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The Liar Paradox: Between Evidence and Truth

Abstract. Systems of paraconsistent logics violate the law of explosion: from contradictory premises not every formula follows. One of the philosophical options for interpreting the contradictions allowed as premises in these cases was put forward recently by Carnielli and Rodrigues, with their *epistemic approach* to paraconsistent logics. In a nutshell, the plan consists in interpreting the contradictions in epistemic terms, as indicating the presence of *non-conclusive evidence* for both a proposition and its negation. Truth, in this approach, is consistent and is dealt with by classical logic. In this paper we discuss the fate of the Liar paradox in this picture. While this is a paradox about truth, it cannot be accommodated by the classical part of the approach, due to trivialization problems. On the other hand, the paraconsistent part does not seem fit as well, due to the fact that its intended reading is in terms of non-conclusive evidence, not truth. We discuss the difficulties involved in each case and argue that none of the options seems to accommodate the paradox in a satisfactory manner.

Keywords: paraconsistency; Liar paradox; epistemic approach; evidence; truth

1. Introduction

Paraconsistent logics are, roughly speaking, systems of logic violating the so-called 'law of explosion'; according to the latter, from a contradiction — a pair of propositions of the form α and $\neg\alpha$, where '$\neg$' is a negation sign — every proposition β of the language of the system follows logically [see Barrio et al., 2018]. In terms of the formal semantics of paraconsistent systems, what is required to achieve that violation is that we advance models in which it is possible to attribute a designated

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value to both α and $\neg\alpha$, but not also to some β. Given this situation, the philosophical challenge is: how should these designated values simultaneously attributed to α and $\neg\alpha$ be informally understood? This is an issue that has recently attracted much attention on the philosophy of paraconsistency, and the idea of a *philosophical interpretation* of paraconsistency has spawned a literature that is currently developing [see, e.g., Barrio and da Re, 2018; Barrio, 2018; Carnielli and Rodrigues, 2015, 2019, 2021; Arenhart, 2021].

One straightforward option is to consider these truth values present in the formal semantics as representing indeed some notion of truth, and then face the fact that paraconsistent logics seem to *impose* on us, inevitably, that some contradictions could be true. The thesis that there are some true contradictions is called 'dialetheism', and seems to suit paraconsistency quite nicely [see Priest, 2006a,b; Beall, 2009]. Basically, the dialetheist will hold that in some cases, we must face the fact that we have both α and $\neg\alpha$ true, and that a paraconsistent logic is required to deal with that situation if we are to avoid trivialism. Motivations for holding such a view are plenty in the literature, and involve situations such as alleged cases of inconsistent legislation, naive set theory deriving Russell's paradox, and the Liar paradox, on which we shall comment in more detail in what follows [see also Priest et al., 2018]. Obviously, we are not claiming that these motivations are uncontroversial, or even that they succeed in establishing dialetheism [see Arenhart and Melo, 2018, for further discussion]; we merely claim that these examples are called forth to motivate dialetheism and its accompanying understanding of paraconsistency.

While it seems completely natural to associate paraconsistency and dialetheism in the way we have just sketched, what is not completely clear is that one may have a paraconsistent logic up and running and still *not* adopt a version of dialetheism [see Barrio and da Re, 2018] for a discussion about the relationship between paraconsistency and dialetheism). If the premises in the rule of explosion are not to be taken as *true*, how to make sense of paraconsistency? In more general terms: how to make sense of paraconsistency, without embracing *true contradictions*? The *epistemic approach* to paraconsistency is a recent proposal to deal with this question, advancing the claim that one should interpret the contradictions allowed in such logics in *epistemic terms*, thus avoiding commitment to true contradictions and the accompanying doctrine of dialetheism [see Carnielli and Rodrigues, 2015, 2019, 2021]. The proposal,

in a nutshell, suggests that contradictions are to be interpreted in terms of *non-conclusive evidence*: α and $\neg\alpha$, in the context of a paraconsistent system, indicate that there is evidence, of a non-conclusive kind, for us to hold both of these propositions, at least for the time being.

Paraconsistent logics, then, *according to this proposal*, are logics related with reasoning with non-conclusive evidence, with truth and falsity being a limiting case of evidence, when conclusive evidence is available; for this latter kind of propositions, classical logic is the appropriate system, so that truth behaves consistently. The motivation for such a distinction comes from the claim, by friends of the epistemic approach, that truth is factive, it reaches reality, and reality itself is not contradictory; on the other hand, evidence, when not conclusive (and eventually contradictory), is restricted to representational apparatus. As a result, in the epistemic interpretation, contradictions may infect our theories, thoughts, and languages, but do not reach reality.

The main reason to advance an epistemic approach to paraconsistency, then, consists in an attempt to have a paraconsistent logic and, at the same time, avoid commitment with dialetheism. In this paper, we examine how the epistemic approach, as advanced by Carnielli and Rodrigues in a series of papers, deals with the most famous motivation for dialetheism (and, as a consequence, for a case that there is at least one true contradiction): *the Liar paradox*. The Liar paradox, it is usually argued, is a derivation of a contradiction using simple expressive and deductive resources of natural language. How would the epistemic approach account for this contradiction in epistemic terms of non-conclusive evidence? We argue that there is no easy route for doing that in the context of the epistemic approach, at least when the set of desiderata advanced by the approach is taken into account. The trouble, in a nutshell, is that, while the epistemic approach requires that contradictions are always related to non-conclusive evidence, once the basic ingredients for the Liar to obtain are granted, there seems to be conclusive evidence for the truth of its conclusion, which would evade the confinement of the contradictions to situations comprising non-conclusive evidence. On the other hand, if we accept that the contradiction of the Liar is indeed a contradiction in alethic terms, then, in the context of the epistemic approach, we seem to be left without logical resources to deal with it. The Liar does not sit comfortably in any of the places the epistemic approach has to offer: *a classical treatment of truth that cannot*

afford contradictions, and a paraconsistent treatment of contradictions that does not account for the notion of truth.

