South American Journal of Logic
Vol. 3, n. 1, pp. 87–109, 2017
ISSN: 2446-6719

Is Dialetheism Self-Coherent?

Jonas R. Becker Arenhart and Ederson Safra Melo

> In a sense, therefore my position is quite self-consistent, though this is hardly a happy way of expressing the matter! So let us say that it is self-coherent.
>
> G. Priest, *In Contradiction*, p. 72.

Abstract

Dialetheism is the view according to which some contradictions are true. The main motivation for such a view comes from the well-known Liar paradox. The dialetheist simply takes the Liar argument as legitimate; by embracing a true contradiction as acceptable, the problem is thought to be "solved". We shall argue that there are difficulties in explaining what dialetheism really amounts to. The first main obstacle comes from the fact that there are distinct versions of the Liar. According to the dialetheist, they do not mean the same thing, and as we shall argue, there is no unified dialetheist treatment for them. The second main problem comes from the very idea of true contradictions and truth value gluts. There are two distinct possible understanding for those concepts, and they do point to conflicting understandings of dialetheism. It is not even clear how to conciliate the dialetheists' guiding intuitions with those problems, so that after all, it seems that dialetheism may end up being incoherent.

Keywords: dialetheism, contradiction, Liar paradox, truth-value gluts.

1 Introduction

Dialetheism may be characterized as the thesis according to which some contradictions are true, that is, some pairs of sentences of the form α and $\neg\alpha$ are both true, where "$\neg$" is the negation sign; these true contradictions are called

dialetheias. Graham Priest is the champion of dialetheism, and in this paper we shall focus on his version of dialetheism, although the view is currently espoused by others as well, with varying degrees of involvement (see Beall [2] for an overview; Priest [9] for the classical statement and defense of the view). With the previous characterization of contradictions and dialetheism, it is said, some sentences (the dialetheias) are both true and false; that is, they incarnate truth value gluts. So, the notions of contradiction, dialetheias, and gluts are closely related according to the dialetheist.

Priest advances those concepts in numerous places. For instance:

> Dialetheism is the view that some contradictions are true: there are sentences (statements, propositions, or whatever one takes truth-bearers to be), α, such that both α and $\neg\alpha$ are true, that is, such that α is both true and false (Priest [10, p.1]).

The relation of dialetheism with contradictions should be clear from that quote (see also the opening paragraph in Priest and Berto [11]). To bring gluts to the center of the stage too, Priest says his position is one

> (...) according to which paradoxical sentences are both true and false — as it is sometimes put, they are semantic gluts (dialetheias). (Priest [7, p.57])

Those definitions or clarifications appear in practically every reference about dialetheism. In order to summarize the main ideas and for future reference, we shall adopt the following as our official definitions of those terms:

Contradictories: a pair of sentences of the form α and $\neg\alpha$, where "$\neg$" is the negation sign (obviously, there is dispute on what negation is and how does it behave; we shall not discuss it here, but rather assume that negation behaves as the dialetheists seem to agree).

Contradiction: the conjunction of contradictories, that is, a sentence of the form $\alpha \wedge \neg\alpha$.[1]

Dialetheia: a true contradiction, that is, a sentence $\alpha \wedge \neg\alpha$ such that both α and $\neg\alpha$ are true (notice that ideally not every contradiction is true, so, not every contradiction is a dialetheia; more on this later).

Truth value glut: a truth value; when a sentence α receives a glut as its truth values, that means that α is both true and false.

[1] Given that conjunction behaves as expected, we may go from a contradiction to a pair of contradictories by separating them, and from contradictories to a contradiction by introducing the conjunction.

Notice that while the definition of contradiction is framed in terms of the syntax of a language (it requires only that a certain formula has a certain form) and depends on the notion of negation, the definition of a dialetheia introduces a semantic component (its truth value), while the definition of gluts is clearly framed in semantic terms, and in fact, seems to be independent of negation (more on this later). The typical dialetheist (mainly Priest, but others as well) conflates the three concepts; they are all required for a typical dialetheist account of true contradictions. The focus of this paper will be to explore the relations between those concepts and challenge their coherence when employed together.

To develop this discussion, it is fundamental that we consider what is usually taken as the "most striking" reason for dialetheism: the Liar paradox. In fact, one of the most telling reasons for one to become a dialetheist comes from the desire to give a definitive answer to the Liar. According to Priest, semantic paradoxes, such as the Liar, show the existence of dialetheias (for instance, see Priest, [9, p.9], [10, p.83]). The basic idea is that the Liar should cause us no special trouble; it is as good a derivation as any other, being valid and sound. The premises are all seemingly true and for the dialetheist, the conclusion (a contradiction) is just as true as a dialetheia must be. Dialetheism, then, accounts for a phenomenon of natural language (the derivation of the Liar) without the need of artificial restrictions on natural language, such as Tarski's hierarchies of languages.[2]

But how good is that argument leading from the Liar to dialetheism? Notice that, as we have briefly characterized them, the concepts of true contradiction and gluts are clearly intertwined. In fact, both concepts are taken almost as synonymous in current discussions. The Liar is evidence for both dialetheias and for gluts, there is no need to distinguish them, it seems. According to Priest [9, Chap.4], dialetheism is not a consistent account of the paradoxes, due to its embrace of true contradictions, but it is a coherent view, where the concepts of gluts and true contradictions are put to work in order to free us from the fear of contradictions.[3]

It is our main goal in this paper to disentangle those concepts and call into question the coherence of dialetheism. We shall argue that the core concepts are really independent, and that the Liar cannot be taken as evidence for their connection as established above. Furthermore, incoherence threatens dialetheism once those concepts are examined more closely. The main result of such a

[2] As Priest has put it, what is at issue with the Liar and related paradoxes is the consistency of the familiar informal concepts (like the concept of truth in natural language); the feasibility of consistent formal theories is not at issue (see Priest [9, Chap.1]).

[3] For further references on the expected coherence concerning dialetheism, see also Priest [5, p.239], [12, p.501,p.505], [9, p.06].

discussion may be seen as weakening the reasons for one to adopt dialetheism: it is not really a most natural treatment of semantic paradoxes, in particular, not of the Liar paradox. The dialetheist thinks she is able to account for features of natural languages to which other approaches fail to make full justice. When the knot between dialetheias, contradictions, and gluts is untied, things are not so clear; the data furnished by natural languages may not provide any evidence in favor of the particular version of dialetheism most common in the literature. As we shall argue, it may even not be so easy to make it clear what true contradictions amount to.

This paper is structured as follows. In the next section we present the main motivation for dialetheism coming from the Liar paradox. We discuss the idea that the Liar presents us with true contradictions and challenge the ability of dialetheism to deal with one version of the Liar, the extended Liar. Then, in section 3 we discuss gluts. There are two main ideas around gluts: the informal one, presented as the conclusion of the Liar, and the logical one, a third truth value operating as a single *sui generis* truth-value. Those two ideas point to different intuitions about how gluts behave. As we shall see, both accounts of gluts cause trouble for the desiderata of any dialetheist answer to the Liar. Those two sections put some pressure on the coherence of dialetheism. We continue in section 4 with an argument to the effect that even the dialetheist must admit that the paradox of the Liar ends up with a contradiction which is indeed a false conclusion. So, the dialetheist treatment does not work and the paradox is still a problem, even for the dialetheist. We conclude in section 5.

