Wierenga on Theism and Counterpossibles

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Abstract

Several theists, including Linda Zagzebski, have claimed that theism is somehow committed to nonvacuism about counterpossibles. Even though Zagzebski herself has rejected vacuism, she has offered an argument in favour of it, which Edward Wierenga has defended as providing strong support for vacuism that is independent of the orthodox semantics for counterfactuals, mainly developed by David Lewis and Robert Stalnaker. In this paper I show that argument to be sound only relative to the orthodox semantics, which entails vacuism, and give an example of a semantics for counterfactuals countenancing impossible worlds for which it fails.

1 Introduction

Several theists such as Zagzebski (1990), Freddoso (1986), and Morris (1987), have claimed that theism is somehow committed to nonvacuism about counterpossibles. Others, such as Pearce and Pruss (2012), have even relied on nonvacuism to develop certain accounts of important theistic doctrines, such as divine omnipotence. Accordingly, a *counterpossible* is a subjunctive conditional, or counterfactual, of the form "if it were the case that p, it would be the case that q", with an impossible antecedent. Examples of counterpossibles include

(1) If $2 + 2$ were 5, dogs would be better than cats,

(2) If Phosphorus were not Hesperus, Frege's preferred examples would be misleading,

(3) If Phosphorus were not Phosphorus, something would not be self-identical.

Moreover, there are different senses in which the antecedent of a counterpossible might be said to be impossible. In the cases above, for instance, the antecedent in (2) is usually claimed to be metaphysically impossible. This is because "Phosphorus is Hesperus" is taken to be metaphysically necessary according to the widely held view of the necessity of identity, defended in Kripke (1980). By contrast, the antecedent in (3) is not just metaphysically impossible, but logically impossible as well, since the logical relation of identity is reflexive. Thus, (3) is sometimes referred to as a *counterlogical*. Under a certain approach to arithmetical truths the antecedent of (1) is also logically impossible; but it can also be labeled, if only to be less controversial, as arithmetically or mathematically impossible. Other cases could involve physical and deontic impossibility, to name a few. But the modality for counterpossibles that is relevant to our discussion is assumed to be *objective*, like the ones mentioned above, in contrast with epistemic, or *subjective* modality.

Now, *vacuism* about counterpossibles is the thesis that all counterpossibles are vacuously true. *Nonvacuism*, in turn, is just the negation of vacuism. Vacuism has gained much support from the orthodox semantics for counterfactuals in terms of similarity or closeness between possible worlds offered by Stalnaker (1968), Lewis (1973), and Kratzer (1979), according to which all counterpossibles are vacuously true. Roughly, the orthodox semantics says that a counterfactual is true if and only if (i) the antecedent is impossible, or (ii) at the possible worlds closest to the actual world where the antecedent is true the consequent is true as well.[1] Consequently, it can be readily seen that (1)–(3) are all vacuously true given condition (i). More recently, Williamson (2007, 2017) has also taken up the cause of vacuism, with a battery of arguments in its favour. Thus, it is fair to render nonvacuism as heterodox.

But why think that theism is somehow committed to nonvacuism? Philosophical lore has it that any property possessed by God is possessed essentially, or necessarily.[2] Accordingly, God is essentially omniscient, omnipotent, omnipresent, omnibenevolent, etc. Also, if God exists at all, it is by necessity; or, by contraposition, if it possible at all for God to exist, then God exists.[3] The

[1]There are fine distinctions here between Lewis and Stalnaker. The latter (but not the former) accepts the Limit Assumption, that is, the thesis that there is always a smallest set of worlds most similar to the antecedent world. Whether one accepts the Limit Assumption has important consequences on the exact formulation of truth conditions for counterfactuals (see, for instance, Brogaard and Salerno (2013, pp. 640-1)). However, we are mostly concerned here about counterpossibles, and will pass over some of the details about counterfactuals in general.

[2]This is, of course, the concept of God traditionally assumed by western philosophers and, in particular, analytic philosophy of religion.

[3]I am using "essential" as synonym for "necessary" here, which is controversial since at

theist then seems committed to the claim that the following propositions are all (metaphysically or conceptually) impossible:

(4) God does not exist,

(5) God is evil,

(6) God is not omnipresent, etc.

This, in turn, means that the following propositions are counterpossibles:

(7) If God did not exist, matter would not exist.

(8) If God did not exist, matter would still exist.

Nevertheless, some theists, especially the trio mentioned above, think that while sentences like (7) seem true and unproblematic, (8) appears to be false. For, *per impossible*, had God not existed, no-one would have created matter. Therefore, if theism is true, at least some counterpossibles are false.