The structure of this paper is as follows. In section 2, we present in more details the epistemic approach and its basic tenets, as developed by Carnielli and Rodrigues in their recent papers. In section 3, we discuss one possibility to accommodate the Liar in the context of the epistemic approach: to hold that the Liar is dealt with by the paraconsistent logic of the epistemic approach, being thus related to non-conclusive evidence. We argue that this is inappropriate to deal with the Liar, which is a problem about truth. In section 4, we check the prospects for dealing with the contradiction of the Liar in terms of truth, using classical strategies to avoid the contradiction. We argue that such move generates trouble to motivate a paraconsistent approach to contradictions, in other scenarios. We conclude in section 5, with a diagnosis of the sources of the difficulties.

2. The epistemic approach to paraconsistency

Considering the previous general presentation on the epistemic approach, in this section we will briefly check some further details about the approach in question that are relevant for our purposes in this paper.

We have already mentioned, in the introduction, that from a technical point of view, avoiding explosion is not that difficult (now that it has become widely known): it is enough to produce a model in which both α and $\neg\alpha$ are attributed designated values, and where β is not designated. From a philosophical point of view, however, the challenging problem is to explain the nature of the contradiction that one is supposed to accept as a premise for reasoning in these circumstances. What does the adoption of $\alpha \wedge \neg\alpha$ as premises require? According to [Carnielli and Rodrigues, 2019, p. 3790], there are three options available:

i. *dialetheism*, the view according to which there are some true contradictions, and, as a consequence, the contradictions involved in paraconsistency are understood in terms of truth and falsehood;
ii. a *pragmatic approach*, which basically proposes to keep using paraconsistent logics as a technical resource, without discussing the nature of such contradictions;
iii. *the epistemic approach*, according to which contradictions in paraconsistent systems do not deal with the notion of truth; they are

> artifacts of language and thought, and so, are better understood in epistemic terms of non-conclusive evidence.

The major dispute is between dialetheism and the epistemic approach, with the pragmatic approach not being properly developed in current discussions. As Carnielli and Rodrigues see it, the dispute may also be put in terms of the *sources of the contradictions*: of whether contradictions are *ontological*, arising from a contradictory reality, or *epistemological*, a result of the very nature of knowledge representation and acquisition [Carnielli and Rodrigues, 2015, pp. 59–60]. Clearly, they claim, dialetheism is associated with ontological contradictions, and the epistemic approach is related with (surprise!) epistemic contradictions. The connection between dialetheism and ontological contradictions is established by the claim that true contradictions, by the very nature of truth, must have some anchoring in reality.[1] Contradictions of the epistemic kind, on the other hand, have their origins in problems with our theories, in defects of the measuring apparatuses, or errors that may be corrected in latter stages. They do not connect with reality, because they are not true. In this sense, the dispute between dialetheism and the epistemic approach concerns whether contradictions may be present in reality, or only in our representational apparatus.

This connection between dialetheism and ontological contradictions is also part of the way that the epistemic approach understands itself, in clear opposition to dialetheism. According to Carnielli and Rodrigues:

> A third position in paraconsistency, antagonistic to dialetheism, claims that *no* contradiction is ontological but, rather, *all* contradictions that occur in scientific theories, belief systems, a number of situations in informal reasoning, and even in semantic and set theoretical paradoxes — that are, strictly speaking, results about languages with certain characteristics — have epistemic character in the sense that they are related to thought and language. This is the position endorsed by us.
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> [Carnielli and Rodrigues, 2019, p. 3790]

In this sense, the positions are claimed to be exclusive, with the epistemic approach aiming to account for every occurrence of contradictions ("*no* contradiction is ontological"!). Also, to substantiate this understanding of the dispute, we find the claim that "dialetheism does not provide a

[1] This understanding of dialetheism is controversial, to say the least [see, e.g., Priest, 2019, pp. 588–589]. We adopt this reading for the sake of argument throughout this paper.

sustained account of paraconsistency" [Carnielli and Rodrigues, 2021, p. 11], due to the fact that its commitment to the notion of true contradiction would require that reality is contradictory. Add to that the claim by [Carnielli and Rodrigues, 2021, p. 14] that one can find no evidence that contradictions exist in reality, and it results that dialetheism has nothing in its favor.

