

# The propagation of suspension of judgment.

Or, should we confer any weight to crucial objections  
the truth-value of which we are ignorant?

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## Abstract

It is not uncommon in the history of science and philosophy to encounter crucial experiments or crucial objections the truth-value of which we are ignorant, that is, about which we suspend judgment. Should we ignore such objections? Contrary to widespread practice, I show that in and only in some circumstances they should not be ignored, for the epistemically rational doxastic attitude is to suspend judgment also about the hypothesis that the objection targets. In other words, suspension of judgment “propagates” from the crucial objection to the hypothesis. In this paper I study under which conditions this phenomenon occurs, and discuss its significance for the topics of skepticism and scientific realism.

## Keywords

Suspension of judgment; agnosticism; epistemic rationality; ignorance; decision under uncertainty; higher order evidence; skepticism; scientific realism.

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## 1 Introduction

It is widely held that, when faced with an actual crucial experiment or objection which contradicts a hypothesis  $H$ , one should disbelieve that  $H$  is the case. At least, this is so unless one recurs to the Duhem-Quine thesis to keep one's confidence in  $H$ . Besides this standard scenario, tricky cases of unconceived alternative hypotheses have recently been put forward. It is not obvious how to react to them: some take unconceived alternative hypotheses to threaten our confidence in actual hypotheses (Stanford, 2006; Rowbottom, 2016), while others have recommended ignoring their relevance (because their number might be negligible), thus remaining confident in  $H$  (Dawid et al., 2015; Sprenger, 2016; Dawid, 2018; Hofer and Martí, 2020).

Be that as it may, there is more to this story, I argue in this paper. Not uncommonly in the history of science and philosophy, there are cases in which we have *actual crucial objections the truth-value of which we are ignorant about*, that is, actual crucial objections about which we *suspend judgment*. Although it seems intuitive to ignore these objections, and this in fact has generally been done, I argue here that under certain conditions we should not ignore them. I show that suspension of judgment about a crucial objection  $O$  to a hypothesis  $H$  “propagates” to the hypothesis  $H$ . That is to say, *in certain conditions, when we suspend judgment about an actual crucial objection  $O$  to  $H$ , we should also suspend judgment about  $H$ .*

Suspending judgment about some proposition, or set of propositions, means neither believing nor disbelieving to any degree any option or options, and instead lacking any degree

of belief whatsoever. A number of representational frameworks in inductive logic have been elaborated to properly represent suspension of judgment.<sup>1</sup> In Section 3 I use a logical formalism to model this doxastic state. Recent philosophical discussions of suspension of judgment include Friedman (2013, 2015); Tang (2015); Staffel (2019); McGrath (2020). Its origins date back to the ancient skepticism of Pyrrho (Empiricus, I c. A.C.).<sup>2</sup>

This phenomenon of the propagation of suspension of judgment does not always occur: in this paper I also aim to delineate the conditions under which it does. After giving examples of where it does and doesn't occur in Section 2, I identify sufficient conditions for such propagation to occur in Section 3. A formal proof that this propagation occurs is carried out in epistemic logic in appendix A, and another proof in 3-valued logic (where the truth-values are interpreted in epistemic terms) is provided in appendix B. In appendix C I also show, on the basis of the results of Rosa (2019, 2020), that such propagation can also occur from a premise of an argument to its conclusion (not only from the conclusion of an argument to the hypothesis it targets). Inasmuch as the phenomenon of the propagation of suspension of judgment will seem, at first sight, to imply a revision of too many strongly-held beliefs, in the discussion of Section 4 I identify several reasons why this does not happen; i.e. why the phenomenon does not overgeneralize. I thus connect the phenomenon to, as well as differentiating it from, the classic philosophical themes of (i) skepticism, (ii) scientific (anti)-realism, and (iii) peer disagreement.<sup>3</sup>

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<sup>1</sup> The different approaches include comparative non-probabilistic non-numerical calculi, such as Norton (2007) (applied to cosmological issues by Norton 2010), or imprecise probabilities, such as de Cooman and Miranda (2007) (applied to cosmological issues by Benétreau-Dupin 2015); for an overview of many other approaches see Dubois (2007).

<sup>2</sup> McGrath (2020) distinguishes different meanings of 'suspension of judgment', and I adhere to the final definition he comes up with on p.7 (he is in fact explicitly aware of the kind of examples we are going to study): "To suspend judgment on a question is to put off belief-forming judgment, that is, to omit it because one aims to judge it later (and not before) or when and only when certain conditions obtain (which one does not yet believe obtain)."

