ Let’s call the object *from which* we are extrapolating the

¹⁰This is still a slightly crude representation of similarity reasoning. For a fully detailed and general analysis, see Bartha (2010) and see Schoonen (2022) for the application to the epistemology of modality.

source object and the object to which we are extrapolating the target object. So, in our example, Dweezil Zappa is the source object and I am the target object. The property that we are interested in is the *hypothetical analogy* – e.g., in our examples, 'son-of-Frank-Zappa' and 'plays-guitar-well' respectively. Finally, let us call the properties *relevant* for the similarity the *similarity base*. In our example, the property of 'being-human'.

The question of relevance thus becomes which properties should be in the similarity base. As mentioned above, the consensus in the analogical reasoning literature is that the similarity base has to be such that the properties are in some important sense causally related to the hypothetical analogy (this is also what, e.g., Hawke and Roca-Royes suggest). There are two important points to note about this relation between the similarity base and the hypothetical analogy, related to two ways in which this relation is more general than one of direct causation. First of all, we broaden the relation between the hypothetical analogy and the similarity base to also include *aleatory explanations*, *determination*, and *explanation* (cf., respectively, Humphreys, 1981; Davies, 1988; Horwich, 1987). All these relations are broader than direct causation. For example, Davies (1988) points out that if we know the direct causes of something, we don't need to perform similarity reasoning at all, but we could just deduce what we want to know about the source object (cf. Schoonen, 2022, Sec. 3.2). Therefore, he introduces determining relations, which are, in a sense, relations between determinables, "without the particular instances of the determinates" (Schoonen, 2022, p. 12). Explanation, in Horwich' terms, is also much broader than mere causal relations. In fact, Horwich argues that we should understand causation to be a particular kind of explanation or that causal relations are particular explanatory relations (Horwich, 1987, pp. 154-156). In what follows, I will use the term 'determining relation' to describe this very broad class of relations between the similarity base and the hypothetical analogy.

Secondly, it does *not* have to be the case that the hypothetical analogy is *determined* (or explained, or caused) by the similarity base, it might simply be that it is *compatible* with the similarity base (e.g., Schoonen, n.d.). What we ultimately want to rule out are cases where the hypothetical analogy *determines* the similarity base.

The realisation that instances of justified similarity reasoning involve some kind of determining relation between the similarity base and the hypothetical analogy is already the first step towards defusing the problem of the necessity of origins. The second step is to recognise a crucial feature of all these determining relations: there is an essential *temporal asymmetry* (Horwich, 1987). For example, in the cases of direct causation, *causes always precede their effects* (cf. Horwich, 1987; Price & Weslake, 2009). So, if, say, object o_1 causes another object o_2 to move (e.g., via the transfer of momentum), then the moving of o_1 is *temporally prior* to the moving of o_2 . The same goes for explanation, whatever explains X , should be temporally prior to X (see Horwich, 1987, Ch. 9 for arguments to the effect that explanation is temporally asymmetric). This temporal asymmetry between will play a crucial role in the defusing of the problem of the necessity of origins.

This temporal asymmetry might seem like a significant metaphysical assumption, so, it will be helpful to consider the 'price' of the temporal asymmetry. Crucially, the temporal ordering follows from very minimal assumptions. For one, we need *not* assume that time is asymmetric (which, might very well be false). All one needs is, as Horwich puts it, *fork asymmetry*: "correlated event types are invariably associated with some characteristic *antecedent* event," while it is not the case that correlated event types are so associated with *later* events (1987, p. 201). This fork asymmetry follows, in turn, from very minimal assumptions about some features of the initial condition of the universe (Horwich,

1987, p. 201; also Chs. 3 & 4).¹¹

We can now put all of this together and we will see that similarity theorists *do* have a symmetry-breaker between the **(Bad)** and **(Good)** cases.

Given that (i) good similarity reasoning is based a determining relation between the similarity base and the hypothetical analogy and that (ii) determining relations are temporally asymmetric, it follows that in good similarity reasoning the similarity base should *precede* the hypothetical analogy. That is, the hypothetical analogy should be a property that is *determined by*, and thus *temporally downstream* from, the similarity base.