It is also worth emphasizing the specific mention of semantic and set theoretical paradoxes in the previous quotation. The former shall play a special role in this paper. Even such contradictions are said to be confined to defects of theories and conceptual apparatuses, and given this very defectiveness of the theories, never escape to reach the world, given that these theories are not true. In this sense, paraconsistent logics appear precisely to tame contradictions where we have a *defective theory*, one that has generated some kind of inconsistency that needs to be, ultimately, overcome. This is an important ingredient of the epistemic approach; the fact that contradictions appear in theories, and do not reach reality, indicates that such theories are provisional, and may be replaced by some future consistent theory:

> the failure of explosion may be interpreted epistemologically as excess of information (conflicting evidence for both α and $\neg\alpha$, but no evidence for β). The acceptance of some contradictory propositions in some circumstances does not need to mean that reality is contradictory. It may be considered as a step in the process of acquiring knowledge that, at least in principle, could be revised.
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> [Carnielli and Rodrigues, 2015, p. 68]

Besides involving an intuitive idea of 'excess of information', as the previous quote suggests, the link between evidence and contradictions may be better understood as follows:

> The acceptance of α and $\neg\alpha$ can be understood as some kind of 'conflicting information' about α, in the sense of having *non-conclusive reasons* for accepting the truth as well as the falsity of α. This kind of 'conflicting information' we call here *conflicting evidence*.
>
> [Carnielli and Rodrigues, 2019, p. 3792]

Here, let us adopt the usual definition of falsity: $\neg\alpha$ represents the falsity of α. In terms of this, the intuitive understanding of propositions in a paraconsistent system, according to the epistemic approach, is that we have evidence for accepting a proposition. So, 'evidence that α is true' means 'reasons for believing/accepting α'; 'evidence that α is false'

means 'reasons for believing/accepting $\neg\alpha$'. These reasons are not always conclusive, and we may find ourselves in situations having non-conclusive reasons to accept both a proposition and its negation, while still maintaining that it is not the case that both are true. *Conflicting evidence* appears when there is evidence for both α and $\neg\alpha$, and both are non-conclusive. Examples of inconsistent theories in science come to mind, like Bohr's model of the atom, and the early formulation of the infinitesimal calculus; one may also cite more mundane situations, such as doctors disagreeing on the diagnosis of a patient, or disagreements advanced by witnesses in a trial.

All of these are central components of the epistemic view. But there is one more important aspect that will play a major role in our discussions to come, which is its commitment to a kind of *descriptivist approach to logic*, instead of a purely normative one. This is meant in the sense that the aim of the proposal is to somehow capture what people actually do when reasoning with evidence, rather than prescribe it from a privileged place, nor to revise the informal uses. This is clearly in accordance with the idea that paraconsistency is called forth to deal with theories that are defective and will be overcome in the future by better (and, hopefully, consistent) ones. We have to use such theories for the time being, in the lack of a better one, and paraconsistency seems to be recommended in such cases. As Carnielli and Rodrigues have put it, "we want to express how people actually, and naturally, draw inferences, when the criterion is preservation of evidences" [Carnielli et al., 2018, p. 55]; [see Carnielli and Rodrigues, 2015, p. 72]. In [Carnielli and Rodrigues, 2021, p. 11], Carnielli and Rodrigues criticize alternative interpretations of paraconsistency in terms of information, because such interpretations fail to connect with actual reasoning:

> There is nothing wrong in interpreting paraconsistency in terms of a notion of information stripped of any epistemic ingredient, such a reading works perfectly well. However, in real-life situations, it is much more likely that what is at stake are propositions together with justifications that may be more or less conclusive. Therefore, we cannot see how their proposal could be a criterion for an account of logical consequence that intends to represent real contexts of reasoning.

As a result, the plan is that the epistemic view attempts to capture the occurrence of contradictions in natural language reasoning, and also, that reasoning with non-conclusive evidence naturally involves contra-

dictions. This descriptive aspect is shared by the epistemic approach with dialetheism, which also has as one of its main motivations to capture contradictions as they arise intuitively from the resources of natural language [see also Priest, 2006a, p. 9]:

> Overall, such paradoxes as the Liar provide some evidence for the dialetheist's claim that some contradictions are *provably true*, in the sense that they are entailed by plain facts concerning natural language and our thought processes. Extended Liar paradoxes like 'This sentence is not true' are spelt in ordinary English. Their paradoxical characteristics, dialetheists argue, are due exactly to the intuitive features of ordinary language: unavoidable self-reference; the failure of metalinguistic hierarchies, which only produce languages that are expressively weaker than English; and the obvious presence of a truth predicate for English, 'is true', which is characterized, at least extensionally, by either the Tarskian T-schema or rules amounting to the transparency of truth. [Priest et al., 2018, sect. 3.2]

This puts both views in direct conflict as to the nature of contradictions that appear when people are reasoning.

To examine the nature of the disagreement more closely, and check how the debate could get more substance, we believe that considerations of how the epistemic view deals with specific cases of contradictions that indeed seem to arise naturally in informal reasoning should be offered. We shall be concerned with a very particular case: *the Liar paradox*. Recall that the Liar sentence (in one formulation) is a sentence defined as follows [see the details in Beall et al., 2020]:

$$\lambda\text{: } \lambda \text{ is not true}$$

Now, assuming that λ must be true or not true, a simple reasoning by considering the cases leads us quite directly to the conclusion that λ is true and also not true; or, in symbols, to the conclusion that $T(\langle\lambda\rangle) \wedge \neg T(\langle\lambda\rangle)$, where '$T$' is a truth predicate and '$\langle\ \rangle$' are devices to form the name of a sentence. Priest argues that the derivation of the Liar provides evidence to the claim that λ is true, and also, that it is not true [see, e.g., Priest, 2006b, p. 109]. Given that a derivation is thought of as providing conclusive evidence, if there is any such a thing, we have evidence for the truth of both claims, that λ is true and that λ is not true, which would be a true contradiction.