<sup>3</sup> The kind of epistemic scenario under study has been largely neglected. It has been noted at least in Raz (1975), Schroeder (2012), and McGrath (2020). McGrath assumes that non-epistemic factors bear on the justification of suspension of judgment. I thus prove here that his assumption is indeed justified (while Schroeder, who rejected it, is wrong — cf. McGrath 2020, fn9). The only explicit exploration of this kind of scenario is Ballantyne (2015), who explores it from a broader perspective, and distinguishes among objections of different strength, so here I investigate what he labels as 'full rebutting defeaters'. He puts on the table related general questions that provide

## 2 Examples and preliminary definitions

**Debates in Metaphysics.** I ran into this kind of epistemic situation not in the domain of scientific theories and crucial experiments, but rather due to an argument in metaphysics: a well-known objection to the Humean account of laws. The objection points to the extreme degree of order or regularity—which we can observe just by looking around us, or at the whole history of the universe—to highlight that if one endorses the Best System account of laws, the degree of regularity exhibited by the ‘Humean mosaic’ is a cosmic coincidence. For, since laws are just descriptions summarizing the regularities of the Humean mosaic, its extreme regularity seems extremely improbable. (To give just one example, *all* the electrons, *for all time* since the Big Bang, have repelled each other whenever they have met.) Now, Humeans have for decades ignored this crucial objection, on the grounds that probabilistic reasoning faces technical problems (related to the principle of indifference), which prevent us from being entitled to assert the conclusion (I explain this in detail in (Filomeno, 2019)).<sup>4</sup> In light of this, people ignore the objection, and I do not deny that it seems reasonable to ignore it. For although the argument is valid, it seems to include an untrue premise (related to the principle of indifference), so the objection is indeed unsound!

This is, in fact, strictly correct (an argument is unsound if one premise is untrue), but I highlight in this paper that not knowing that the premise is true does not mean that the premise is false; in this case we don’t know whether the premise is true or false, and what we should do is suspend judgment about it. In (Filomeno, 20xx) I in fact apply in detail the present thesis to this case, to show that this objection cannot be so quickly ignored: we should suspend judgment about the conclusion; and since it is a major objection, we should suspend judgment about the Humean account of laws. (See the argument below in Section 3, and (Filomeno, 20xx) for its application to this scenario.)

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a wider map of what is at stake, thus nicely complementing our project. Finally, he also cites antecedents worth mentioning: the oldest appears to be Sánchez’s (1581) ‘Quod nihil scitur’, who laid out the same type of argument for his skeptical conclusion.

<sup>4</sup>In (Filomeno, 2019) I aim to eschew the technical objection (recurring to recent defenses of the principle of indifference), but leave aside that line of thought now. Even granting the usual Humean response, in (Filomeno, 20xx) I argue that Humeans still face serious trouble.

**What do philosophers believe?** A quick look at the 2020 ‘PhilPapers survey’ question on laws seems to show a different reaction among its respondents: only a minority of people are agnostic about the debate (less than 10%), while those who endorse Humean laws (around 30%) accordingly seem to ignore this objection.<sup>5</sup>

More generally, I claim that a reasonable and common attitude has been to ignore, at least to some extent, this kind of objections. Perhaps, some of the other paradigmatic questions found in the PhilPapers survey present a similar epistemic situation, but if this is so, respondents seem to have ignored such objections. Another quick look at the 2020 responses shows that ‘agnosticism’ is an extremely infrequent response to all the questions (almost always less than 10%).<sup>6</sup> In general, the range of subjects affected by the propagation of suspension of judgment is potentially wide. It might affect situations of decision under ignorance, particularly when we are in the dark about potentially relevant information, as in philosophy of religion, metaphysics, and philosophy of cosmology (of course even if we are experts in the field). However, each case has to be scrutinized. So in what follows, I cite some simple examples to begin to understand the situation. I begin with an example in which there is *no* propagation of suspension of judgment and we should indeed, as is usually done, ignore the objection.

**Detective investigations.** Imagine that someone has been murdered in their apartment. We form the hypothesis H that ‘John is the killer’. H is initially supported by a certain amount of evidence (for instance, there are DNA traces that show that he was present that day). Suppose that this evidence is not at all decisive, but just enough to make us moderately confident in H. We won’t need to assign a specific value to this confidence, just a value above 0.5 (but not close to 1), say 0.7. Faced with just this evidence, it is rational for the detective to be confident

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<sup>5</sup>In fact, today some philosophers only debate a much weaker objection: the inability of laws to explain their instances.

<sup>6</sup>In 82% of the responses, agnosticism received less than 10% of the votes. Out of the 100 questions, agnosticism scored over 20% of the votes just seven times. Yet it disappears again when the results are filtered according to the corresponding area of specialization (philosophy of physics in one case, of mathematics in another). For the record, these seven questions are: ‘Newcomb’s box’ (22% agnostic), ‘Sleeping beauty’ (40%), ‘Quantum mechanics’ (24%), ‘Spacetime’ (20%), ‘A or B theories of time’ (23%), ‘Continuum hypothesis’ (26%), and ‘Foundations of mathematics’ (23%).

to a certain degree that John is the killer.