Of course, the only support just offered for nonvacuism is the intuition that (8) is false. Yet, Zagzebski (1990) offers an actual argument in support of vacuism if only to reject it afterwards on behalf of nonvacuism. Wierenga (1999) claims, however, that Zagzebski's rejection of vacuism is solely based on her intuition that counterpossibles such as (8) are false, and he in turn provides reasons supporting an important premise in Zagzebski's argument for vacuism that he takes to be independent of the orthodox semantics for counterfactuals. This is important since, had the argument turned out to depend upon the orthodox semantics, which in turn validates vacuism, Wierenga's case would beg the question against nonvacuism. Surely, no-one would be convinced by an argument for vacuism that depends upon the orthodox semantics for counterfactuals. If either vacuism or nonvacuism is to be established, it should be defended on independent grounds. Ultimately, Wierenga claims that examples such as (8) are unconvincing to support nonvacuism given that there is, after all, an argument available for vacuism.

In this paper I show that Zagzebski's argument for vacuism, as well as Wierenga's beefed-up version of it, is cogent only under the assumption that the orthodox semantics for counterfactuals — or something very much like it — is correct. Thus, the argument does depend on orthodoxy. There are recent semantic approaches for counterfactuals inheriting much of the flavour of the

least Fine (1994). But there is no need to make substantial assumptions concerning essence for the purposes of this paper, for one could just as well formulate the ideas above by using only the notion of necessity.

orthodox semantics but are such that, if assumed, a fundamental premise in the argument for vacuism is false. In these semantics, involving impossible worlds, some counterpossibles are false, thereby vindicating nonvacuism. Semantics of this kind for counterfactual conditionals have been developed and defended by a variety of philosophers including Routley (1989), Read (1995), Nolan (1997), Mares and Fuhrmann (1995), Mares (1997), Vander Laan (2004), Kment (2006a,b), Brogaard and Salerno (2013), and, more recently, Berto et al. (2017). Wierenga's case for vacuism is therefore unconvincing since the choice between vacuism and nonvacuism would hinge, ultimately, on which semantics for counterfactuals we adopt in order to properly evaluate the cogency of Zagzebski's argument. In §2 Zagzebski's argument for vacuism and Wierenga's defense thereof are presented and discussed. In §3 I present in more detail the Lewisian semantics for counterfactuals as a prime example of the orthodox camp, and I prove Zagzebski's argument to be sound relative to that semantics. Wierenga's argument in favour of the latter is also demonstrated to be sound. Also, I use Nolan's (1997) semantics for counterfactuals as an example of a heterodox option according to which both Zagzebski's argument and Wierenga's defense thereof fail to be sound. Finally, §4 accesses the merits of a distinction made by Wierenga in order to accommodate the intuition that some true counterpossibles are not trivial.

2 An argument for vacuism?

In this section I present Zagzebski's argument for vacuism as formulated by Wierenga (1999, p. 90), as well as the latter's reasons to endorse it. The argument, which I call VAC, goes as follows. Where p and q are any propositions whatsoever,

(9) If p is impossible, then p entails q. [Premise]

(10) If p entails q, then p counterfactually implies q. [Premise]

(11) If p is impossible, then p counterfactually implies q. [From 9 and 10]

Simply put, if (9) and (10) hold, vacuism is true. The success of the argument therefore depends on the truth of premises (9) and (10). The former is assumed by any classical semantics, and we do not need to dispute it here. It should be pointed out, though, that the notion of entailment underlying (9) is the usual modal one, that is:

(12) p entails q if and only if it is impossible for p to be true and q false. (Cf. Wierenga (1999, p. 90)).

The truth of (12) will also not be disputed. It remains for us to question the veracity of (10). As Wierenga (1999, p. 91) points out, Zagzebski's denial of (10) looks as though it is grounded in her original examples, which involve sentences such as (8), of seemingly false counterpossibles.[4] The point seems to be that since "God does not exist" is impossible, it entails "matter would still exist," since it is impossible for the former to be true and the latter false. Yet, the intuition is that the former does not *counterfactually imply* the latter, since (8) seems false, hence (10) ought to be rejected.