This means that if the hypothetical analogy is a property that *temporally precedes* the property (or properties) of the similarity base, it cannot be the case that the similarity base determines (or causes/explains/etc.) the hypothetical analogy. In those cases where the hypothetical analogy is temporally prior to the property of the similarity base, the similarity reasoning is thus *not* justified – i.e., one is not justified in accepting the conclusion of such similarity reasoning.

Let's see how this dissolves the problem of the necessity of origins. In **(Bad)**, we reasoned from Dweezil Zappa and me being both human (i.e., 'being-human' is the similarity base), to the possibility of me being the son of Frank Zappa (i.e., 'son-of-Frank-Zappa' is the hypothetical analogy). We now know that in order for this similarity reasoning to be justified, the similarity base should be temporally prior to the hypothetical analogy. But this is clearly *not* the case. Being the son of Frank Zappa is what *makes* Dweezil Zappa human. If Dweezil was the son of Micky and Minnie, then he would be a mouse, rather than a human. So, in this case, the hypothetical analogy determines the similarity base – being the son of Frank Zappa determines (in a broad sense) that Dweezil is human. Thus, we are not justified in accepting the conclusion of **(Bad)** – i.e., we are not justified in believing that it is possible that I am the son of Frank Zappa.

Let's see how **(Good)** fares, where we reasoned from Dweezil Zappa and me both being human to the possibility of me playing the guitar well. Note that 'plays-guitar-well' is a property that is temporally downstream from the similarity base – i.e., Dweezil was human before he was able to play the guitar well. This means that in this case, the similarity reasoning is fine and we are indeed justified in accepting the conclusion (though it is unlikely that this possibility will ever actualise).

This concludes the discussion of our dissolving of the problem of the necessity of origins. In turns out that there *is* a symmetry breaker for cases such as **(Good)** and **(Bad)**: the temporal ordering of the properties involved. The reason why this *dissolves*, rather than solves, the problem is that similarity theorists had everything they needed all along. It is just a proper understanding of similarity reasoning (that it requires determining relations between the similarity based and the hypothetical analogy) and of the temporal asymmetry of these determining relations.

¹¹Note, further, that we do not need to make any assumptions about the metaphysical necessity of this temporal ordering. For example, in the case of the claim that causes precede their effects, all that is needed for the proposed solution is that *as a matter of fact* causes precede their effects; we don't need to make this into a necessity claim. So, as Horwich points out "phenomena that *are* naturally described in terms of *backward causation* [are such that] the correlational structures they entail are unlikely to occur. In other words, the sort of correlational data that would suggest backward causation *are empirically improbable*" (1987, p. 106, last two emphases added). From this Horwich concludes that causes, at least *de facto*, precede their effects, which is all we need.

3 OBJECTIONS

I've argued that similarity-based epistemologies of possibility already have everything they need to deal with the problem of the necessity of origins – i.e., distinguishing (**Bad**) from (**Good**). This is because justified similarity reasoning relies on relations between the similarity base and the hypothetical analogy that are time asymmetric (e.g., causation, determination, explanation). Because of this time asymmetry, the hypothetical analogy should not cause, determine, and/or explain the similarity base. If it does, then the similarity reasoning is faulty. This distinguishes cases such as (**Bad**) from (**Good**). Importantly, this is not some *ad hoc* solution to problematic cases, but based on the independently motivated temporal ordering of causation (and explanation; cf. Horwich, 1987) and the categorical aspect of relevant similarity (cf. Schoonen, 2022).

In closing, let me mention three worries that one might have given the proposed solution to the problem of the necessity of origins.

3.1 OTHER FEATURES OF ORIGIN

The first worry is dealt with rather straightforwardly. The worry is that the suggestion is too stringent as it also rules out knowledge of features of one's origin that are *not* necessary. For example, even if one was born in room 1.3.8 of the hospital, it still seems possible that you could have been born in a different room, e.g., 1.3.9.¹² We would not want our similarity-based epistemology of possibility to be such that we are not justified in believing that it is possible to have been born in room 1.3.9 and the worry is that the solution to the problem of the necessity of origins rules out knowledge of these other features of one's origin. The worry might be strengthened by the idea that the room in which one is born is not caused by the similarity base (e.g., the fact that one is human).