As usual, let us make a clarification regarding suspension of judgment: as will be seen throughout the paper, suspending judgment does not amount to a 0.5 confidence in each option—a situation which represents an equal amount of evidence—but rather refraining from having any degree of confidence whatsoever. In the usual metaphor of weighing the arguments on a pair of scales (Fig. 1 p. 11), it represents not using any such scales (it means, we could say, eschewing this metaphor entirely).<sup>7</sup>

Let us also clarify that in this paper we are not focusing on *degrees* of confirmation or disconfirmation of hypotheses, but rather on cases of the refutation of hypotheses. Accordingly, in this simple scenario we can add the type of objection we shall be concerned with: a crucial objection  $O$  that would prove that  $H$  is false, i.e. that John is not the killer, but we are ignorant as to the truth-value of  $O$ . Two candidates could be:

$O_1$ : The killer's DNA has been found on the victim and on the crime weapon. This, then, is crucial evidence that would tell us who the killer is. If true, this new evidence might confirm or refute  $H$ . But, unfortunately, the DNA-test has given no result, because the DNA samples have been lost or corrupted.

Alternatively, consider another potential crucial objection:

$O_2$ : The victim saw who killed him, but, well, he's dead. His testimony would suffice to confirm or refute  $H$ .

Obviously, the detective has to ignore both  $O_1$  and  $O_2$ . The detective should not update her beliefs as to who is the killer; she rather should keep her confidence in John being the killer. We can conceive of a lot of analogous objections, which we should also ignore.

Now, instead, consider another crucial objection in this scenario:

$O_3$ : His lawyer puts forward a line of reasoning that would definitely absolve him—it represents an objection to Hypothesis  $H$ , as it is an argument clearly in-

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<sup>7</sup>Unlike the case of equal amounts of evidence, suspension of judgment is usually associated with the *lack* of any evidence, but that's not the only situation in which this doxastic state should be endorsed.

criminating someone else. However, unfortunately, this argument relies on something that we cannot ascertain.<sup>8</sup>

This means that now we have an actual crucial objection whose truth-value we ignore that if true, would refute H. In this situation, the doubts about its unreliability might tempt some to just ignore such a line of reasoning: to not take it into consideration and keep one's previous confidence in H. Others could think that this objection, of a peculiar epistemic status, does bear some influence on the overall assessment of H. Here, an incorrect subcase would be to accept the objection and exculpate John: in the balance of arguments for and against, we put the objection into the balance as if it were a solid argument (it might be solid, but we don't know). As I show in this paper, neither of these two options is correct. Rather, the epistemically rational doxastic attitude is now to suspend judgment, not only about the objection but also about the hypothesis that John is the killer. That is, the detective ought to update from her previous state of confidence in H and suspend judgment about H.

**Consistency with Bayesianism.** Another initial observation about epistemological assumptions is now prompted by our example: our recommendation might seem, *prima facie*, to be at odds with a basic tenet of the Bayesian representation of doxastic states in terms of degrees of belief. For it is as though we are arguing that this is a case in which one has insufficient evidence to endorse an epistemic credence, even a slight degree of belief in proportion to the correspondingly slight evidence. The approach of objective Bayesian epistemology counsels that one should just keep one's confidence and wait for further information before updating it.

We won't dispute the basic principle of believing in proportion to the evidence. True, we are arguing that the agent should *not* be slightly confident, but instead refrain from having any degree of belief whatsoever. Yet, the reason for this is that we shall consider *new information* to

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<sup>8</sup>Which could be these doubts about the argument's solidity? It could be, for instance, that the lawyer's argument relies on the diagnosis carried out by a psychiatric expert witness, about whom it is later found to be perhaps biased (due to family ties, economic reasons, or something similar). Or, it could be that the lawyer's argument relies on a scientific thesis in experimental psychology that (after the replication crisis) turns out to be more controversial than initially expected; thus, we are unable to ascertain whether it truly is the case—we cannot discard it, nor accept it.

have arrived, which justifies the update in the agent’s belief. That is, the information provided about the mere existence of a future potential crucial objection, the truth-value of which we are ignorant about, is actual information. Such information is about the arrival of future decisive evidence, and as such it can be considered a sort of actual second-order evidence. I will show that this suffices to update our beliefs. Another way of putting it is that some unknown unknowns have been updated so as to become known unknowns.<sup>9</sup>

We can conceive of other objections analogous to  $O_3$ , which we should not ignore either. Informally, any objection  $O_x$  that is analogous to  $O_3$  seems to amount to new information that would lead the detective to think something like: “So far I have been believing that John is the killer (H), *but if* this new information ( $O_x$ ) that I have received is true, then John would not be the killer.<sup>10</sup> Unfortunately I am ignorant as to whether this new information is true; in other words, I suspend judgment about this new information ( $O_x$ ). So what do I believe now about John being the killer (H)? Now I do not know either, for the veracity of it (H) is *dependent on the veracity of this information* (O). Therefore, as I am suspending judgment about O, I must also suspend judgment about H.”