At any rate, my focus is not on Zagzebski's rejection of VAC, but Wierenga's reasons to endorse it. That is, the question we face is whether there is any reason at all to endorse (10) that provides us with evidence for vacuism which is independent of the orthodox semantics for counterfactuals. Wierenga thinks there is. As I see it, he offers two arguments in support of (10) and, consequently, in favour of vacuism. The first comes directly from (12), the modal notion of entailment. Wierenga says that as soon as we stipulate (12) as a proper sense of 'entailment', alongside (9) "[(10)] likewise seems true. If there is no way p can be true without q being true, as well, then if p *were* true, q would have to be true, too." (1999, pp. 90-1). Now, admittedly, this is not so much of an argument, but rather a mere restatement of (10). Wierenga appears to think that it follows from the concept of entailment as understood in (12) that if there is a relation of entailment between two propositions there must also be a relation of counterfactual implication between them. If we symbolize[5] the latter by $>$, the thesis is that for any propositions p and q,

(13) If $p \vDash q$, then $p > q$.

Again, this is just a formal restatement of (10). So why should we believe in (13)? If the reason is merely that (13) seems to be true, Wierenga's defense of VAC so far rests only on intuition, which is no better than Zagzebski's reasons for rejecting the same argument. However, another reason might be offered by defending the truth of *conditional proof*, which states that in order to prove or show an implication between two propositions to be true, it is sufficient that the consequent is true under the assumption that the antecedent is true, too. In other words, if a proposition entails another, then the former implies the latter. We all know that under classical assumptions conditional proof holds for material implication. It is less obvious though that it holds for counterfactual implication, too. In the orthodox semantics for counterfactuals, where vacuism is true, conditional proof does hold for counterfactual implication. But in some

[4]Zagzebski (1990, p. 169).

[5]I purposefully confuse use and mention with respect to logical symbols for readability.

heterodox semantics for counterfactuals where vacuism is false, conditional proof fails.[6] Thus, whether VAC is sound or not depends on an antecedent commitment to a semantics for counterfactual implication, for it is against our choice of a formal semantics or proof theory that we evaluate the truth value of (13) and, consequently, (10). Otherwise, the only defense of (13) is entirely intuitive, which, as we have already seen, makes it no more likely to be true than its denial. In §3 we prove that (13) is true with respect to the orthodox semantics, but that it fails when a different semantics for counterfactuals is in play.

Another reason for Wierenga's endorsement of (13) that bears directly on (12) is that he might be excluding impossible worlds as 'ways a world could be.' Wierenga would not be alone in this, as Lewis (1986), for instance, also rejected impossible worlds — although for reasons that were grounded in his controversial modal realism. In the quote above, Wierenga explicitly talks in terms of ways a proposition could be true or false. If one restricts 'ways' to possible worlds, then it seems that if there is no possible world w at which p is true without q being true, it follows that in the closest world u to the actual one, if p is true at u, q is true at u, too. But this follows only if the closest world to the actual one in relevant respects is a possible world, rather than an impossible one. By countenancing impossible worlds, the implication above does not generally hold.

Two things can be said to elaborate on this. The first is that the heterodox semantics for counterfactuals we present in §3 takes (12) as its notion of logical consequence. Still, (13) ends up false. Second, why think that impossible worlds could not be closer to the actual one than possible worlds? Suppose God was not omnipotent — which is impossible according to traditional theism — but could still do everything God actually does. That is, in this possibility there is nothing which is required of God's power that was not actually required, even though some things could have been required that God would not be able to do but are such that God is able to do. Thus, such world differs from the actual one purely in its modal profile: rather than being able to do anything that an omnipotent being *could* do, God does anything an omnipotent being *in fact* does. All of God's actions, however, remain the same.[7] Although the world just described is an impossible one, there would

[6] A caveat: I have in mind here *single premise* conditional proof, for conditional proof with multiple premises fails even in the usual Lewis/Stalnaker semantics for counterfactuals. See, for instance, Nolan (2016, p. 2637).

[7] It might be objected that the possibility introduced here violates the Lewisian doctrine of *Humean supervenience*, namely, that if two worlds are identical in the matters of particular fact that they support, they are also identical in their modal and counterfactual properties

be no noticeable difference from the actual world, and I take that such world is closer to the actual world than many possible worlds. If this is right, there seems to be nothing objectionable in admitting impossible worlds in our theory of counterfactuals.

Now, with respect to VAC, Wierenga concludes the following:

> I must admit that my own endorsement of [(11)] had been somewhat ambivalent, at last prior to discovering Zagzebski's argument for it. But that argument seems pretty good. I speculate that at least some of the theistic critics of [(11)] harbor a suspicion that acceptance of [(11)] is driven by an antecedent commitment to the usual possible worlds semantics for counterfactual conditionals. Zagzebski's argument, it seems to me, puts to rest that suspicion, inasmuch as it offers independent support for [(11)].[8] (p. 91)

As we have argued, Wierenga's original suspicion is true, as VAC does depend on an antecedent commitment to a certain type of semantics for counterfactuals, as we prove in §3, unless it rests entirely on intuition. Hence, it is false that premises (9) and (10) offer *independent* support for (11).