This seems to be a clear case where dialetheism takes advantage. What should the epistemic approach say in the face of the Liar? Given

the claim that the approach can handle *any* contradiction, it certainly must have an account of the Liar, right? As we have seen, according to the epistemic approach, there are two kinds of ways to evaluate propositions: as involving inconclusive evidence, or as involving conclusive evidence (truth). Let us check what are the prospects of treating the Liar in each option, and, as a consequence, check whether the epistemic approach can meet the challenge presented by this particular contradiction.

3. The Liar: contradiction in terms of non-conclusive evidence

It would be quite unfair to say that the epistemic approach has nothing to say about the status of the Liar paradox. As we have already mentioned, and as it was presented in a quote in the previous section, it is suggested *en passant* by the proponents of the epistemic approach, without emphasis on the specific case of the Liar, that *paradoxes such as the semantic paradoxes are cases of contradictions in a theory, in a language, and not in reality.* Now, although it is not clear that the Liar paradox would be a paradox about reality for anyone (where 'reality' is typically a short for 'concrete reality'), not even for a dialetheist, and it is not even clear in what sense this claim could be understood, we shall not bother with that point specifically here; rather, in this section, we shall explore further the most obvious way out for the epistemic approach, the one that seems to be advanced most explicitly by them: *the Liar is a paradox somehow restricted to a language or a theory.*

The contrast of interest here is between paradoxes (and contradictions) *in languages and theories*, on the one hand, and paradoxes (and contradictions) *in reality*, on the other. As we have seen, one of the main tenets of the epistemic approach is that every contradiction is a contradiction exclusively in a representational apparatus (like language and/or in a theory), never in reality. In this sense, then, the contradiction generated by the Liar would not reach reality, and would not be truth-apt. Recall, again, what are the direct consequences of this confinement of the paradox to a language and theory, in the context of the epistemic approach:

i. it makes the contradiction resulting from the paradox amenable to a paraconsistent treatment by one of the systems advanced by Carnielli and Rodrigues, where logical consequence is understood in

terms of preservation of evidence [see also Carnielli and Rodrigues, 2019],

ii. and more importantly, the resulting contradiction should be interpreted in terms of non-conclusive evidence, not in terms of truth.

So, the good news is that, by confining contradictions to a language or theory, one may somehow embrace the contradictions and deal with them using the resources of a paraconsistent logic, avoiding the explosion that would ensue from such contradiction. *No need to look for conceptual revision to avoid the contradictions* [see Scharp and Shapiro, 2017, on revising the notion of truth].

The bad news for this option, we think, is that the contradiction must be understood in terms of non-conclusive evidence, not in terms of truth, and it is not easy to see how this could be done when it comes to the Liar paradox. According to this perspective, if we ever meet the propositions α and $\neg\alpha$, they should be informally understood as 'there is non-conclusive evidence for α', and 'there is non-conclusive evidence for $\neg\alpha$'. But, in the case of the Liar, what is the evidence for both $T(\langle\lambda\rangle)$ and $\neg T(\langle\lambda\rangle)$? Clearly, the evidence in this case is *the derivation of the contradiction itself*, as [Priest, 2006b] has put it. So, there is evidence for $T(\langle\lambda\rangle)$, because one can derive it, and there is evidence for $\neg T(\langle\lambda\rangle)$, because one can derive it too. The ingredients for the derivation of each case are the same, that is, there is no special assumption for one proposition that does not also hold for the other.

A first difficulty in this line of understanding a contradiction would be how to frame an intuitive meaning for these derivations in terms of non-conclusive evidence. Clearly, the subderivation that the Liar sentence is true, and the subderivation that it is not true, are on equal terms when it comes to evidential strength: one cannot claim that one of the options has more right to be the true one, but that we just do not know which is the case. Concerning the evidential force, derivations are all on equal footing, provided that they follow the appropriate rules, and this force is typically understood as conclusive, given the nature of a logically correct derivation. So, it is hard to accept the idea that both have a kind of evidence in their favor coming from the derivation, if the assumptions for the paradox are accepted (which seems to be the case for those working with a naive notion of truth).

This claim could be made more vivid by a comparison with other cases involving the treatment of conflicting evidence. Suppose that in

a jury, two testimonies are given by distinct persons, one for the claim that α, and another for the claim that $\neg\alpha$. The judge certainly expects that, as further investigation is made, and further questions are posed, it will result in the end that one of α or $\neg\alpha$ will be found out to be true. So, until such investigations are not finished, we have conflicting evidence for them. But we are claiming that nothing of the sort can be expected for the Liar. To claim that we just do not have evidence *enough* to decide which of the propositions is the case, when it comes to the contradiction of the Liar sentence, would be hopeless. This is not only because it is implausible that further investigation could indicate that one of the options is the correct one (what else could one add to the evidence already provided by the derivations?), as in the case of the jury, but also because choosing any of the options as 'the correct one' is troublesome in the case of the Liar.