**The unobservable universe.** In many examples, *prima facie* it is not obvious what to believe, i.e. whether to ignore the objection or not, i.e. whether to keep our current degree of confidence or suspend judgment. Let us end our overview of the epistemic situation under discussion through another example in which it is unclear whether our type of objection

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<sup>9</sup> What the Bayesian is unable to do, however, is to represent suspension of judgment. For alternative formal models see footnote 1. There is a growing amount of literature in epistemology reflecting on this, to which I shall appeal later, but our approach comes from the philosophy of science literature. As Norton (2007, 2008, 2010) urges, rather than choosing *a priori* the best inductive logic to represent our beliefs, the empirical or ‘material’ conditions of the problem have to justify the appropriate inductive logic. Whilst a probabilistic framework—a precise numerical assignment of probability—is often justified, this is not always so, and using an incorrect inductive logic can lead us to make incorrect predictions. One case in which some contend a probabilistic framework is unjustified is that of so-called ‘total ignorance’. In total ignorance, suspension of judgment is said to be the most appropriate doxastic state, yielding an inductive logic different from the usual probabilistic framework, the latter being unable to model suspension of judgment. (Further, assigning the same probability to each possibility is not the only disputable step, another being that of *adding up* the probabilities. Thus, the axiom of additivity is removed.)

<sup>10</sup>We are assuming that the objection  $O_3$  to H being true means that the decisive evidence found refutes H.



should be ignored, which might remind the reader of some classic discussions in philosophy of science, as discussed in Section 4.

Consider a physicist in, say, the XIII century who knows everything known so far about physics. Her best guess as to how the world is is then given by this physical theory (assuming the naturalistic stance). Her corresponding scientific image of the universe is the hypothesis  $H$ . Then she later discovers that the observable universe is only an insignificantly small region of the universe: she comes to know that there is a vast unobservable region of the universe, which might contain crucial evidence about how the world is. (To give a size estimated in some current cosmological models, suppose that the ratio between the radii of the observable and the unobservable universe is  $3 \cdot 10^{23}$ ; note that this number is so high that is cognitively ungraspable.) We can then agree that the evidence available to this physicist is of *much* less weight than the vast amount of evidence that she lacks from the unobservable universe. Thus, let us assume that an induction from the observable to the unobservable is unjustified given the disparity between their sizes, which differ by many orders of magnitude. (In other words, this means that one cannot appeal to the uniformity of nature, as it cannot be inductively justified, given the disparity between the sizes of the sample and the total population.)

Thus, the scientist began with a certain degree of confidence in  $H$ . Then, the crucial objection  $O$  the truth-value of which we are ignorant consists in knowing of the existence of a newly discovered region of the universe, which due to its overwhelming size, *might* refute the scientific image the physicist has. Again, the question is: what should the physicist believe in light of *coming to know of this new “evidence”  $O$* , which *might* represent a crucial objection to  $H$ ?

I take it that this is not obvious. Historically, some physicists and philosophers have considered something similar to what I have outlined to support instrumentalism or scientific antirealism (e.g. [Van Fraassen 1980, 2002](#)). According to them, scientific theories are just useful tools with extremely successful predictions, but this does not imply that the world in fact resembles what these scientific theories say. Here our argument will support such an antirealist stance: unless some stronger conditions are present—that is, in light of only  $H$  and  $O$ , and with no more evidence—our initial confidence in  $H$  should now be updated to *suspension of judgment about  $H$* . At the same time, one could invoke the reasons that I later provide in Section 4 to resist this antirealist conclusion.

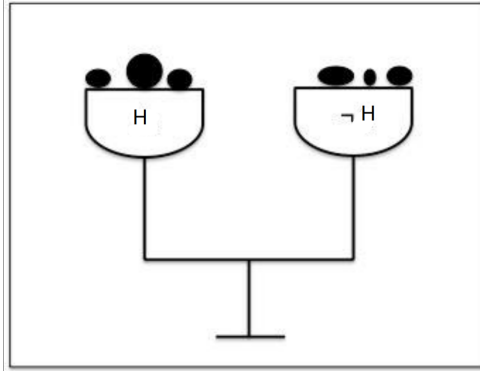


Figure 1: A typical assessment of arguments for and against a hypothesis  $H$ , some more weighty than others. Here the arguments on both sides are approximately of the same weight.

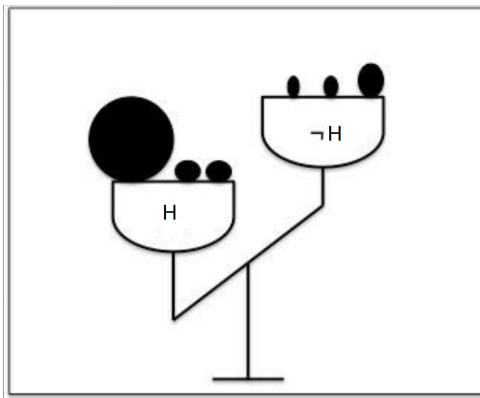


Figure 2: Sometimes one objection is crucial, so it renders irrelevant the rest of the arguments for and against  $H$ , and makes ' $\neg H$ ' win.