But Wierenga has another argument in favour of vacuism, or, more exactly, in favour of (10), which he thinks is also independent of orthodoxy. He endorses a principle formulated by Pollock (1984, p. 113) called *generalized consequence principle*, or (GCP), which states the following:

(GCP) If X is a set of states of affairs each member of which would obtain if P obtained, and X entails Q, then $(P > Q)$ obtains.

Pollock — and, I take it, Wierenga, too — thinks that (GCP) is intuitively obvious,[9] and that it delivers a reason for endorsing (10) that is independent of the orthodox semantics for counterfactuals. Equipped with (GCP), the argument put forward by Wierenga is as follows.[10] Let p and q be any propositions. Then

(see Lewis (1986), p. 111). If one countenances Humean supervenience, then one needs to modify the example accordingly. This can be done simply by assuming some contingent feature of the world to vary in the case God is not omnipotent. Other examples similar to these are mentioned in Nolan (1997), especially p. 544.

[8] I use brackets around the numbers mentioned by Wierenga since these are different from the ones I ended up having here.

[9] Pollock (1984, p. 113).

[10] The argument we consider here is the simplified version of that of Wierenga (1999, top of p. 92), but there is no significant difference, and the same point could be made with respect to the other, more complicated argument.

(14) p counterfactually implies p. [Premise]

(15) If p counterfactually implies p and p entails q, then p counterfactually implies q. [Premise, from (GCP)]

(10) then follows from (14) and (15). Wierenga seems to take (14) as an obvious fact about counterfactuals since he does not question it, whereas (15) is just an instance of (GCP) — which, again, is taken to be intuitively obvious. He then claims the following:

> Now [(10)] was, as far as I can tell, the only premise in Zagzebski's argument for [(11)] that could plausibly be questioned. But we have just seen what I take to be a convincing argument in support of it. So it looks as though, her intentions to the contrary notwithstanding, Zagzebski's argument for [(11)] is successful. (Wierenga, (1999, p. 92))

Wierenga concludes by saying that given the argument above he finds it "hard to be persuaded by (...) examples to deny [(11)]" (p. 100), and that, consequently, the theistic examples, rather than (11), should be deemed unconvincing. But even though we do not question the truth of (14), it is far from obvious that we should accept (15). As we shall see in §3, (15) is true when evaluated against the orthodox semantics for counterfactuals, but it fails once a different semantics with impossible worlds is assumed. This means that, once more, the truth of the premises is not independent from an antecedent commitment to the orthodox semantics. As it is, VAC is still unconvincing for anyone with intuitions leaning to nonvacuism.

To sum up, Zagzebski presents an argument for vacuism, namely, VAC, which she ultimately rejects given the force of examples such as (7) and (8) viz-à-viz premise (10). By contrast, Wierenga endorses VAC, mainly because of independent arguments for premise (10), which are deemed sufficiently strong for him to reject the examples. Yet, as we have claimed, and will prove next, Wierenga's arguments only have force if we assume the orthodox semantics for counterfactuals, which entails vacuism. Since there are other semantics that, if assumed, will make false some of the premises in Wierenga's arguments, there is no reason — at least no reason presented by Wierenga — to endorse VAC that is independent from a previous commitment to orthodoxy. The only option to get around this, it seems to me, is to endorse those premises on the basis of intuition, as conceptual truths about counterfactuals. But then those arguments seem hardly more effective than Zagzebski's intuitions behind her original examples.[11]

[11] Another option is to offer arguments for vacuism that are truly independent of the

3 Semantics for counterfactuals

3.1 The orthodox semantics

There are important and well known differences between the semantics offered by Kratzer, Lewis, and Stalnaker, but these are not relevant for the issues discussed here, and so we choose to focus on the Lewisian semantics for counterfactuals. Especially because this is the formal semantics receiving much of the attention in the literature.