2 Where does the Liar lead us to?

What does dialetheism, as previously characterized, imply and how is it motivated? To answer those questions, we may attain ourselves to the main motivation for dialetheism, the Liar paradox, and Priest's answer to it. It could be said that the answer amounts to stating the Liar and then simply taking the conclusion as it is: from a sound argument we reach the fact that yes, there are true contradictions (see also Priest ([12], [9], [10], [11]). We are going to consider two versions of this paradox: the "simple" (or "ordinary") Liar and the "extended" (or "strengthened") Liar; we shall argue that it is not that simple to accept the conclusion of those arguments as dialetheias. What those paradoxes tell us may cause trouble for the dialetheists' account of semantic paradoxes.

Intuitively, all that is required to derive the Liar are some simple resources: basic logic and a truth predicate T in the object language satisfying the T-schema for every sentence of the language.

Let us start with the *simple Liar*, a sentence L that, intuitively, *says of itself that it is false*:

$$L \leftrightarrow F(\ulcorner L \urcorner)$$

Here the angle brackets are a name-forming device and 'F' is the falsity predicate understood in the usual way: 'false' (*i.e.* $F(\ulcorner L \urcorner)$) means 'has a true negation' (*i.e.* $T(\ulcorner \neg L \urcorner)$. Assuming the instance of the T-schema applied to L, $(T(\ulcorner L \urcorner) \leftrightarrow L)$, with '$T$' being the truth predicate, we have the following: $T(\ulcorner L \urcorner) \leftrightarrow F(\ulcorner L \urcorner)$. From this, ultimately, we have as a conclusion that $T(\ulcorner L \urcorner) \wedge F(\ulcorner L \urcorner)$. That is, the Liar sentence L is *both true and false*.

The reasoning process (the definition of falsehood, the T-schema, etc.) is dialetheically acceptable and, of course, the conclusion (the dialetheia), is acceptable for dialetheists as well. So, according to dialetheists, this argument shows the existence of dialetheias.

However, that is not the only form of the Liar that Priest calls forth in order to support his view. According to Priest and other dialetheists, every consistent attempt to treat the semantic paradoxes leads to extended Liar paradoxes (see, for instance, [6, p.158], [9, chap.1]; [12, pp.508–510]; [11, sec.5.1] and the references therein). For instance, in considering the gap approach — the view proposing that the Liar sentence L is neither true nor false —, Priest calls upon the extend Liar: a sentence L that, intuitively, *says of itself that it is not true*:

$$L \leftrightarrow \neg T(\ulcorner L \urcorner)$$

By reasoning similar to the one in the simple Liar, in this case, we have as conclusion that $T(\ulcorner L \urcorner) \wedge \neg T(\ulcorner L \urcorner)$. That is, the extended Liar sentence L is *both true and not true*.

But why are we insisting in these two versions of the Liar? The conclusion in each case isn't bad enough for the classical logician? And isn't it all the same for the dialetheist? In fact, for the classical logician the conclusions of both arguments are equally bad, they are equally false (we shall return to this point later), so she must avoid accepting the conclusion of the argument. However, for the dialetheist both arguments are not equally good; or, at least, it is not so obvious that they exhibit the same kind of problem. According to Priest's own standards, the paradoxes are different. Let us check.

Both arguments would show the same thing if the equivalence between $T(\ulcorner \neg L \urcorner)$ and $\neg T(\ulcorner L \urcorner)$ were established, as it is the case in classical logic. Then, even their definitions would be equivalent. Priest ([9, p.70]) separates the equivalence into two implications:

Exhaustion: $\neg T(\ulcorner L \urcorner) \rightarrow T(\ulcorner \neg L \urcorner)$

Exclusion: $T(\ulcorner \neg L \urcorner) \rightarrow \neg T(\ulcorner L \urcorner)$

To begin with the first one, *exhaustion* says that if a sentence is not true, then it is false. So, Truth and Falsity exhaust the possibilities of truth values, and as a consequence there are no truth value gaps (*i.e.* sentences neither true nor false). *Exclusion*, on the other hand, says that whenever a sentence is false, then it is not also true. It clearly forbids a sentence from being both true and false, or, in other words, of bearing a glut as its truth value. The gap theorist rejects exhaustion (not being true, a sentence may also not be false), while the glut theorists, like Priest, typically accept exhaustion while rejecting exclusion.

So, with that distinction in hand, and taking Priest's arguments against exclusion (see Priest ([9, chap.4]), we clearly see it that there are two kinds of Liar arguments (we shall return to Priest's arguments against exclusion soon). Priest even goes on to claim that those conclusions of the simple Liar and of the extended Liar have distinct properties. In fact, as a first step, it is possible to show that from the conclusion of the extended Liar $T(\ulcorner L\urcorner) \wedge \neg T(\ulcorner L\urcorner)$, the existential quantifier $\exists x(T(x) \wedge \neg T(x))$ follows. Also, from the law of excluded middle (which is dialetheically acceptable, see Priest [9], [10]) we have $\forall x(T(x) \vee \neg T(x))$, and with the de Morgan law (idem), we derive $\neg\exists x(T(x) \wedge \neg T(x))$. On the other hand, from the simple Liar we can derive $\exists x(T(x) \wedge F(x))$, but its corresponding negation $\neg\exists x(T(x) \wedge F(x))$ cannot be derived without the exclusion principle (see Priest ([9, p.72]). In this sense, the extended Liar is "more contradictory" than the simple Liar (that is Priest's own conclusion).

However, if that difference makes sense and both arguments are taken to be sound in natural language, then there is clearly a gap in the dialetheists' story about the Liar. To begin with the conclusion of the extended Liar, *viz.* $T(\ulcorner L\urcorner) \wedge \neg T(\ulcorner L\urcorner)$, it is clear that such a sentence is not itself saying that L is a glut. Indeed, it is a conjunction of a sentence true and not true, which implies that L is a glut (due to exhaustion), but given the above considerations banning exclusion, the conjunction of a sentence true and false (a glut case) does not imply a conjunction of a sentence true and not true. Thus, the conclusion of the extended Liar is not a glut.[4] Let us put it another way: after deriving the sentence $T(\ulcorner L\urcorner) \wedge \neg T(\ulcorner L\urcorner)$ as the conclusion of the extended Liar, what we have as the last step in the derivation is *not* that L is true and false; rather, L is *true and not true*. It clearly has the form required to be a contradiction, but *not* the form of a glut (true and false). That is, the situation in the extended Liar may be depicted as follows:

1. $L \leftrightarrow \neg T(\ulcorner L\urcorner)$	Extended Liar sentence
$\vdots$	$\vdots$ (Standard derivation)
n. $T(\ulcorner L\urcorner) \wedge \neg T(\ulcorner L\urcorner)$	Conclusion

[4] Besides, as we shall argue in section 3, to consider the extended Liar as a glut will have some consequences for the understanding of a glut that are not so good for dialetheism.