We are now in a position to begin to delineate the situation at stake: see Figures 1 and 2 for a standard toy-representation of the epistemic situation. We have a number of arguments for and against  $H$ . All have a certain weight (depending on how good these arguments are, which depends on a variety of reasons) that tips the scales for or against  $H$ . When an objection is deemed 'crucial', this means that it is an especially weighty argument against  $H$ : if it were put on the scales, i.e. if it were true, then it would *definitely* tip the scales against  $H$  (i.e. towards full disbelief in  $H$ ), as in Figure 2.

**Assuming the objection to be crucial.** We must assume that the objection is crucial. We can also say that by this we mean that if we were certain of the objection's soundness, it would be rational to uniquely disbelieve the hypothesis  $H$ . This condition is necessary for the

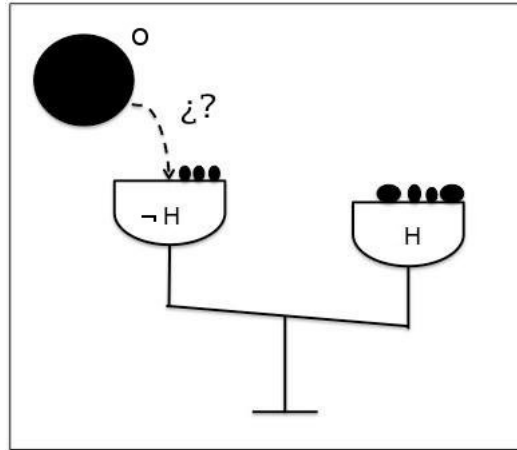


Figure 3: Our scenario of interest is one in which we know that there is a crucial objection but we are ignorant as to whether it is true, so we are ignorant as to whether we should take it into account.

propagation of suspension of judgment to occur from the conclusion to the hypothesis. More exactly, something weaker is necessary, namely that the objection's strength outweighs any other sum of arguments in support of the account (so that the scales would end up tipped against H).

If we believe  $O$  is false, we remain confident in  $H$  (the other reasons for or against  $H$  become relevant); if we believe  $O$  is true (the other reasons are irrelevant) we disbelieve  $H$ . Thus, concerning the physicist of the thirteenth century, ignorant as to whether the crucial objection  $O$  is true, I shall argue that she should suspend judgment about the target hypothesis  $H$ , i.e. the hypothesis that her current scientific image of the universe is an approximately faithful description of the whole universe. In other words, in this scenario the new second order information leads the astronomer to substantially reduce her confidence (which was previously high, because of her realist attitude) in her image of the unobservable region, and the propagation of suspension of judgment ends up supporting agnosticism about the scientific image of the universe, such as that advocated by constructive empiricism.

Then, of course, someone wishing to preserve her confidence in  $H$  could seek to refute the suggestion that the situation depicted resembles the actual balance of arguments for and against  $H$ . This, of course, does not mean that the phenomenon of the propagation of suspension of judgment is wrong. For instance, in this specific example, one could reply to our assumption that an extrapolation from the observable to the unobservable is unjustified, given

the disparity in sizes.<sup>11</sup> Anyway, what would something like this reply amount to in Figure 3? It would amount to removing the objection  $O$  as a solid argument to be put on the scales.

Likewise, our assessment of the arguments for and against  $H$  could, of course, be complemented by further arguments on either side—in ways that would render irrelevant the propagation of suspension of judgment. Suppose that we had another very strong reason to believe (or disbelieve)  $H$ . Then, the objection would no longer influence our confidence in  $H$ —we would not have a situation such as the one schematized in Figure 3. We would instead have another weighty ball which, as it would have a definite truth-value, would be placed on the scales, thus definitely tipping the scales for (or against)  $H$ . Our suspension of judgment regarding the objection would then be irrelevant.

### 3 The propagation of suspension of judgment

Let us recapitulate the general epistemic situation we have identified so far: we begin by believing in a theory  $H$ , being more or less confident in  $H$ . We then come to know that there is an actual crucial objection  $O$  against  $H$ , that is, an objection that would refute  $H$  (that would make us disbelieve in  $H$ ), but we are ignorant as to whether it is a solid argument. What should be our doxastic attitude towards the hypothesis  $H$ ? Should we suspend judgment about  $H$ ?

Although comprehensible and intuitive, because this is what should be done in many cases (i.e., when it is unsound due to a false premise), it is wrong to *always* neglect such an objection: I argue that crucial objections the truth-value of which we are ignorant should not always be neglected. For, under certain conditions, not knowing the truth-value of the crucial objection implies, since it is crucial, that the truth-value of the thesis the objection attacks is also something about which we must remain agnostic. In other words, under certain conditions, suspension of judgment about a crucial objection “propagates” to the thesis that the objection targets.