Perhaps one could try to motivate the suggestion that the derivations of the contradictory sentences of the Liar are better understood as providing only non-conclusive evidence for the contradiction by finding fault with part of the framework where the derivations take place. That is, one could concede that a derivation, in the sense of a deduction, is a way of providing conclusive evidence for a proposition, but that the derivation of the Liar is mistaken in some step. One could see the case of the Liar as instantiating a derivation in the context of a *defective theory of truth*, just as some defective theories in empirical sciences do seem to derive contradictions. Still, following this line of approach, one would be required to argue that a consistent theory of truth is achieved, perhaps by an approach along the lines of Tarski, which was successful in spotting the fault in the naive notion of truth, and also that a program for a rigorous theory of the naive notion of truth is hopeless. But although that move is certainly open for defense [see Williamson, 2017], it is not a move open for the friend of the epistemic approach, at least not for the standard formulation, as we shall see.

Before we proceed, notice that this shift of focus, putting now the weight on the fact that the naive notion of truth where the Liar is derived is defective is not completely alien to the epistemic approach; in fact, it would benefit from the aforementioned fact that, according to the epistemic approach, theories delivering contradictions are not true; they are at best steps towards the correct theory of a given field, if any such thing exists. As a result, a naive theory of the very concept of truth that delivers the Liar is a bad theory for this concept, and as such, does not

reach reality, as true theories should do, but rather only delivers some kind of non-conclusive evidence. That is, this kind of answer benefits from the fact that the epistemic approach sees inconsistent theories as defective *theories*, not reaching reality, and that this may apply even to a naive theory of truth that delivers the Liar. The naive theory of truth delivering the Liar, then, would be no different than other defective theories such as Bohr's model of the atom; the only difference is that it deals with the notion of truth.

Although in this suggestion the contradiction of the Liar paradox is indeed confined to a theory, the fact that it is a contradiction involving truth still generates much trouble. In a nutshell, the proposal consists in admitting that the naive notion of truth leads to a contradiction, but that this theory is not the appropriate theory of truth; there is a better one, which is consistent. If we leave aside the question of how to understand the contradiction of the Liar in terms of evidence, we are still left with the question of how to understand the naive theory of truth, with *its* contradiction. Unless one convincing story is told, we are better advised to seek a version of dialetheism: *semantic dialetheism*. Let us check.

According to semantic dialetheism, there are true contradictions, but these contradictions never reach concrete reality, they concern only our semantic concepts [see Mares, 2004; Beall, 2009]. Here we have some relations between semantic dialetheism and the epistemic approach to paraconsistency. Both approaches agree that concrete reality cannot be inconsistent, and that sentences describing concrete reality cannot be truly contradictory. In both views, contradictions should be tamed by paraconsistency. However, they disagree on the understanding of the notion of contradiction. According to the semantic dialetheist, while confined to purely semantic concepts, such as truth, contradictions can be true. But this goes against the very basic tenet of the epistemic approach to avoid true contradictions.

Of course, one could claim that the dialetheist, in the semantic version, at least, adopts the semantic theory producing a Liar paradox as a good or true theory about the very concept of truth, while the friend of the epistemic approach would see that theory as defective. This is the major difference between the two approaches in the case we are considering. This puts the dispute in terms involving theory choice about nothing more and nothing less than the notion of truth. Although both views agree that the naive theory of truth is inconsistent and deliver contradic-

tions about its target concept, and that we deal with it paraconsistently, it is worth noting that *they disagree on the status of this naive theory and of the resulting contradiction*. While the semantic dialetheist sees this theory as a good one, able to capture appropriately the notion of truth, the friend of the epistemic approach disagrees, and considers that the very fact that a contradiction is derived is a sign that the theory is inadequate. The trouble then is how to argue in favor of one or the other view on the status of the naive theory of truth.

It seems to us that the epistemic approach will have to concede a point to the semantic dialetheist here, contrary to her own will. The reason is already known: given the basic desideratum of coping with the way people actually think and reason with informal concepts, that is, the descriptivist aspect of the epistemic approach we have already discussed, the dialetheist seems to have an advantage here. Clearly, the following of common use and basic intuitions is not in complete agreement with revisions and conceptual engineering of a concept, and that seems to get worst when the concept in question is the concept of truth [see Scharp and Shapiro, 2017 for revisionist proposals]. So, if the desideratum of following the way people do use concepts is really adopted, it seems that when it comes to the case of the truth, it does really point much more to a dialetheist approach, which embraces semantic closure and attempts to preserve all of the ingredients that lead to the paradox, as the dialetheist suggests, rather than favoring the view that the paradox is a clear sign that the naive theory of truth fails and, as a solution, one should provide a consistent treatment of truth. So, given one of the aims of the epistemic approach of keeping in line with the informal way of using concepts, if this is brought to the stage as a requirement on any approach and is used to judge *this* dispute, the semantic dialetheist is better off in her treatment of the notion of truth than the friend of the epistemic approach (see again our quote of [Priest et al., 2018, sect. 3.2] presented above). In this sense, the descriptivist aspect of the epistemic approach is in clear conflict with the claim, also by the epistemic approach, that a contradictory theory is only provisional. The semantic dialetheist will wish to resist precisely that point, and will call the descriptivist aspect shared by both semantic dialetheists and the epistemic approach in her favor.