We assume a suitable propositional language containing a countably infinite set of proposition symbols p, q, r,...,$\neg$ for negation, $\wedge$ for conjunction, $\supset$ for the material conditional, and $>$ for the counterfactual conditional. Modal operators could be added, but we have no need for them here. Now models for this language can be defined as follows:

Definition 3.1 (Lewis Models) A *Lewis model* is a triple, $\mathcal{M} = \langle W, \$, v\rangle$, such that

- W is a set of possible worlds,
- $\$$ is a function from worlds to systems of spheres of worlds, where a *system of spheres* is a set of sets of worlds, where $\$_w$ is set of spheres associated (or around) with w, and
- v is a function from worlds and proposition symbols to truth values.

In accordance with Lewis (1973, p. 14), we impose the following (standard) conditions on systems of spheres, more of which will be added below:

(C) $\$_w$ is *centered on* w, which means that $\{w\} \subseteq \$_w$.

(1) $\$_w$ is *nested*, which means that for every $S, S' \in \$_w$, either $S \subseteq S'$ or $S' \subseteq S$.

(2) $\$_w$ is *closed under unions*, which means that $\bigcup S \in \$_w$, provided $S \subseteq \$_w$.

(3) $\$_w$ is *closed under (nonempty) intersections*, which means that for any nonempty $S \in \$_w$, we have $\bigcap S \in \$_w$.

A formula φ is true at a possible world $w \in W$ in a model if and only if $v_w(\varphi) = \{1\}$. This notion of truth-at-a-world is extended to all formulas as follows.

orthodox semantics. This is, in part, done by Williamson (2017). But since this paper focuses on Wierenga's arguments, a treatment of Williamson's arguments should be done elsewhere.

Definition 3.2 (Truth-at-a-world) For any $w \in W$,

$$
\begin{array}{lcl}
\mathcal{M}, w \vDash p & \iff & v_w(p) = \{1\}, \\
v_w(\neg\varphi) = \{1\} & \iff & v_w(\varphi) = \{0\}, \\
v_w(\varphi \wedge \psi) = \{1\} & \iff & v_w(\varphi) = \{1\} \text{ and } v_w(\psi) = \{1\}, \\
v_w(\varphi \supset \psi) = \{1\} & \iff & \text{either } v_w(\varphi) = \{0\} \text{ or } v_w(\psi) = \{1\}, \\
v_w(\varphi > \psi) = \{1\} & \iff & \forall u, S \text{ s.t. } u \in S \in \$_w, v_u(\varphi) = \{0\} \text{ or,} \\
& & \exists u, S \text{ s.t. } u \in S \in \$_w, v_u(\varphi) = \{1\} \text{ and} \\
& & \forall z \in S, v_z(\varphi \supset \psi) = \{1\}.
\end{array}
$$

Note the truth conditions for counterfactuals. Informally, we get conditions (i) and (ii) mentioned in §1, except that the notion of closeness or similarity is formally encapsulated by Lewis's systems of spheres. It remains for us to define truth in a model and logical consequence:

Definition 3.3 (Truth and consequence) A sentence φ is *true* in a Lewis model $\mathcal{M} = \langle W, \$, v\rangle$, written $\mathcal{M} \vDash \varphi$, if and only if $v_w(\varphi) = \{1\}$ for every $w \in W$, and a sentence φ is a *logical consequence* of a set of sentences Γ if and only if for every Lewis model $\mathcal{M} = \langle W, \$, v\rangle$ and $w \in W$, if $v_w(\gamma) = \{1\}$ for every $\gamma \in \Gamma$, then $v_w(\varphi) = \{1\}$.

Now, there are several other conditions on systems of spheres mentioned by Lewis (1973, p. 120), but we can add at least three of the less controversial ones, which are also accepted by Nolan (1997, p. 564), for example.

(N) $\$_w$ is *normal*, which means that for every $w \in W$, $\bigcup \$_w$ is nonempty.

(T) $\$_w$ is *totally reflexive*, which means that for every $w \in W$, $w \in \bigcup \$_w$.

(W) $\$_w$ is *weakly centered*, which means that for every $w \in W$ and nonempty $S \in \$_w$, $w \in S$, and $\exists S'$ s.t. $S' \in \$_w$ and S' is nonempty.

Next we show that VAC as well as Wierenga's second argument are both sound with respect to the semantics just presented. First we prove (9) and (10), appropriately formalized.