Clearly it is correct to neglect unsound arguments which are unsound owing to a premise being false; and, less obviously, also to neglect *some* unsound arguments that are unsound

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<sup>11</sup>A (rough) way to reply to this assumption might be to claim that the disparity in sizes is not so large, or that, for some reason, a small random sample suffices to give a reliable estimate, or something like that.

because one premise's truth-value is neither true nor false. However, some of the latter kind of unsound arguments *should not be neglected*.

In the epistemic situation described, our credence in H crucially depends on our credence in O. Believing the truth of O would lead us to disbelieve H (it would tip the scales against H in Figure 3); believing the falsity of O would preserve the initial positive confidence that we have granted (the scales in Figure 3 remaining unchanged). So the question is: once we are ignorant of the truth-value of O, what should we believe about H?

Suspending judgment about O means that *the hypothesis H might or might not face a crucial threat*. We do not know. Hence, the doxastic state that we are warranted to maintain is, at most, that *we are ignorant of whether we should disbelieve or keep our (positive by assumption) belief in the hypothesis H*. As previously outlined (esp. fn 1 and 9), suspension of judgment is defined as the doxastic state that amounts to being ignorant as to whether  $p$ . Thus, in this situation, the epistemically rational doxastic state that one should endorse is to *suspend judgment about H*. In general, one should *update one's own beliefs by also suspending judgment about the hypotheses that depend on the truth-value of the objection's conclusion*.

Let us look at this in more detail. Since we are not focusing on *degrees* of confirmation or disconfirmation of hypotheses, but rather on cases of the refutation of hypotheses, this allows us to model the situation in terms of epistemic logic instead of resorting to probability theory (which is able to express degrees of confirmation). Also, we would have had problems in employing probability theory, given that it is unable to represent suspension of judgment. Our argument can be formalized in epistemic logic into 3 premises and a conclusion, where  $q$  is the hypothesis H and  $p$  is the crucial objection O:

$$\begin{array}{c} K(p \rightarrow \neg q) \\ Ip \\ \frac{K(\neg p \rightarrow q)}{Iq} \end{array}$$

The formula  $Ip$  means that we are ignorant as to whether  $p$  is the case, which is equivalent to saying that we don't know that  $p$  and we don't know that  $\neg p$  (van der Hoek and Lomuscio, 2004; Fine, 2017). That is,

$$Ip \equiv \neg Kp \wedge \neg K\neg p.$$

See the proof in appendix [A](#).

The third premise is stronger than is strictly necessary. Rather than merely stating that we are confident in the hypothesis  $q$ , it grants that we know that if the crucial objection  $p$  is false, then  $q$  is the correct theory. To prove our conclusion we could have relaxed this premise, but it is not necessary to do so, as I will show that the argument is valid too, and for the sake of simplicity we leave this stronger version (the proof is shorter). I dispense with this optional premise in the proof of appendix [B](#).

## 4 Discussion

Now we can discuss some consequences of and connections to this phenomenon, which in turn will serve to better understand its significance. First, we shall now inquire into an undesirable radical consequence: an apparent “over-propagation” of suspension of judgment to too many hypotheses. Then, having restricted the scope of the phenomenon, we shall inquire into its connections with other philosophical debates.

**Radical skepticism?** The phenomenon I have shown in the previous section (and in appendix [B](#) and in appendix [C](#) following [Rosa 2019, 2020](#)) seems to yield a radical, undesirable consequence: much like traditional skepticism about the external world and about every empirical proposition, it seems that suspension of judgment propagates to *any* hypothesis. The alleged rationale behind this “over-propagation” is that it does not seem unreasonable to think that there will always be a potential crucial objection, the truth-value of which we are ignorant, to *any* hypothesis (or at least almost any hypothesis); hence, we should end up suspending judgment about almost everything; much like the age-old skeptical conclusion that we don’t have justified true belief in any empirical proposition.<sup>12</sup>

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<sup>12</sup>Let us first note that a common dialectics in contemporary analytic philosophy is to take an undesirable consequence as an objection to the thesis put forward. Yet we must be careful. Although we are going to investigate replies to the over-propagation of this phenomenon, such undesirable consequence might still remain undefeated, and we might be led to accept it. This is familiar in the history of philosophy, where many arguments with puzzling conclusions have remained undefeated for centuries (arguably, Zeno’s paradoxes, the liar paradox, or diverse skeptical arguments, to name a few). In any case, it is beyond the scope of this paper to settle the debate; I just put it forward.