If that is not enough, the semantic dialetheist may be in advantage in another respect. Suppose that the naive theory of truth is assumed to be overcome by a consistent theory. Still, the naive theory will be

an inconsistent theory (a superseded one, to be sure) that requires a logical treatment. This would be in line with the epistemic approach's requirement that paraconsistent logics be used to deal with contradictions *in theories that are defective*, not with the final ones. In this case, the Liar paradox, as derived in the naive version of truth, would have to receive a paraconsistent treatment in terms of evidence. But again, the semantic dialetheist will be in a better position to account for the situation: the contradiction obtained is not merely evidence, but uses the same notion of truth as appears in any other true sentence. That is: it is not necessary to multiply concepts of truth; one for the naive defective view, one for the revised and classical view. The semantic dialetheist has a more unified view.

One could also elaborate on this point: given that the semantic dialetheist and the epistemic approach both agree that contradictions do not infect concrete reality, what is it that prevents the epistemic approach from accepting that some contradictions do indeed occur at the semantic level? That is, why not accept some true contradictions, provided that they are kept at a non-factual level? The epistemic approach seems to conflate two distinct commitments, that could be separated here: i) avoid true contradictions, ii) avoid contradictions in reality. The semantic dialetheist agrees with ii), but not with requirement i). It seems that the epistemic approach rejects i) because the proponents believe that by accepting it, one also accepts ii). As we see, this is not the case for the semantic dialetheist. The semantic dialetheist, by disentangling these concepts, would call the epistemic approach as a companion, by arguing for the abandonment of the view that all contradictory theories are defective and must be eventually succeeded. According to the semantic dialetheist, the naive theory of truth is the best theory for truth, and copes with the descriptivist aspect of the epistemic approach. It is all a matter of abandoning the requirement of not accepting true contradictions, and preferring descriptivism; both cannot stay.

This is not a minor issue, due to the fact that dialetheism (semantic or not) gains much of its purchase from the descriptivist treatment it is supposed to give to the Liar. As [Priest, 2006a, p. 9] has put it:

> It is not at issue that we can devise formal theories which are consistent, or even provably consistent. What is at issue is the consistency of the familiar concepts which give rise to the paradoxes, or, what comes to the same thing, the consistency of the semantics of fragments of natural language.

So, it is not as if the friends of the epistemic approach could not come up with a consistent treatment of the Liar. There are such options on the market. The challenge, rather, is to grant that the treatment is faithful to the working of such concepts that give rise to the paradox, such as the concept of truth in its behavior in natural language. *This* clearly is not available for the epistemic approach, and versions of dialetheism have a huge advantage on any dispute concerning this issue. A consistent formal treatment, then, that is unrelated with how people reason in face of a contradiction (such as the Liar), is not an option, considering the descriptivist aspect of both approaches, dialetheist and epistemic.

4. The Liar: contradiction in terms of 'truth'

One distinct approach to the Liar paradox in the context of the epistemic approach could be to agree that the logical consequence involved in the derivation of the paradox must not be understood in terms of non-conclusive evidence, as suggested by the previous section, but rather in terms of truth. This assumption would require that one recognizes that the contradiction derived is indeed a contradiction in terms of the concept of truth, and, in the context of the epistemic approach, establishes a contradiction in the province of truth that cannot be dealt with by non-conclusive evidence. According to the features characterizing the epistemic approach, that means that the logic employed will be classic, and this requires that one take more radical measures to prohibit the derivation in order to avoid the contradiction. One such solution could be to follow Tarski, for instance, and avoid semantically closed languages [see Williamson, 2017]. This would allow that truth is treated consistently, by classical logic, and that there are no true contradictions. This is clearly in line with the proposal of the epistemic approach.

In fact, this more revisionist approach has something in its favor: it could be argued that it is precisely what the friends of the epistemic approach really do, when they require that the notion of truth submits to classical logic. Recall, classical logic does indeed deal with a notion of truth that does not allow for full semantic closure, and involves, in the end, some kind of conceptual revision. Anyway, this is not the official doctrine of the epistemic approach, but it seems to be allowed by them, in their commitment to a classical treatment of truth. However, we shall ar-

gue in this section that following this line has some consequences for the whole epistemic project that threatens the coherence of the approach too.

One of the major difficulties of allowing the use of some kind of strategy such as Tarski's, which requires a kind of conceptual engineering on a naive concept, is that one can no longer hold the desideratum to account for informal reasoning. This descriptive ingredient of the epistemic approach, recall, consists in attempting to capture "how people actually, and naturally, draw inferences, when the criterion is preservation of evidences" [Carnielli et al., 2018; Carnielli and Rodrigues, 2015, p. 55 and p. 72, respectively]. This should include conclusive evidence, i.e., truth. That is, the plan to capture the way people reason with truth (conclusive evidence) would have to give way to more revisionist approaches, which would be hard to motivate.

Besides facing trouble with the descriptivist component of the approach, the biggest trouble seems to come from a difficulty to motivate such a special treatment of the contradiction generated by the paradox of the Liar, in opposition to the treatment conferred to other contradictions in other contexts, such as doctors advancing contradictory diagnoses of a patient, or of contradictory testimonies presented to a jury. This would generate a kind of two-fold standard for the treatment of contradictions, and for the treatment of distinct logics. In a nutshell, it requires that a contradiction such as the one delivered by the Liar paradox be singled out from other contradictions, and receive a special treatment to be eliminated by a Tarski-style solution, or something of the sort, so that the concept of truth can be dealt with consistently. It generates a two-fold standard on the treatment of logics too, because it allows that, while classical logic may contain an amount of artificiality and re-engineering over naive concepts among its basic concepts, it seems to require that contradictions of other kinds, such as those appearing in empirical theories, should be left intact, and be treated by paraconsistent logic.