In order to obtain that L is true and false more steps are required in the derivation, using exhaustion. So, the derivation would be some lines longer:

1. $L \leftrightarrow \neg T(\ulcorner L \urcorner)$	Extended Liar sentence
$\vdots$	$\vdots$ (Standard derivation)
n. $T(\ulcorner L \urcorner) \wedge \neg T(\ulcorner L \urcorner)$	Original conclusion
$n+1$. $T(\ulcorner L \urcorner)$	From n
$n+2$. $\neg T(\ulcorner L \urcorner)$	From n
$n+3$. $T(\ulcorner \neg L \urcorner)$	Exhaustion in $n+2$
$n+4$. $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$	From $n+1$ and $n+3$

However, adding those further steps in the standard derivation of the extended Liar won't help: the original true and not-true sentence remains there (in the n-th step in the above sketch of a derivation). As far as we know, the dialetheists rejecting exclusion have not yet established the truth value of a conjunction between true and not-true sentences. So, there is a sentence in the derivation bearing a mysterious truth value. In the case of glutty sentences, we at least think of the sentence as being true. In the case of the conclusion of the extended Liar, there is no clear truth value to be attributed. But then, how can we even say that the derivation is sound?

Given that, our first point concerning the different versions of the paradox is that there are contradictions that are not gluts; the conclusion of extended Liar is an example. This is evidence to the fact that the syntactical characterization of contradiction may be satisfied by a formula, while that formula is not clearly a glut. In this case, contradictions and gluts do not always come together. We knew that already, for ideally not every contradiction is a dialetheia (so not every contradiction is also a glut), but in this case there is much more involved: there is a contradiction that *prima facie* cannot be dealt with dialetheically, given that the acceptable contradictions should all be gluts. Our argument in what follows is that while dialetheists have a story to tell about how to deal with the simple Liar, they have not provided such a story as to how to tame the conclusion of the extended Liar (at least not when exclusion is absent). Furthermore, given that the extended version is not equivalent to the simple one (as Priest himself has argued), we cannot simply adopt the treatment given to the simple Liar and use it to deal with the extended Liar; the cases are different. So, the fact that one of the conclusions of one of the paradoxes entails a sentence that is just like the conclusion of the other should not confuse us into thinking that the solution to them is the same. There seems to be two options for the dialetheist. Let us see.

The first one consists in denying that the conclusion of the extended Liar is acceptable. That is, we should discriminate between the versions of the paradox and deem the extended version as somehow unacceptable mainly due

to the truth value "untrue" that infiltrates through it. Obviously, that poses an undesirable asymmetry with the treatment of the simple Liar, leaving the dialetheist with no answer to an important semantical paradox, and the move is clearly unmotivated for a dialetheist. So, this is a non-starter.

The second option consists in assuming that this contradiction is indeed acceptable. This choice will have a consequence of utmost importance that we have already hinted at: the typical argument granting that a contradiction does not lead to triviality will not work for the conclusion of the extended Liar (that is, that the so-called explosion law does not obtain). In fact, the usual trick for banning explosion consists in attributing to the premises the glut truth-value and taking the conclusion to be simply false. By the dialetheist's account of validity, this move cannot be performed in this case. Here, taking the conclusion of the extended Liar as the premises of an argument to triviality, we have that they are simply not a glut, so, we cannot reproduce the typical counter-example of glutty premisses and false conclusion, and the dialetheist owes us an explanation on how an inference to triviality (explosion) is blocked. In other words: the extended Liar is not really covered by the dialetheists' logic, we don't know what may legitimately be inferred from truth and non-truth, given that there is no such truth-value as non-truth in the usual dialetheists' logic (and given that it is *not* equivalent to false, recall). That is really a problem, because as we have mentioned, the conclusion of the extended Liar is an explicit contradiction. So, there is no explanation of how can we grant that from a contradiction not everything follows, when that contradiction involved the truth predicate in the extended Liar fashion.

That last point is made clearer when we notice that the *Logic of Paradox* (LP), Priest's formalization of those ideas, has simply no space for the kind of contradiction present in the extended Liar (see Priest [5]). Every contradiction allowed in LP is thought of as representing a true contradiction, and, by the dialetheists' lights, also a glut. So, contradictions that are not gluts are either simply false or not represented, and that grants that the usual treatment of explosion in LP will not be available to them. Perhaps another truth-value (not-true or untrue) would be needed, or perhaps, the very idea of contradiction involved and conflated with gluts leads to such equivocation (for more on such distinctions and equivocations, see Béziau [3], Arenhart [1]).

One could try to block this by claiming that there is a treatment available: by pointing to the fact that $T(\ulcorner L \urcorner) \wedge \neg T(\ulcorner L \urcorner)$ implies $T(\ulcorner L \urcorner) \wedge F(\ulcorner L \urcorner)$, we could try to grant that a contradiction implies a glut, and a glut is able to prevent explosion. That is, the extended Liar is a case of the simple Liar. However, that begs the question against our point. We claim that a contradiction that is not a glut is simply not touched by the logic of the dialetheist, so, it may lead to triviality and imply everything. The fact that it implies a glut is just

irrelevant in this case.

Perhaps we can make our point even clearer if we state the problem with the extended Liar taking into account the role of negation. Consider that a sentence is not-true precisely when it fails to be true. This is a truism, but when we plug it in the dialetheist picture of truth-values, the result is interesting. It seems that Priest expects that a genuine negation[5] acts just like that. As Priest [10, p.79] puts it: "[a] genuine contradictory-forming operator will be one that when applied to a sentence, α, covers all the cases in which α is not true". On the other way around, it seems, $\neg\alpha$ is false when negation covers all the cases in which α is true. Now, a sentence can be true, according to dialetheists, in two distinct fashions: it may be simply true, or true and false (a glut). If negation is to behave properly, as recommended by Priest, a sentence that is not-true fails to be 'true' in any of the senses mentioned. It is just false, simply false. Put in terms of the three-valued logic LP, where 1 is true, 0 is false and i is glut, any sentence that is true have as its truth value either 1 or i; negating such a sentence with a genuine negation should then lead us to 0.[6] In this sense, if the negation behaves properly, the conclusion of the extended Liar is a conjunction between a sentence that receives 1 or i and a sentence that receives 0. That is not the scenario presented by dialetheists where explosion fails; rather, that is the kind of situation that leads to explosion in classical logic. The dialetheist just has no treatment for that kind of situation.