Whereas it is disputed whether, after millenia, ancient skepticism has been fully answered, here I point out some reasons why this radical over-propagation of suspension of judgment does not occur in most of our theories and our beliefs. The analogy with skepticism helps us to show why. The radical skeptical conclusion is that we lack not only certainty, but also justified true belief in any empirical proposition. Hence the recommendation to suspend judgment about everything. In this line of thought we can fit our peculiar objection O (recall Figure 3 p. 12). O only makes matters worse, bolstering the case for suspending judgment. Yet, in relation to what we are concerned with, i.e. objections of the sort O, we can resolve the undesirable over-propagation of suspension of judgment by ruling out most of the cases. There are several independent reasons to think that our phenomenon does not occur too often:

1. To begin with, the objection must satisfy the special condition of being *crucial*, so not any objection can do the job.
2. Even when restricted to crucial objections, the frequently applied *Duhem-Quine thesis* is ready to jump in. That is, a real epistemic assessment is not as simple as a logical refutation; the door is always open to dispute some implicit assumption involved in the alleged crucial objection, or in some auxiliary hypothesis.
3. As we have noted, the balance of actual arguments for and against H has to be within a certain range: there must be no other strong argument on either side of the scales. This thus excludes a large body of theories about which one is extremely confident or unconfident. To give an uncontroversial example (which would be shared by those more and less sympathetic to scientific realism), think of an established theory, like the most basic tenets of solar system astronomy (that there is a system composed of a star, the Sun, with some planets plus some other celestial objects orbiting around it). Faced with this and many other well-established theories and beliefs, only the radical skeptical scenario questioning all our evidence (brain-in-a-vat scenarios) would be able to push us towards suspending judgment. That is to say, for all the well-established theories and beliefs (i.e. with an initial extremely high degree of confidence in the theory), there will be no risk of suspending judgment due to any crucial objection (unless we take seriously the radical skeptical scenario). For more on this, see above p. 13 and below p. 20 in the paragraph about the analogies with anti-realism. See also Ballantyne (2015), which complements

our points with several examples and distinctions.

4. We have always supposed that the objection is not *unconceived*, but that it is instead an actual conceived objection. This, I have argued, can be interpreted as actual new information, albeit second-order information about evidence. We are not conjecturing that it might be plausible that, in the future, there will be an unconceived objection that refutes the current theory. Instead, we are restricting ourselves to the scenario in which, today, there is an actual objection the truth-value of which we are ignorant. This substantially limits the over-propagation, as it rules out conjecturing any unconceived hypothetical cases.

But is ruling out unconceived cases justified? Can unconceived cases, in general, be ignored? This of course is a complicated, independent, debate by itself, which I don't intend to solve. But we can say something to frame it in the context of our thesis and describe it in our terms. The idea is that an antirealist might well insist on the legitimacy of unconceived crucial objections—along the lines of [Stanford \(2006\)](#)—and argue that they must be included in the balance, as the objection O is in Figure 3. This would lead us to disbelieve the corresponding scientific theories. It has been argued that when one's confidence in the existence of an unconceived sound objection is high, then one's confidence in the falsity of H should be correspondingly high. Accordingly, the crucial task, complicated due to our ignorance, becomes properly justifying that the “probability” of an unconceived sound objection is high.

Now, it is beyond our purview to resolve this complex task; yet, we can now point out that if one does not know the probability of a future unconceived sound objection, then one's credence in H should be correspondingly undetermined. This is analogous to the scenario of Figure 3, and I have argued that there is propagation of suspension of judgment. Thus, one should suspend judgment on the current scientific theory H.

Of course, either of these two strong counterintuitive results (disbelieving or suspending judgment about any H that fits the schema) could be the case; they cannot be ruled out just because they are counterintuitive or too strong. Still, I believe them to be unrealistic. I believe this move is unwarranted for most scientific theories: for all those theories that are well established, appealing to an unconceived theory or, in our case, to an unconceived objection, is unwarranted. In other words, the probability (confidence)



we should assign to it is neither high nor undetermined; it should be low. As [Hoefler \(2020\)](#) and [Hoefler and Martí \(2020\)](#) argue, the reason this move looks unwarranted is that the more the established theories have grown and received confirmation (as well as developing interdependence with other theories), the less plausible is the postulation of a logical possibility that would radically undermine these extremely well established theories (never before so well established in history).<sup>13</sup> Analogously, appealing to an unconceived objection  $O^*$  seems equally unreasonable, for most well-established theories and beliefs.

At the same time, however, in the case of less established theories, like the most speculative theories of fundamental physics, appealing to an unconceived theory or, in our case, to an unconceived objection  $O^*$ , does not seem outlandish to us. I don't think that this is controversial: this possibility is in fact seen, implicitly or explicitly, as one of the reasons why some theoretical physicists are very cautious about the latest conjectures. As of today, two fairly well-known examples, about which some physicists are agnostic in spite of the indirect empirical support they receive, are: (i) the existence of dark matter (instead of modifying the theory of gravity), and (ii) the process of cosmic inflation in the early stages of the universe.