Here we have to be careful and remember that what we are after in order rule out the bad cases is that the hypothetical analogy determines the similarity base. Above, we already noted that the hypothetical analogy might very well be merely compatible with the similarity base and that to rule out bad instances of similarity reasoning, the hypothetical analogy should not determine the similarity based.

We can now see that, as we saw above, (**Bad**) is indeed ruled out by this solution, but the fact that one could have been born in a different room is not. For being born in a different room is not related in the relevant way to being human.¹³

3.2 A WORRY FROM NATURALISM

Another worry is of a more naturalistic nature and has it that the proposed solution is too stringent because people *do* judge it to be possible that one has different origins. If this would indeed be true and one hopes to give a naturalistically respectable account, then, at the very least, one has to be able to explain these judgements. This worry is strengthened by the thought that Kripke and Putnam had to convince others with significant argumentation that origins are in fact necessary.¹⁴

¹²This is related to the problem of *which* features of origin, rather than the question of why origin rather than development (Mackie, 1998).

¹³Thanks to Nathaniel Baron-Schmitt and Barbara Vetter for discussion on this point.

¹⁴Thanks to Samuel Boardman for raising this worry.

I think there are a number of ways in which one can respond to this objection. I will first suggest that people do *not* judge it possible that one has origins different from one's actual origins. Secondly, I will argue that in the case of Kripke and Putnam, it concerns theoretical knowledge and this should not affect the similarity-based epistemology of modality proposed here.

As far as I am aware, there is no direct empirical evidence about people's possibility judgements (e.g., in relation to features of one's origin) in relation to the temporal order of the properties in question. Such evidence would be directly relevant to this objection from naturalism. The solution proposed here would predict that people judge it impossible that one has different origins, but that people judge it to be possible that one is born in a different room.

Though there is no such direct evidence, there is a lot of evidence that suggests that people *don't* judge it to be possible that one is of a different kind (it seems fairly uncontroversial to extrapolate that these judgements are partly about one's origins). This is best shown by transformation studies (see [Rips, 2001](#) and [Gelman, 2003](#) and the references therein). For example, when someone judges an object to be a cat, but is later shown that if we 'open up' the object and it contains nuts, bolts, and other robotic-like machinery, people will retract their original kind judgement. That is, people *don't* think that objects can change or transform to different kinds. If the object that they thought to be a cat turns out to be a robot, then they judge that it was a robot all along (and not a cat that transformed to be a robot). Similarly, when an object of a particular kind (e.g., a cat) is shown to be raised from birth by and living with a group of other another kind (e.g., horses), where the cat will behave exactly as a horse in all external behaviour (since the cat is raised by and lives with horses), people will still judge it to be a cat, rather than a horse. They *don't* judge the cat to have transformed to be a horse due to these external features.

Until there are empirical findings directly relevant to people's judgements about the possibility of different origins, I take it that these findings concerning judgements of transformation with regards to which kind an object belongs to suggest that people *don't* judge it possible that we can have different origins. If this is true, then the naturalistic worry is avoided.

Relatedly, one might think that our epistemology of modality should not rule out cases such as (**Bad**), not because ordinary agents judge these cases as possible, but for more theoretical reasons. For example, one might suggest that it is in fact *theoretical* modal knowledge that origins are necessary, therefore, an epistemology of ordinary modal knowledge should not rule out such cases as epistemically defective.

I think that this objection is confused. If one thinks that knowledge of the necessity of origins is a form of theoretical knowledge outside of the purview of an epistemology of possibility for ordinary agents, then you actually *agree* with the reasons for ruling out cases such as (**Bad**) as defective. An interesting further question would be whether we should have an epistemology of theoretical (modal) knowledge (e.g., [Fischer, 2017](#)) that, in this case, would 'overrule' the judgements based on similarity-reasoning. The interaction between the different methods for acquiring modal knowledge is something that is not often discussed (though see [Fischer, 2015](#)).