So, the conclusion of our first argument is clear: when the extended Liar is taken into account, the link between contradictions, gluts, and dialetheias breaks down, and the dialetheist seems to have no clear answer to the problem. While in the extended derivation sketched above, the sentence L of the extended Liar ends up being true and false, the derivation itself elicits a conjunction between truth and non-truth, whose status is not covered by the dialetheist. Our diagnosis is that such a situation comes from a unwarranted association between the three core concepts of dialetheism. The conclusion of the extended Liar is a contradiction, but it is not true, and it is not a glut. Contradictions and gluts do not match in the desired way. As we mentioned, the coherence of the dialetheist treatment to the paradoxes is questioned.

Notice that the dialetheist could take a further step and claim that, however that story is told, we indeed have a dialetheia: given that the extended Liar is (to the dialetheists' mind) a sound argument, the conclusion must be true. So,

[5] According to Priest [10, chap.4], any account of negation that is worth its name must grant that negation is a contradictory-forming operator to begin with. The understanding of contradiction that is at stake here is the traditional one, from the square of opposition, which we shall examine soon: α and β are contradictories when at least one of them is true, but not both.

[6] Of course, negation in LP does *not* do that: it takes i back to i; that is one of the reasons some have claimed that Priest's negation is not a genuine contradictory-forming operator.

we have a true contradiction (a dialetheia). That is, the idea is that both $T(\ulcorner L \urcorner)$ and $\neg T(\ulcorner L \urcorner)$ are true. This shows however that dialetheias appear in this case only after the application of the truth predicate to the whole conclusion of the extended Liar; in the case of the conclusion of the paradox, it is not to the extended Liar sentence L directly that ends up being a true contradiction, but rather the claim that L is true and not true (the conclusion of the argument) that forms a true contradiction. That is, L is not itself a dialetheia, because the contradiction appears only when the truth predicate is already involved and negation applies externally to the truth predicate. In this case, the dialetheia must involve the sentences $T(\ulcorner L \urcorner)$ and $\neg T(\ulcorner L \urcorner)$, which are both deemed to be true, not L directly. The original sentence of the extended Liar, then, is not a dialetheia, contrary to what the dialetheist claims. So the extended Liar sentence L is itself not a dialetheia and we are left with no account of its status. So, this is not a good move.

That last worry brings us back to the simple Liar. Given that the extended Liar presents us with a case of a contradiction that is not a dialetheia, perhaps there are some surprises in the simple Liar too? Indeed there are. Consider the conclusion of the simple Liar: $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$. This is usually claimed to be a dialetheia, a true contradiction. However, on what concerns contradiction, the conclusion fails to have the appropriate syntactical form! It really does not have the form of a contradiction, given that the negation operator is inside the truth operator (it is an "internal contradiction", as Priest calls it [9, chap.4]). This conclusion is, at best, a statement to the fact that L is a glut, but not a contradiction. So, as we shall explore further latter (see the next two sections), gluts do not need to come as contradictions! Without the exclusion principle we cannot go from gluts to a statement in the form of a contradiction, strictly speaking.

Of course, one may use the properties of conjunction, the definition of falsity mentioned before, and the T-schema, to go from $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$ to a contradiction. In fact, from that conjunction we have $L \wedge \neg L$, which satisfies the requirements laid before to be a contradiction. That means that the simple Liar implies a formula that is a contradiction. But notice that it is not equivalent to a contradiction (that is, it does not mean the same as a contradiction, in any reasonable sense of 'meaning the same'). In fact, we cannot go from $L \wedge \neg L$ to $T(\ulcorner L \urcorner) \wedge \neg T(\ulcorner L \urcorner)$ without exclusion. In other words, there is no homophonic translation for the formula without truth predicate to a formula with truth predicate. We cannot insert truth predicates in a contradiction and end up with another contradiction. So, external contradictions do not mean the same as gluts: one cannot slide between them through a chain of equivalences. That is enough, it seems to us, to grant that the notion of an external contradiction and gluts are not the same. The simple Liar (a glut) may imply

a contradiction, but one cannot go from a contradiction to a glut.

Of course, we could define a pair of contradictories in semantic terms, but that definition is such that it does not work to the benefit of the dialetheist: traditionally, a pair of sentences α and β are contradictory (in semantic terms) if and only if they cannot both be true, and they cannot both be false. That is, they each have one of the two truth values, and only one (Priest also recognizes that definition as intuitively correct in Priest [10, p.78]). The semantic definition would forbid gluts, and would be inadequate for the dialetheist (see also [3], [1]). Of course, the dialetheist may change the classical terminology to make her case, but then the dispute with classical logicians will be merely a terminological dispute, something even dialetheists wish to deny.

To keep with the semantic definition of contradictories, Priest typically believes that one may have a negation sign $\neg$ representing a contradiction-forming operator (so that α and $\neg\alpha$ are contradictories in the above semantic sense) and also that one may have true contradictions (so that α and $\neg\alpha$ may both be true; see Priest [10, chap.4]). However, this move simply illustrates the typical ambiguity in dialetheism that we are bringing to light here. If α and $\neg\alpha$ are to be contradictories in the semantic sense, then, at least one of them must be true, but not both. Priest argues that we may have true contradictions (now contradictions are understood as a pair of formulas α and $\neg\alpha$, in the sense of a pair of formulas of a given syntactical form) if we allow that some sentences may be true and false, *i.e.*, gluts. Of course, if α is a glut, by definition of glut and of falsity, we have that α is true and $\neg\alpha$ is also true. But this simply violates the requirement of the *semantic* notion of contradiction: that we have one of them, but not both. Gluts are clearly forbidden by that definition. Priest introduces the semantic definition of contradiction, but then, when it comes to defend that some contradictions may be true, it is the syntactical notion that does the job. The semantic definition, as we have claimed, is violated. So, a semantic definition of contradiction, the one authorized even by Priest, is incompatible with gluts and dialetheias.

So, overall, the Liar does not seem to corroborate the story told by the dialetheist. Either it poses us a contradiction, but neither dialetheia nor glut, or else it advances a dialetheia, but the lack of the exclusion principle prevents it from being a contradiction. Recall also that in the first case there is no properly paraconsistent treatment for a contradiction: not being a glut, we have no explanation of how a contradiction does not lead us to triviality. In fact, recall that the problem is the presence of a conjunction between true and not-true, which is left unexplained by the dialetheists' canon.

3 Understanding gluts

Perhaps some of the previous difficulties could be solved by adopting the exclusion principle. In that case, we would have the equivalence between $T(\ulcorner\neg L\urcorner)$ and $\neg T(\ulcorner L\urcorner)$. Why exactly doesn't Priest adopt exclusion? Easy: recall that intuitively, exclusion prevents the possibility of gluts. However, as we argued in the previous section, the conclusion of the extended Liar is not a glut, but it is a contradiction. So, in the case of the extended Liar, there would not be a problem, adopting exclusion would rule out something we already do not have. But let us not go so fast.