In other words, the problem with this treatment of the Liar is that it introduces a selective treatment of inconsistencies. The inconsistency of the Liar, given that it deals with the notion of truth, is deemed unacceptable, so it is quarantined and dealt with by a form of conceptual engineering, which re-elaborates it in order to ensure that classical logic applies [for further discussion on revising inconsistent concepts, see also Scharp and Shapiro, 2017]. Other contradictions, on the other hand, such as contradictions arising in empirical scientific theories, like the early model of the atom advanced by Bohr, or the inconsistency obtained

when one brings together quantum mechanics and general relativity, for instance, are to be dealt with by a paraconsistent logic in terms of non-conclusive evidence. The trouble, then, is: how to motivate such a distinction of treatments, if not only by arguing that in the case of the Liar, one is avoiding true contradictions by such a move, and in the case of inconsistent empirical theories or inconsistent medical diagnoses, one is allowed to embrace the contradictions in terms of paraconsistency and of evidence? And how to argue for the latter distinction, except by the fact that one does not believe in true contradictions? Clearly, this is not a solution to the problem of understanding contradictions that could allow one to dispense with dialetheism, but it is rather a solution that depends on rejecting dialetheism beforehand.

This kind of solution leads to a slippery slope, in which it becomes hard to motivate a paraconsistent treatment of any contradiction. If one is allowed to provide for a revision of contradictions that are not agreeable, as in the case of contradictions involving the notion of truth, then, one should have the right to pursue the same kind of move in other fields of inquiry too, unless a good motivation for a precisely drawn line is advanced. That would mean that one should then have the right to allow that other contradictions, such as those appearing in scientific theories, are not to be temporarily accepted too, because they may also be eliminated by some kind of conceptual engineering or by the very revision of the theories in question. But then, if it is allowed that contradictions may be eliminated by whatever process of conceptual revision that is available and reasonably motivated, it seems that there is nothing left to be dealt with in the paraconsistent setting, and the problem of interpreting paraconsistent logics vanishes. The alternative, it seems, would be either to concede that the Liar is a contradiction that must be understood in terms of truth, and that there are some true contradictions, which is also implausible for the epistemic approach, or to allow that ultimately there are no principled grounds for accepting contradictions of any kind, given that they all may be dispensed with. The difficulty, in a nutshell, comes from the fact that not all contradictions receive the same treatment under this proposal and so there is not a uniform treatment of contradictions.

But this is not all. Even if one could motivate the claim that the contradiction delivered by the Liar should be quarantined and treated by some kind of revision or conceptual engineering, while other contradictions must be dealt with in the context of evidence and paraconsistent

logic, all is not settled. Troubles come from the fact that one of the tenets of the epistemic approach consists in treating contradictions as infecting theories, and not reality; the development of a contradiction is a clear sign that the inconsistent theory is not the final word about the topic it deals with. Recall:

> The acceptance of some contradictory propositions in some circumstances does not need to mean that reality is contradictory. It may be considered as a step in the process of acquiring knowledge that, at least in principle, could be revised. [Carnielli and Rodrigues, 2015, p. 68]

So, an inconsistent theory will, ideally, be overcome by a consistent one. However, while that is not done, we need to live with the inconsistent one. Also, even in cases where a consistent replacement is found, one may wish to deal with the inconsistent theory that was abandoned, for the sake of curiosity, or scientific interest of that theory. This is one motivation for the paraconsistent treatment offered by the epistemic approach. Consider Cantor's naive set theory, for an illustration. Paraconsistency is neither required in the first stages of the theory, when no contradiction is found, nor in latter stages, after the engineering by Zermelo and Fraenkel (and others) has taught us how to avoid the contradiction in the ZFC axiomatic system. The problem is in the middle stage, as it were, in the way from a completely naive to a completely reformulated theory; it is there that Russell's contradiction appears. It is in order to keep dealing with *that* inconsistent theory, which is not true, that one needs paraconsistency and the interpretation in terms of evidence [see also Carnielli and Rodrigues, 2021, p. 13].

That is fair enough, and would be a good description of the efforts of the epistemic approach to avoid an ontological interpretation of the paraconsistent logics. But that cannot be done for the specific case of the Liar, for reasons we have already argued for in the previous section. Even if we concede that the contradiction can be overcome by a consistent solution like Tarski's [see, e.g., Williamson, 2017 for a defense of the abandonment of self-reference in the context of the theory of truth], the very fact that a paradox may be derived for the naive concept cannot be forgotten, and the dialetheist will press precisely at that stage. There is still a contradiction at the naive stage that needs to be accounted for, and is in terms of the naive notion of truth. We still need to be told how to logically account for *that* contradiction. The epistemic approach does not have the possibility open to the classical approaches to the truth, which

recommends a *substitution* of the naive concept by a revised consistent one; rather, the epistemic approach proposes that a paraconsistent logic may deal with contradictions in theories that are known not to be the final theory, such as Bohr's model of the atom, and, it could be argued, the informal concept of truth. So, even if the concept of truth can be revised successfully, there is still a contradiction, involving truth, that is present at the informal naive level, and cannot be accounted for in terms of non-conclusive evidence.