3.3 NON-QUALITATIVE PROPERTIES

A final worry arise from non-qualitative properties, in particular *object-dependent properties* (cf. [Cowling, 2015](#); [Hoffmann-Kolss, 2019](#); [Orilia & Paolini Paoletti, 2022](#)). For example, what should we say

about the property of ‘being-Dweezil-Zappa’ in the examples mentioned above; should we be justified in accepting that it is possible for me to be Dweezil Zappa?¹⁵

Clearly, this conclusion should also be considered ‘epistemically defective’. Unfortunately, it is not obvious whether or not the temporal ordering of things can help here (e.g., which property is temporally prior ‘being-human’ or ‘being-Dweezil-Zappa’),¹⁶ and we should note that that in ampliative reasoning (in general) we should not extrapolate non-qualitative properties like this.

It is an interesting further question for which non-qualitative properties, this kind of similarity reasoning is faulty. For example, the property of ‘standing-next-to-Frank-Zappa’ seems fine: if it possible for Dweezil to stand next to Frank Zappa, then it is also possible for me to stand next to him. So perhaps it is only haecceistic properties – properties about *being* a particular individual – that are problematic. However, maybe there are others.¹⁷

However interesting these questions are, they do not constitute a worry for similarity-based *epistemologies* of modality. These kind of questions need to be addressed by anyone working on ampliative reasoning (cf. Goodman, 1983), not just epistemologists of modality relying on similarity reasoning.¹⁸

Acknowledgements:

Firstly, many thanks to two anonymous reviewers of this journal for their great comments. Also, many thanks to Samuel Boardman and Sonia Roca-Royes for many discussion that helped this paper. An early version of this paper was presented at the Human Abilities colloquium, thanks to the audience there for their insightful questions and discussion. In particular, thanks to Samuel Boardman, Nathaniel Baron-Schmitt and Barbara Vetter.

This paper was written during a fellowship at *Human Abilities*, a Centre for Advanced Studies in the Humanities (*Kolleg-forschungsgruppe*) funded by the *Deutsche Forschungsgemeinschaft* (DFG), where I was hosted by Barbara Vetter and Dominic Perler. Thanks to both for hosting me and allowing me to be part of a greatly stimulating research environment.

¹⁵Thanks to Samuel Boardman for extensive discussion on this point.

¹⁶Note that we are after the property of being Dweezil Zappa, not the property of being named ‘Dweezil Zappa’.

¹⁷A reviewer raised a further very interesting family case that seems to be problematic. Consider not the possibility of me having Frank Zappa as a father, but the possibility that the Zappas have me as their child. Following a similar line of similarity reasoning – the Zappas are relevantly similar to my parents, so it is possible for the Zappas to have me as their child – it seems that we are justified in believing this.

I believe that this case is extremely interesting, as it raises a number of questions that similarity theorists, (also more broadly than those interested in the epistemology of modality). For example, it seems to create problems for accounts that *can* explain why the reasoning in **(Bad)** is epistemically defective (e.g., the account presented here and that of Roca-Royes (2017)). This observation suggests that modal knowledge in relation to origins might be significantly different from modal knowledge of (potential) offspring. This seems in line with what, e.g., Mackie (1998) and others have noted, namely that there is a “modal asymmetry in the temporal career of an individual” (Vetter, 2015, p. 204): the beginning is settled, and the rest is left open. Relatedly, this example shows that modal knowledge of origins is different from modal knowledge of offspring, something which happens *since* the relevant object came into existence.

My intuition is that, given this temporal asymmetry, intuitions in the case of the possibility of the Zappas having me as their child are much less clear cut than in the original **(Bad)**. One reason for this might be that this case is more ambiguous between the *de re/de dicto* reading of this possibility (e.g., the Zappas to have a child that is very much like me, versus they have *me* as their child), than **(Bad)**. For example, I am tempted to think that in the former case, the *de dicto* reading is the most prominent, whereas in **(Bad)** the *de re* reading is more prominent.

All of this deserves much more discussion that I can provide here, and I am truly grateful for the reviewer for raising this interesting case.

¹⁸Roca-Royes (2017) also rules out inductive inferences based on non-categorical properties with her ‘qualitative anchors’ (p. 237).

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