The main arguments against exclusion are simple (Priest [9, chap.4]): 1) there are no good reasons to adopt it; 2) exclusion would spread inconsistencies, that is, any statement of the form $T(\ulcorner\alpha\urcorner) \wedge T(\ulcorner\neg\alpha\urcorner)$ also becomes a contradiction of the form $T(\ulcorner\alpha\urcorner) \wedge \neg T(\ulcorner\alpha\urcorner)$. That is, any *internal contradiction* would be also an *external contradiction*, thus multiplying contradictions beyond necessity.

Now, leaving aside the fact that it is strange to have two distinct kinds of contradictions, internal and external (see also [1]), the second point is going to be crucial here. For the sake of argument, let us concede that internal contradictions are really contradictions just as external contradictions (recall that what Priest calls internal contradictions do not have the syntactical form of a contradiction). Priest wishes to keep dialetheias to a minimum. It is not the case that every contradiction that one faces should be accepted and taken as true. Dialetheias are supposed to be rare, even for a dialetheist (unless one is also a trivialist; see [4] for further discussion). That principle is backed by two kinds of claims. The first claim concerns economy, and appears in the form of *Priest's razor* [9, p.116]: do not multiply contradictions beyond necessity. Exclusion makes an internal contradiction into an external contradiction, so contradictions spread without necessity. The second reason concerns the very usefulness of contradictions: whenever there is an explanation for a phenomenon that does not require the postulation of a true contradiction, then, other considerations being equal, we should prefer the consistent explanation (see [8]). According to Priest, Liar paradoxes are cases that cannot be adequately treated by consistent theories, so this is a case in which adoption of true contradictions is justified.

Then, the reason to avoid exclusion is related to the command to keep dialetheias to a minimum. However, the conflation between dialetheias and gluts makes that kind of control impossible. Indeed, let us assume that we have a dialetheia, perhaps the simple Liar sentence L. Then, by definition, $T(\ulcorner L\urcorner)$ and $F(\ulcorner L\urcorner)$. Can we confine gluts only to that one sentence? Not according to the behavior of gluts in the logic LP! Let us check.

Let us take L as our glut. What could we say about $\neg L$? Well, according

to the behavior of negation in LP, the negation of a glut is always a glut too. So, gluts always come in pairs. That is not all, however. The conjunction of a glut, like the simple Liar L, with any true sentence S, like "snow is white", is always a glut too, so that "$S \wedge L$" is another glut, just as "$S \wedge \neg L$". The negations of those kinds of sentences, as we mentioned, are also gluts. That already accounts for quite a lot of gluts, when the processes are further iterated. But there is more. The disjunction of a glut with any false sentence G, like "snow is green", is a glut too; that is, "$L \vee G$" is a glut, just as "$\neg L \vee G$". Their negations are gluts too, and so on. So, gluts multiply very fast; one cannot keep control over the infestation: feed the logic LP with a single glut and you shall easily go much beyond necessity.

So, if gluts are identified with true contradictions (and we are supposing this, for the sake of argument), there will be many true contradictions, much more than a modest dialetheist would like to admit. Given one single sentence that has a glut as a truth value (and the dialetheist admits that the simple Liar is one such), practically every true and every false sentence will get involved in a composed sentence that is also attributed a glut truth value. That clearly attests against the idea that dialetheias are rare and should not be multiplied, bringing dialetheism closer to a trivial position.

We do not impute a version of trivial dialetheism to Priest and other dialetheists.[7] They may clearly hold that sentences such as "snow is white" and "2 + 2 = 4" are just true (although they will have trouble to express it), and others such as "Snow is red" are only false (idem). Our claim is simpler: given a single glut, it is virtually impossible to avoid a demographic explosion in the population of gluts if LP is admitted as the underlying logic. So while that is not quite a trivial dialetheism, it is close enough to cause trouble to Priest's razor: dialetheias are indeed abundant. And, given our assumption that dialetheias are true contradictions, there are just as much true contradictions as there are formulas.

Notice that much the same happens in classical logic. Given a true formula, one can produce lots of other true formulas by employing the connectives. So, is there a special problem for gluts? Of course! When we identify gluts with true contradictions, true contradictions will multiply beyond necessity. Truths may multiply; we usually think it a nice fact that we can get further truths from one truth. However, contradictions should not multiply; they should be the exception, even in the dialetheist framework; alas, they are not. There is a

[7] Béziau [4] argues that Priest and defenders of LP cannot avoid trivial dialetheism. Given that in LP it is possible for every formula to be a glut, he argues, then every formula is indeed a glut. By the identification of gluts and contradictions, trivialism results. We do not go so far, although we think our argument forces the dialetheist to recognize much more gluts than she expected (which is already bad enough).

big difference in truths multiplying themselves and contradictions multiplying themselves. There is no special reason to believe in the truth of those contradictions obtained before; they seem to be an artifact of the underlying logic, not in tune with Priest's razor.

The previous argument against the rarity of dialetheias is based in the treatment given by LP to gluts. It still opens the door to a wider problem on the relation between gluts and dialetheias. Considering again the simple Liar paradox, L is a glut and, according to Priest, a dialetheia, given that $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$. However, from the point of view of the logic LP, to be a glut is simply to have a definite truth value, which is both T and F. There is no need to call for negation here. The typical valuation in LP goes from propositions to the sets of truth values $\{\{T\}, \{F\}, \{T, F\}\}$. In this sense, a sentence may be a glut *simpliciter*: it received the third value.

What is so bad about that account is that the idea of a sentence receiving a glut as its truth value is independent from negation. Even if a language had no negation sign, sentences in that very language would still be able to be gluts. That is, in a negation-free fragment of the language of LP we would be able to produce gluts that need not be dialetheias. Accepting gluts is distinct from accepting true contradictions. Gluts would still multiply themselves, but there would be no contradiction in the syntactical sense, as defined in the beginning of the paper. That points to the fact that there is something missing in the dialetheists' story, the connection between central concepts is not as obvious as it is taken to be.

However, the above argument could go on even in a language having a negation sign. As the examples above involving conjunction and disjunction show, notice, that *very few of those sentences representing gluts have the form of a contradiction.* The problem comes again from the identification made by the dialetheist between gluts and true contradictions. Given one glut, according to LP, not every molecular formula that is a glut will be a contradiction! So, the identification of gluts and true contradictions fails in these cases too, at least so far as the official definition of contradiction and dialetheias goes. One may have gluts without true contradictions, at least according to LP. Perhaps one could avoid the charge of incoherence here by distinguishing gluts from dialetheias, but then a dialetheically acceptable independent motivation for such a distinction will have to be provided, and much of what has already been said by dialetheists will have to be revised. However, nothing that dialetheists have written so far indicates they are considering those concepts as separable, so, once again, the doctrine seems to lack in coherence, given that unwarranted identifications have been made.

The dialetheist may protest in this point: the proper understanding of falsity requires negation and a truth predicate. So, even if from the logical point of

view it does make sense to separate gluts from dialetheias, from an intuitive point of view it does not. There is an explanatory role to be played by negation in defining falsity.