Proposition 3.1 *For any formulas φ and ψ, if there is no Lewis model $\mathcal{M} = \langle W, \$, v\rangle$ and $w \in W$ such that $v_w(\varphi) = \{1\}$, then $\varphi \vDash \psi$.*

Proof. Obvious, since we are assuming a classical semantics. □

Proposition 3.2 *For any formulas φ and ψ, and Lewis model $\mathcal{M} = \langle W, \$, v\rangle$, if $\varphi \vDash \psi$, then $\mathcal{M} \vDash \varphi > \psi$.*

Proof. Let φ and ψ be any formulas and suppose that $\varphi \vDash \psi$. Then for every Lewis model $\mathcal{M} = \langle W, \$, v\rangle$ and $w \in W$, if $v_w(\varphi) = \{1\}$, then $v_w(\psi) = \{1\}$. Assume, for reductio, that $\mathcal{M} \nvDash \varphi > \psi$. Then there is a Lewis model $\mathcal{M} = \langle W, \$, v\rangle$ and $w \in W$ such that $v_w(\varphi > \psi) = \{0\}$. By the truth conditions for $>$, this means that $\exists u, S$ s.t. $u \in S \in \$_w, v_u(\varphi) = \{1\}$ but $v_u(\varphi \supset \psi) = \{0\}$, that is, $v_u(\psi) = \{0\}$. However, by the first assumption we have $v_u(\psi) = \{1\}$, which is impossible. Therefore, $\mathcal{M} \vDash \varphi > \psi$. □

Theorem 3.1 *For any formulas φ and ψ, if there is no Lewis model $\mathcal{M} = \langle W, \$, v\rangle$ and $w \in W$ such that $v_w(\varphi) = \{1\}$, then for any Lewis model $\mathcal{M} = \langle W, \$, v\rangle$, $\mathcal{M} \vDash \varphi > \psi$.*

Proof. From Propositions 3.1 and 3.2. □

Therefore, VAC is sound with respect to the orthodox semantics. Now it remains for us to check the truth of (14) and (15), which is simple given the availability of Proposition 3.1.

Proposition 3.3 *For any formula φ and Lewis model $\mathcal{M} = \langle W, \$, v\rangle$, $\mathcal{M} \vDash \varphi > \varphi$.*

Proof. Suppose $\mathcal{M} \nvDash \varphi > \varphi$. Then, simply put, there must be a world $w \in W$ such that $v_w(\varphi) = \{1\}$ but $v_w(\varphi) = \{0\}$, which is impossible. □

Proposition 3.4 *For any formulas φ and ψ, if $\mathcal{M} \vDash \varphi > \varphi$ and $\varphi \vDash \psi$, then $\mathcal{M} \vDash \varphi > \psi$.*

Proof. From Propositions 3.1 and 3.3. □

Since (10) follows from (14) and (15), Wierenga's second argument is sound with respect to the orthodox semantics.

3.2 Nolan's semantics

The semantics for counterfactuals developed by Nolan generalizes that of Lewis by adding impossible worlds to the models. His motivation is varied, but it includes the intuition that some counterpossibles are false (cf. Nolan (1997, p. 544)). The truth conditions for the Boolean connectives remain the same, and only the counterfactual conditional needs to be modified. Accordingly, Nolan models can be defined as follows:

Definition 3.4 (Nolan Models) A *Nolan model* is a tuple, $\mathcal{M} = \langle W, I, \$, v\rangle$, such that

- W is a set of possible worlds,
- I is a set of impossible worlds,
- $\$$ is a function from worlds (both possible and impossible) to systems of spheres of worlds (both possible and impossible), where a *system of spheres* is a set of sets of worlds (both possible and impossible), and
- v is a function from worlds (possible or impossible) and propositions to truth values.[12]

Following Nolan, we write $v_w(p) = x$ for $x \subseteq \{1, 0\}$, with $\{1\}$ being *true*, $\{0\}$ *false*, $\{1, 0\}$ *both*, and $\emptyset$ *neither*. Thus, there are four types of values a sentence could receive in this semantics. This accounts for the fact that at impossible worlds there can be gaps and/or gluts, that is, sentences that are neither true nor false, and sentences that are both true and false. In a nutshell: anything goes in impossible worlds. By contrast, possible worlds only admit propositions that are either true or false, that is, with values $\{1\}$ or $\{0\}$. Then, a formula φ is true at a possible world $w \in W$ in a Nolan model $\mathcal{M} = \langle W, I, \$, v\rangle$ if and only if $v_w(p) = \{1\}$. This notion of truth-at-a-(possible)world is extended to all formulas just like in the orthodox semantics, the only difference being the treatment for the counterfactual conditional. Notice that, originally, Nolan's semantic conditions for $>$ were just the ones already defined by Lewis, but the revision below was called for since otherwise *identity for counterfactuals*, i.e. $\varphi > \varphi$, would fail as a theorem (see Nolan (1997), p. 565). Accordingly, the truth conditions for $>$ are defined as follows:

Definition 3.5 (Truth conditions for counterfactuals)

$$\begin{aligned} v_w(\varphi > \psi) = \{1\} \iff & \forall u, S \text{ s.t. } u \in S \in \$_w, v_u(\varphi) = \{0\} \text{ or,} \\ & \exists u, S \text{ s.t. } u \in S \in \$_w, v_u(\varphi) = \{1\} \text{ and} \\ & \forall z \in S, \text{ if } v_z(\varphi) = \{1\} \text{ then } v_z(\psi) = \{1\}. \end{aligned}$$

It is important to emphasize that logical consequence and validity in this semantics is also defined solely with respect to *possible* worlds (cf. Nolan, p. 563), and hence in perfect consonance with (12). Now it is a simple matter to show (10) to be false with respect to Nolan's semantics. (Since we are assuming a classical semantics, (9) still holds.) We can construct a Nolan model $\mathcal{M} = \langle \{w\}, \{i\}, \$, v\rangle$ where the smallest sphere associated with w includes both w, which is a possible world, and i, which is an impossible world, and is such

[12] Nolan (1997) also adds a set π of propositions, with a short discussion offered on p. 563. This may be added to the models, but we do not need it for the purposes of this paper.

that $v_w(q) = \{1\}$, $v_i(p) = \{1\}$, and $v_i(q) = \{0\}$. Since entailment only ranges over possible worlds, and q is true at the possible world w, $p \vDash q$ holds in this model, but $p > q$ fails, since the closest world to w where p is true, namely, i, is also a world where q is false. Thus, according to Nolan's semantics for counterfactuals, (10) is false, whence VAC — and Wierenga's argument — is unsound relative to it.[13] Notice, moreover, that the same model falsifies (15), for $\mathcal{M} \vDash p > p$ holds in this model; after all, the closest world to w where p holds *is* a world where p holds.

4 Two senses of triviality

If counterpossibles were vacuously true they would have been trivial, in a certain sense, since anything would be counterfactually implied by an impossibility. The evidence to the contrary is, nevertheless, widespread. Several examples like the ones mentioned here and in the literature of seemingly false counterpossibles are compelling evidence for a nonvacuist treatment. The merits of semantic theories are usually accessed against our semantic intuitions, which in turn reflect our semantic competence with respect to this or that linguistic context.[14] There is a strong case, therefore, for the acceptance of nonvacuism. After all, even vacuists would *use* counterpossibles of the sort "if some counterpossibles were false, vacuism would still be true" to the effect of uttering a false proposition.

But philosophical theorizing makes heavy use of counterpossibles. If all of them are trivial, then it seems that a large portion of philosophical theorizing involving counterfactual thinking with impossible antecedents would be trivial and, hence, in a certain sense, uninformative. This point has been elaborated by many including Freddoso (1986, p. 45), Zagzebski (1990, p. 171), Nolan (1997, pp. 536–41), and Brogaard and Salerno (2013, pp. 644–45). In response, Wierenga distinguishes two ways in which a counterfactual can be said to be trivial/nontrivial: (a) a counterfactual is trivial if its antecedent is impossible — that is, if it is a counterpossible, (b) a counterfactual is nontrivial if it is "*derivable* from a nontrivial general truth or if it is *justified* by some such nontrivial truth." (1999, p. 97) Wierenga offers no argument for this distinction, but we can imagine that his motivation involves the claim

[13] Nolan (2016) explores the failure of conditional proof in another context, as a way of blocking Curry's paradox.

[14] As Dowty et al. (1981, p. 2) puts, native speakers' "judgments of synonymy, entailment, contradiction, and so on" provide the grounds according to which we evaluate semantic theories.

that if a proposition follows at all from a nontrivial general truth, then the former proposition inherits, as it were, the latter's nontriviality. He then gives examples of such a principle in play, one of which goes as follows. Suppose we want to prove that the square root of two is an irrational number. We may prove this by reductio:

(16) The square root of two is a rational number. [Premise for reductio]

(17) For every real number r, if r is a rational number there are integers n and m such that at most one of n and m is even and r is equal to n divided by m. [Theorem]

(18) If the square root of two were a rational number there would be integers n and m such that at most one of n and m is even and the square root of two is equal to n divided by m. [From 16 and 17]

(19) There are integers n and m such that at most one of n and m is even and the square root of two is equal to n divided by m. [From 16 and 18]

Since (19) is absurd, we can discharge the assumption (16) and conclude that the square root of two is irrational. But, as Wierenga claims, even though (18) is a counterpossible, and trivial according to vacuism, it is nontrivial in the sense of (b), since it follows from the general and nontrivial mathematical truth (17).