5. Conclusion

We have discussed the role of the Liar paradox in the context of the epistemic approach to paraconsistent logics. On the one hand, according to this approach, paraconsistent logics seem to be the appropriate tool to deal with contradictions. On the other, they seem inappropriate for handling them in the case of the Liar, if the kind of contradiction it deals with does not involve the notion of truth. The Liar paradox is left in a quite uncomfortable situation, and this is more problematic given the fact that the Liar is indeed one of the main motivations for dialetheism, the view that the epistemic approach wishes to reject.

From the guidelines of the epistemic approach, contradictions live in a linguistic realm, not in reality; this led us to first analyze the Liar paradox in terms of evidence, not in terms of truth. We have argued that this way to understand what is going on in a derivation of the Liar takes away much of the meaning of the paradox and the force of the derivation of the Liar; accepting the scenario of the naive theory of truth, it becomes simply impossible to resist the claim that the Liar has conclusive evidence for its truth. What else could be missing in such a derivation, so that it is understood as non-conclusive? One may try to resist this move, by embracing the derivation of a contradiction in terms of *truth*, but attempting to avoid dialetheism by restricting this derivation to a defective theory; in this case, one falls directly into the arms of the semantic dialetheist: if we keep a descriptivist approach to inferential practices involving truth, we seem to be recommended to embrace true contradictions. This would require rejection of one of the basic tenets of the epistemic approach, that contradictions only appear in defective theories, which is quite a problem for the view. In fact,

giving that up, one loses the reason to provide an *epistemic* approach to contradictions.

On the other hand, if one assumes that the Liar is a derivation of a contradiction involving the notion of truth, and somehow argues that a revision of the naive concept is required, then, we have argued, it becomes difficult to motivate the very existence of a paraconsistent logic and a paraconsistent account of contradictions to begin with. In fact, if we allow that some contradictions such as the Liar should be treated in revisionist lights, avoiding the contradiction, one cannot avoid that the same policy be adopted for every other contradiction too. The idea that a sharp line exits between consistent concepts requiring classical logic and inconsistent concepts requiring a paraconsistent logic is lost, and one may argue that every inconsistent concept should be revised, without the need for paraconsistency.

In the end, it seems, the epistemic approach is in a quite curious situation: due to its descriptivism, it cannot appeal to classical or consistent restrictions typically employed to avoid the paradox, and due to its epistemic treatment of contradictions, it cannot also embrace it, as the dialetheist does. The paradox rests in the middle of the way, in a logical limbo, between contradictions dealt with by the concept of evidence, and consistent statements dealt with by a classical notion of truth. There is simply no comfortable place for it in the framework.

If we are to propose a diagnosis for so many difficulties, we would suggest that it comes from internal tensions in the formulation of the epistemic approach. Two basic tensions seem to be accountable for the difficulties.

First of all, the epistemic approach is a mixture of *two incompatible views* of logic: descriptive and revisionist. The idea that classical logic deals with truth brings a revisionist component to the approach, given that classical logic and the classical notion of truth require a revision of naive concepts and restrictions that are set clearly in order to avoid paradoxes [again, one may have good reasons to be revisionist in this sense, see Williamson, 2017; Scharp and Shapiro, 2017]. On the other hand, there is a more descriptivist approach tied to paraconsistency. In fact, typically, paraconsistent logics are motivated by a desire to relax the revisionist character of classical logic, preserving more features of the naive concepts and logical procedures dealt with in common situations involving reasoning. However, as we have argued, there are situations where one cannot have it both ways, such as in the case of the Liar. The

requirements of both kinds of approaches trump each other, generating difficulties for a coherent solution to the Liar. The problem is that the epistemic approach wants it both ways, and the Liar ends up not properly dealt with.

The second one concerns the idea that the epistemic approach is both an attempt to interpret the nature of contradictions (wherever they appear) in terms of evidence, and also an attempt to provide a paraconsistent model of reasoning with evidence (as pointed in [Arenhart, 2021]). The first aspect commits the friend of the epistemic approach with providing an interpretation to every contradiction, the Liar included, in epistemic terms, and then, the troubles we have been discussing will immediately appear, leaving this interpretation with significant problems, and no clear advantage over semantic dialetheism. This line of understanding the meaning of the epistemic approach seems to be very much in line with the idea that the epistemic approach is a rival to dialetheism in the understanding of paraconsistency. An alternative reading of the epistemic approach consists in seeing it as providing paraconsistent treatments of reasoning with evidence, without having to explain the meaning of contradictions in every context. On this second line, it seems, the contradiction of the Liar will not have to be accounted for, given that it is not naturally framed in terms of evidence. By following this line, the friend of the epistemic approach is understood as only attempting to provide a paraconsistent description of reasoning in contexts involving evidence. *The price to pay is that it is no longer an interpretation of contradictions and paraconsistency, being no longer an alternative to dialetheism (robbing it of one of its main raisons d'être)*: it becomes, rather, the more pedestrian fact that paraconsistency may be applied to model reasoning in some circumstances. Certainly, this would take much of the initial motivation for advancing an epistemic interpretation, and it is not clear that the friends of the epistemic approach would happily take it (besides, it generates further difficulties of its own, as discussed in [Arenhart, 2021]). Anyway, our suggestion is that a clearer picture of the major aims of the epistemic approach itself would lead to a better understanding of the obstacles that it will have to face.

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