To appreciate the point of such a remark, let us distinguish two accounts of gluts. According to the informal intuitive account of gluts, gluts are dependent of negation, they are, in a sense, "detachable" in two components: the true and the false. In this case, for a sentence α to be a glut it must be the case that $T(\ulcorner\alpha\urcorner) \wedge T(\ulcorner\neg\alpha\urcorner)$. The simple Liar, it is said, is one such glut. Alternatively, according to the second account of gluts, the one we find in LP, they are "undetachable", attributed at once as a single entity, as it were, to a proposition. In this case, for a sentence α to be a glut is to be valued both truth values at once. So, if α is a glut, $v(\alpha) = \{T, F\}$.

It is the second, undetachable account that leads to the separation of gluts from true contradictions and the like. It is also the second that leads us directly to the multiplication of gluts (which, as we mentioned, needs not be also a multiplication of dialetheias). So, if the dialetheist complains that the detachable, informal sense of glut is to be preferred, while the undetachable sense is to be abandoned, the problem arises that the Logic of Paradox does not represent the intuitions behind gluts. So, there is a lack of harmony in the account, to say the least, and we may really go on and say that the detachable and undetachable accounts of gluts are different.

What is really troubling about that distinction is that one of the desiderata for a dialetheist theory of language and truth is that it somehow works as a model of natural language [9, pp.73–74], gluts and dialetheias included. There are some features of natural language that the dialetheists' logic should model. Given the above claims that the account of gluts encapsulated by LP fails in capturing some of the features of gluts in natural language (as the next arguments also attempt to establish), then the main reason for furnishing such a logic vanish. That is, formal and informal accounts of gluts are out of tune.

Let us check what the detachable account of gluts tells us about the behavior of gluts. As we shall see, that account of gluts leads us to another problem for dialetheism on what concerns the operation of connectives over gluts and, again, calls into doubt the coherence of the position. Let us begin with the operation of negation and negating a glut. What do we expect when we negate a glut? More elementarily put: when we negate a true proposition, we usually understand it as having the opposite truth value, false. That kind of intuition the dialetheist wishes to maintain, as when Priest [9, p.64] says that "[n]egation is that sentential function which turns a true sentence into a false one, and vice versa" (see also [10, chap.4]). However, this intuition is not applied to the negation of a glut: when we say that a sentence is not a glut, what do we expect? That it is not both true and false! The logic LP presents us with a

different picture, as we already mentioned. If we say that a glutty sentence is not the case, what we said is itself a glut. There are two conflicting intuitions running behind the scenes here.

The undetachable account of gluts seems responsible for the truth table of LP: when we negate a sentence whose value is $\{T, F\}$, the idea seems to be that negation operates over each of the values separately, and the resulting value is $\{F, T\}$, that is, the same set as before. So, negate a glut and you have a glut. But, as we mentioned before, the intuition over gluts and negation seems to point somewhere else. Let us go into a few more details.

Keeping with the intuitive explanation of a glut in terms of negation and truth, let us see how our intuitions about negation should be vindicated, against what the dialetheist herself says (and against the undetachable account of gluts incorporated in LP). Suppose we have the glutty sentence $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$ of the simple Liar. If this is a dialetheia, by definition this is a true statement, a conjunction of two true statements (let us assume it for the moment, but see below). This may be seen when we notice that the conjunction is equivalent to $T(\ulcorner L \wedge \neg L \urcorner)$. This is a true contradiction. Negating it, we have $\neg T(\ulcorner L \wedge \neg L \urcorner)$. If the original sentence was simply true — as we are assuming for the sake of argument — its negation is simply false (the dialetheist would concede it, see [10, chap.4]). By the truth conditions of the conjunction, the conjunction in case is false when one among $T(\ulcorner L \urcorner)$ and $T(\ulcorner \neg L \urcorner)$ is false, that is, when L is not true or not false. So, one of the truth values must fail for L. That is, negating a glut may not end up in another glut.

The issue seems to be clearer in the form of a dialogue:

Dialetheist: What I am saying now is both true and false!

Monaletheist: No, not both.

In this case, the behavior of the negation over a glut gives us something that clearly is not a glut. The problem seems to come from an oscillation between the two distinct treatments of gluts, the detachable and the undetachable, of course. They point to distinct directions. In the detachable case, we operate with other connectives, mainly conjunction and negation, and their workings seem to preclude the behavior of the connectives in LP when they deal with glutty sentences. In particular, if we accept that the negation of a glut leads to falsity, as the above discussion suggests, the dialetheist loses the paraconsistent character of the negation, which is essential to control explosion in the face of contradictions. However, that seems to be closer to the facts (recall, once again, that one of Priest's goal is to keep close to the data furnished by natural languages; we think the above dialogue close enough to what is expected from most people that have not read about dialetheism).

If one is not convinced of the double standard that is operating here, consider again the simple Liar. According to Priest, its defining sentence L is a glut. In LP, one may always negate a glut, and the result is a glut. However, recall our discussion in section 2 on the extended and the simple Liar. The main feature of the conclusion of the simple Liar, according to Priest, is that we cannot legitimately have its negation! Why not? Because, being a conjunction of two true statements (at least the dialetheist assumes that), its negation would be false, we presume. So, there is a difference between the treatment of gluts in the formal logic LP and in the informal paradigmatic proof for the existence of gluts, the simple Liar.

The detachable character of gluts generates other discrepancies with conjunction and disjunction as well. Consider again our simple Liar L as a glut. Taking explicitly the definition of glut as a conjunction, $(T(\ulcorner L\urcorner) \wedge T(\ulcorner \neg L\urcorner))$, what we have is a conjunction between a true and a false sentence. According to the truth tables for conjunction in LP (which happens to be the same as in classical logic in this case), the result should be false. So, considering the detachable definition of glut, the glut sentence of the conclusion of the simple Liar is simply false, as the classical logician would have it. Consider again our true sentence S for "snow is white". If we apply the definition of glut for the conjunction $L \wedge S$, we have $(T(\ulcorner L\urcorner) \wedge T(\ulcorner \neg L\urcorner)) \wedge T(\ulcorner S\urcorner)$, which again is a false sentence, not a glut. That is a result of the falsity of the glut sentence. So, contrarily from what the truth tables of LP say, the conjunction of a glut with any true sentence is not again a glut, but rather a falsity, when seen from this point of view.

Disjunction presents similar difficulties. Let us take into account again our false sentence G for "snow is green". Then, "$L \vee G$", following the definitions, becomes "$(T(\ulcorner L\urcorner) \wedge T(\ulcorner \neg L\urcorner)) \vee F(\ulcorner G\urcorner))$". Distributing over disjunction, we get "$(T(\ulcorner L\urcorner) \vee F(\ulcorner G\urcorner)) \wedge (T(\ulcorner \neg L\urcorner) \vee F(\ulcorner G\urcorner))$". The result is again a false sentence, provided we follow the truth tables of LP when dealing with classical truth values. The explanation is simple: just notice that the second conjunct is in fact a disjunction of two false sentences, $T(\ulcorner \neg L\urcorner)$ (which is by definition $F(\ulcorner L\urcorner)$), and $F(\ulcorner G\urcorner)$. However, as we mentioned before, the disjunction of a glut and a falsity is a glut according to LP, but not according to the calculation when the detachable definition of glut is employed.