However, for every true counterpossible we can easily devise a nontrivial general truth from which it is derivable. And we can show this by assuming some of the very premises used in VAC, that is, by assuming the whole vacuist framework granted by Wierenga. Let p and q be any propositions, except that p is impossible. Then

(20) Necessarily, If p is impossible, p counterfactually implies q. [From 11]

(21) Necessarily, p counterfactually implies q. [From 20 and assumption that p is impossible]

(22) Necessarily, $\neg p$ is true. [From assumption, since the negation of an impossibility is necessarily true]

(23) It is impossible that $\neg p$ is true and that p does not counterfactually imply q. [From 21 and 22]

(24) $\neg p$ entails that p counterfactually implies q. [From 23 and 12]

Another way of making the same point is by just observing that if $p > q$ is a true counterpossible, both it and $\neg p$ are necessarily true, and therefore the latter entails the former. Now, one might immediately object that sentences such as $\neg p$ are not *general truths*, which is what Wierenga's condition (b) requires. In a sense, however, necessary truths are general, since they are usually understood as embedding a quantifier over worlds, circumstances, situations, and so forth; for instance: *at every possible world* $\neg p$ *is true*, *under all circumstances* $\neg p$ *is true*. But, in any case, it is simple to transform a truth into a general truth. Take the following list of counterpossibles:

(25) If God were evil, traditional theism as it actually is would not offer a correct depiction of God.

(26) If water were XYZ, its chemical compound would differ from the actual one.

(27) If Intuitionistic logic were the one true logic, the law of excluded middle would be true.

We can derive these, respectively, from the following general principles:

(29) Necessarily, for every x, x is God only if x is not evil.

(30) Necessarily, for every x, x is water if and only if x is H20.

(31) Necessarily, for every x, x is Intuitionistic logic only if x is not the one true logic.

Moreover, it seems we could also just devise a general nontrivial truth from which a true counterpossible is derivable. For example, the counterpossible *if Hobbes had (secretly) squared the circle, the sick children in the mountains of South America at the time would not have cared* seems true.[15] But this is derivable from *if anyone had (secretly) squared the circle in Europe, the sick children in the mountains of South America at the time would not have cared*, which is general and nontrivially true — it is, in fact, empirical. It seems that for any counterpossible one could always generate such general truths, whence condition (b) is easily met. In this sense, (b) is too weak. But, for what it is worth, we can also show that (b) is too strong, for there are straightforward counterexamples to (b). Take Wierenga's own example involving the square root of two. The counterpossible *if the square root of two were rational, the square root of two would be rational* is trivial, uninformative, and necessarily true. Therefore, it is entailed by any proposition. *A fortiori*, it is entailed by Wierenga's own (18).

[15]This examples comes from Nolan (1997, p. 544).

5 Conclusion

I have discussed arguments endorsed by Wierenga to support vacuism about counterpossibles and found them wanting. In particular, Wierenga's main defense of vacuism was shown to depend on the orthodox semantics for counterfactuals and, therefore, notwithstanding his intentions, not independent thereof. Despite the results concerning VAC and Wierenga's defense of vacuism, there is still a question about the claim that theism illuminates philosophical logic by showing, somehow, the need of admitting false counterpossibles. With respect to this, I must say that there seems to be nothing special regarding the relation between theism and counterpossibles. For, if theism ought to be committed to nonvacuism given intuitive judgments about sentences like (7) and (8), then we would have to say that mathematics, chemistry, logic, biology, and myriads of other disciplines are also committed to nonvacuism for the same reason, namely, intuitive judgments regarding counterpossibles. By characterizing the antecedent of a certain counterpossible deemed false as impossible *relative to a certain theory T*, which might be theism, mathematics, chemistry, or whatever, analogous reasoning would make us say that all of these are committed to nonvacuism. And since examples like the ones mentioned here might be multiplied without limit, there is nothing about theism *per se* and its relation to counterpossibles that we should take to be surprising or illuminating. Rather, the examples relevant to theism are just instances of a much more general point that some counterpossibles which are contraries, that is, of the form $\varphi > \psi$ and $\varphi > \neg\psi$, cannot both be true. This is not to say that theists should not believe in nonvacuism about counterpossibles. Rather, theists should not believe theism is special in illuminating this particular area of philosophical logic.

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