The problem comes from an ambiguity between the detachable and the undetachable versions of gluts. In LP the gluts are treated as undetachable, they are attributed *en bloc* to the sentences, independently even of negation. Informally, following the simple Liar, which is the main motivation for dialetheism, gluts are attributed to sentences that come in conjunctions, and treated as detachable. In the first case, L itself receives the glut truth value, in the second case, we are no longer dealing directly with L, but with a compound sentence

that involves L and its truth values.

So, perhaps the conclusion is that a coherent account of the behavior of gluts still challenges the dialetheist. In the language of LP it behaves one way, in the metalanguage, it behaves differently. However, the dialetheist wishes to avoid such a division between levels in language, which she deems artificial (for instance, see [9, chap.1]). What then? How are we supposed to understand gluts? Those are difficult questions, and however we answer them, the behavior of gluts, as we have seen so far, seems far from the desired intuition underlying dialetheism.

4 The falsity of a glut

As we have discussed in the previous section, a sentence expressing a glut, judging from its definition, is always false. The classical logician could, of course, say that she already knew that. The dialetheist, as Priest, could claim that he had anticipated that objection. According to an objection that Priest [9, p.99] deals with, having the belief in glutty contradictions will force us to believe some false propositions, because gluts are false too. So, how damaging is the main objection of the previous section?

Our above objection is much more serious than the one anticipated by Priest. Let us check how Priest deals with the issue. According to Priest, to believe in some true contradictions involves believing that they are true and that they are false. This is evidence that Priest treats gluts as detachable. A part of the glutty sentence is true. Another part of the glutty sentence is false. You believe in each conjunct of a conjunction when you believe in the whole conjunction. So, you believe in some falsities too. But that is not a problem, because belief in a glut is belief in a true proposition as well. Given that according to Priest truth dominates over falsity, whatever that means, then there is no problem in having some false beliefs, provided that they are also true.[8]

Our objection goes straight against such an answer: our argument points to the fact that in the detachable understanding of gluts the conjunction $T(\ulcorner L\urcorner) \wedge T(\ulcorner \neg L\urcorner)$ should be understood as plainly false, as any conjunction of a truth and a falsity would be, no truth included in the truth value of the whole conjunction. It is false, and only false. That is how the conjunction behaves in LP too,

[8] Of course, that claim still does not address the issue of what are we to do with the conclusion of the extended Liar. Priest [8, p.34] suggests that we should not believe in untrue sentences. Recall that the conclusion of the extended Liar is both true and not-true (untrue). That situation contributes to the claim that coherence is lacking in the dialetheist picture. Interesting as it is, however, we shall not discuss the issue of belief in untrue propositions here.

when dealing only with classical truth values. So, according to our reading of the conclusion of the simple Liar, that conclusion of the paradox, taken as a conjunction, is simply false, as a classical contradiction.

Perhaps it could be argued that the above argument shows only that, under the detachable understanding of gluts, there is no merely true predication of something as being a glut. That is, the original sentence $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$ is never only true, but always both true and false, so that the attribution of glut character to L is itself a glutty sentence. There are two problems with that suggestion. The first one is that there will be no true contradiction, but only true and false contradictions. That is clearly against the general tenet of dialetheism, which clearly is defined as stating that some contradictions are true, or at least it seems so. But that is a minor problem, which may be solved by a change in terminology. The second difficulty comes from the fact that the previous suggestion is of no help to the dialetheist: the idea that dialetheias are true and false, as suggested, operates on an equivocation over $T(\ulcorner \neg L \urcorner)$ and $F(\ulcorner L \urcorner)$. When the second conjunct in $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$ is seen as $T(\ulcorner \neg L \urcorner)$, we seem to have a conjunction between two true sentences, and we have truth as a result. When the second conjunct is seen as $F(\ulcorner L \urcorner)$, we have a conjunction between truth and falsehood, resulting in a false sentence. However, that ambiguity is easily solved when we recall the definition of falsehood: we really only have a conjunction between a true and a false sentence, and the result of the conjunction, taking the definition of falsehood seriously then does not oscillate between truth and falsehood, it is only false.[9]

Notice, furthermore, that Priest himself is ambiguous as to how to treat glutty sentences. Sometimes he deals with them as if the two truth values were separable, sometimes, as if they were both together attributed to a sentence, as a unit. The first treatment accounts for the claim that it is legitimate to infer that L is true from $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$, and it is also legitimate to infer that L is false from $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$. Taking that for granted, and contrary to what we have argued before, let us concede that the sentence $T(\ulcorner L \urcorner) \wedge T(\ulcorner \neg L \urcorner)$ is both true and false, and that it lies at the end of the derivation of the simple Liar. The dialetheist stops there and claims that some sentences are both true and false. Our claim is that, under the detachable interpretation of gluts, this

[9] The trouble with truth and falsity appears also when it comes to deal with belief: Priest [8, p.33] suggests that "truth is the aim of cognitive processes", while falsity "has no independent epistemological force". Truth dominates falsity, and there is nothing dangerous in believing some falsities. However, as Priest also recognizes, falsity is the truth of the negation. But then, the question arises: can't negative statements be the aim of cognitive processes? Can't one believe (*i.e.*, have as the aim of a cognitive process) that there is no largest prime number, that Brazil did not win the 2014 FIFA World Cup, and so on? It is not clear to us why such is the case. Those are truths that one may reasonably believe. However, this situation only illustrates the kind of trouble that falsity poses for dialetheists like Priest.

whole sentence is simply false, due to the behavior of negation and conjunction. But more can be offered in terms of evidence for our claim: nothing prevents us from going one step further in the simple Liar and separating the conjunction, obtaining $T(\ulcorner\neg L\urcorner)$ as the conclusion of a one-step longer argument. That is, the conclusion of the simple Liar now one step longer is a false statement, simply false. That is the most dramatic conclusion that the detachable account of gluts affords us.

Again, the classical logician already knew that such a conjunction of truth and falsity yields a falsity. But the dialetheist will have trouble explaining that something she treated as a sound argument now leads, with only one more step, to straight falsity. That is the paradigm of an invalid argument. That is, from the definition of the Liar sentence L and the T-schema, we can derive a falsity, a pure falsity. In model theoretic terms, we have as premises $\{\ L \leftrightarrow F(\ulcorner L\urcorner)$, T-schema$\}$, from which it follows $F(\ulcorner L\urcorner)$. If the premises are true, as the dialetheists contend, and the reasoning is sound, but the conclusion is (just) false, as it clearly is, then we are facing an invalid argument, again against the claims of the dialetheists.

How to explain that? The point is that the detachable understanding of a glut, taken as $T(\ulcorner L\urcorner) \wedge T(\ulcorner\neg L\urcorner)$, is a conjunction. The dialetheist accepts the rule of separation, that is, from $\alpha \wedge \beta$ we may validly derive each of the conjuncts. But from the sentence $T(\ulcorner L\urcorner) \wedge T(\ulcorner\neg L\urcorner)$ we may derive $T(\ulcorner\neg L\urcorner)$, that is, $F(\ulcorner L\urcorner)$. So, if the premise had a designated value (glut is a designated value for the dialetheist), the conclusion of a valid inference should also be designated. However, that is clearly not the case! The conclusion is only false. There is only one move to prevent the separation rule from being invalid: assume that the premise is false as well. That is what we have argued before, joining the classical logician. That, however, is not what the dialetheist wishes. In fact, that move would lead to the classical conclusion that the Liar paradox has a false conclusion (contradiction in the classical sense).

Notice that, apart from that problem of going from a glut to a false sentence, there is another main worry: that move is impossible in LP, with the undetachable account of gluts. Assuming that our premises are gluts, we can never validly infer a false sentence! Obviously, with that account, the separation rule is sound in LP. So, Priest's intuitive account of gluts implying falsity as well as truth ([9, p.99]) follows the detachable approach, but it is not reproducible in LP, not as a valid inference, at least.

Obviously, the problem comes again from an incoherent switch between the detachable and undetachable accounts of gluts. When gluts are treated as a unit, as a kind of third truth value so that one cannot separate truth from falsity, then the inference from glut to falsity cannot be made. However, the undetachable account of gluts also prevents Priest's arguments that truth has

some kind of advantage over falsity: there is nothing to separate those truth values in a glut, so it does not make sense to say one of them dominates over the other. In the end, the problem remains: how should we understand gluts in a coherent way?

5 Conclusion

As we have seen, the dialetheist has a hard time making the idea of true contradictions coherent. We have explored some difficult questions posed to the dialetheist, and they all point to the same direction: there is some kind of ambiguity in dialetheism that makes it a hopeless solution to the Liar paradox and even more, that makes it hard for us to understand what is really meant by true contradictions. Let us recall those difficulties, rather briefly.

The first trouble comes with the two versions of the Liar, the simple Liar and the extended Liar. As we have seen, by the dialetheists' own lights those are distinct paradoxes, and while we may say we have a dialetheia in the conclusion of the simple Liar, the same cannot be said about the conclusion of the extended Liar. The last one is clearly a contradiction, but without gluts we have no clear account of how to avoid explosion and consequently, triviality. So, in general, the difficulties come from the main difference between external and internal contradictions. While internal contradictions do provide for gluts and we have a logical treatment for them (*i.e.* they are not explosive), for external contradictions such a treatment is lacking; in fact, even a truth value for an external contradiction is lacking, we simply do not know which truth value we should attribute to it.

The second trouble comes with the very concept of glut and its relation to contradictions and dialetheias. Two treatments for gluts are available, both leading to very distinct results. The undetachable account of gluts deals with sentences having a third truth value, the glut, which means "true and false". That treatment is fine for the logic LP, although it violates other requirements on dialetheias, such as economy and rarity. Also, they lead to counterintuitive results when conjoined by logical connectives with other non-glutty sentences; in particular, we may have glutty sentences that are not contradictions. The detachable account of gluts is closer to the treatment Priest gives to gluts in informal discussions, but it leads to an abandonment of dialetheism: contradictions are always false, due to simple facts of conjunction and truth values. Also, the simple rule of separation of conjunction is violated if gluts are not taken as false sentences.

Recall that the dialetheist wanted to provide a model whose main aim was to preserve intuitive features of our natural language and the workings of such language. Intuitively, the claim is that natural reasoning leads to contradictions

when semantic concepts are freely taken into account, and *that* data should be preserved in the model. What the difficulties we have explored all point to, it seems to us, is that another much more powerful intuition seems to be vindicated: contradictions should really be understood as a warning signal, as a sign that something is clearly wrong with our conceptual machinery. Rather than accommodate contradictions, we should, perhaps, seek to find the source of the problem; if we can't agree on what it is, at least we agree that something has gone seriously wrong, and *this*, perhaps, is the most basic intuition. The credentials of this intuition should not be easily dismissed: our everyday struggle to avoid being caught in contradiction and 2.000 years of battle against the Liar certainly testimony in its favor.

Acknowledgments

We would like to thank Richard Heck for comments on a previous version of this paper.

References

[1] J. R. B. Arenhart. Liberating paraconsistency from contradiction *Logica Universalis*, v.9, p.523-544, 2015.

[2] J. C. Beall. Introduction: at the Intersection of Truth and Falsity. In: *The Law of Non-Contradiction: New Philosophical Essays*. Edited by G. Priest, J. C. Beall and B. Armour-Garb.Oxford: Clarendon Press, p.1-19, 2004.

[3] J. -Y. Béziau. Round Squares are No Contradictions (Tutorial on Negation, Contradiction, and Opposition). In: *New Directions in Paraconsistent Logic*. Edited by J. -Y. Béziau, M. Chakraborty and S. Dutta. New Delhi: Springer, p.39-55, 2015.

[4] J.-Y. Béziau. Trivial dialetheism and the logic of paradox. *Logic and Logical Philosophy*, v.25(1), p.51-56, 2016.

[5] G. Priest. The logic of paradox. *Journal of Philosophical Logic*, v.8, p.219-241, 1979.

[6] G. Priest. Logic of paradox revisited. *Journal of Philosophical Logic*, v.13, p.153-179, 1984.

[7] G. Priest. Gaps and gluts: a reply to Parsons. *Canadian Journal of Philosophy*, v.25(1), p.57-66, 1995.

[8] G. Priest. What's So Bad About Contradictions? In: *The Law of Non-Contradiction: New Philosophical Essays*. Edited by G. Priest, J. C. Beall and B. Armour-Garb. Oxford: Clarendon Press, p.23-38, 2004.

[9] G. Priest. *In Contradiction: a study of the transconsistent*. 2nd edition. Oxford: Oxford Un. Press, 2006a.

[10] G. Priest. *Doubt truth to be a liar*. Oxford: Oxford Un. Press, 2006b.

[11] G. Priest and F. Berto. Dialetheism. In: *The Stanford Encyclopedia of Philosophy*. Summer 2013 Edition). Edited by E. N. Zalta. URL = http://plato.stanford.edu/archives/sum2013/entries/dialetheism/, 2013.

[12] G. Priest and R. Routley. The philosophical significance and inevitability of paraconsistency. In: *Paraconsistent Logic: Essays on the Inconsistent*. Edited by G. Priest, R. Routley, and J. Norman. München: Philosophia Verlag, p.483–539, 1989.

Jonas Rafael Becker Arenhart
Department of Philosophy
Federal University of Santa Catarina (UFSC)
Florianópolis, SC, Brazil
E-mail: jonas.becker2@gmail.com

Ederson Safra Melo
Department of Philosophy
Federal University of Maranhão (UFMA)
São Luís, MA, Brazil
E-mail: edersonsafra@yahoo.com.br