Moreover, there are ways of sustaining some kind of theory endorsement even when the propagation of suspension of judgment does happen:

5. This phenomenon is intended to apply only in contexts of *epistemic rationality*. And then, in cases where this phenomenon does apply, eschewing the different conditions laid out in the previous four points, we can still resort to the distinction that has been drawn in various ways in the literature: a distinction between a strict epistemic rationality in which the aim of not being wrong is prioritized, and another epistemic rationality in which the aim of belief is truth, even if this means adopting more risk—a well-known

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<sup>13</sup>More in detail, [Hoefler \(2020, 6\)](#) argues that, with respect to the well-established parts of chemistry, “the incredible variety of experimental and observational evidence we have accumulated, which meshes together in complex ways, makes the existence of such an alt-chemistry quite inconceivable for us, and thus the burden of proof lies on the philosopher who wants us to take it as a live possibility: show us how things in chemistry could be radically different.”

distinction in the epistemology literature since the Clifford (1877) vs. James (1896) debate. The phenomenon of propagation holds in strict contexts, that is, only when the former aim of belief is endorsed, such that the priority is not being wrong. Instead, when the latter aim of belief is endorsed, such that the priority is holding true beliefs, at the risk of being wrong, the recommendation of suspension of judgment can be dispensed with. It should be noted, however, that scientific (and philosophical) inquiry is paradigmatically framed as having the former aim of maximizing caution and avoiding falsehoods, so in this context this strategy wouldn't work.

6. But yet another strategy in the vicinity would: in contexts of scientific or philosophical inquiry, it seems reasonable to endorse what has been described in various ways in the literature, and has sometimes been called the 'acceptance' of a theory (Van Fraassen, 1980). This means not literally believing in the truth of the theory, but rather acting *as if* it's true, in order to continue pursuing research (in the case of scientific inquiry), or to continue living according to some beliefs (in the case of "real life").<sup>14</sup> Recently, several philosophers have defended doxastic attitudes similar to 'acceptance', in a way that, it seems to us, enhances the legitimacy of such a doxastic stance. Instead of talking of 'acceptance', Goldberg (2013, Ch14) talks in terms of 'regarding-as-defensible' those propositions that one believes but which are subject to the skeptic's recommendation of withholding any such belief; Friedman (2020, forthcoming) talks about 'the zetetic attitude'; McGrath (2020) talks in terms of an inquiry attitude (distinguished from other kinds of suspension of judgment); and still in the vicinity, Staffel (2019) talks of 'transitional attitudes'. All of these provide a subtle investigation that could qualify and enrich our assessment. Furthermore, this tension can also be resolved by moving on from the idealized rational agent considered in the present normative study to a realistic system of human cognition, in which systems of belief are fragmented and divided into different compartments (Lewis, 1996; Egan, 2008).

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<sup>14</sup>The parallel with ancient skepticism is illustrative here: Pyrrho recommended suspension of judgment, and so, regarding pragmatic rationality, i.e. which beliefs to hold in order to act in real life, Pyrrho recommended to live just by following the habits with which you happen to be surrounded, for practical convenience.

**Scientific antirealism.** I have pointed out the connection of our phenomenon with skepticism: its similarly unwelcome overpropagation, and the several reasons to resist such overpropagation. This allows us to connect the phenomenon to another classic debate in philosophy, wherein some versions of scientific antirealism advocate for suspending judgment about the theory, due to well-known concerns about the truthlikeness of current theories (or of unobservable entities, in another of the several versions of this argument). The whole dialectic in our paper echoes a classic argument for scientific antirealism: the pessimistic meta-induction. For the pessimistic meta-induction *also conjectures the existence of a future refutation of the current scientific theory*. And on those grounds, Van Fraassen’s version of antirealism recommends suspension of judgment. As can now be seen, the antirealist makes as if she were supposing that in the future there will be something like our objection O, albeit so far unconceived.

There are a variety of versions of antirealism; here I am just sticking to some aspects of Van Fraassen’s version. It is interesting to note, nevertheless, that another standard way of interpreting the pessimistic meta-induction is to conclude that our current scientific theories *are probably false* (e.g. the classic [Laudan \(1981\)](#)). This would amount to the following variation in the balance of figure 3: the objection O—the pessimistic meta-induction—is now considered to be *probably true*, so we are inclined to put it in the balance; accordingly, the balance is probably tipped against C—realism about current scientific theories—which is to say that C is probably false. This additional commitment to the probabilistic claim in this standard formulation of the pessimistic induction argument is something that later (perhaps more cautious) versions such as Van Fraassen’s refrain from endorsing. Irrespective of which antirealism is better, it can be seen that our epistemic scenario more closely parallels Van Fraassen’s version.

Are we thus supporting the pessimistic meta-induction? I have argued that the phenomenon holds as long as the objection is actual and conceived, and that I don’t consider it plausible that unconceived objections are relevant, except in the most speculative contexts of theoretical physics. If this is correct, then we are not supporting the pessimistic meta-induction. However, as in the debate on scientific realism, it is not clear why one should not take such objections into account. I suspect that a discussion at this level of generality is unable to settle the issue, and that it depends on the context (the field of science in question). Accordingly, I suspect that unconceived objections might be significant only for the question

of realism about the most speculative contexts of physics. In any case, it is of course beyond the scope of this paper to resolve the issue of unconceived alternatives, which I do not know how to answer.

**Peer disagreement.** Finally, this is also linked to another branch of epistemology which sometimes ends up recommending suspension of judgment: the debate about faultless peer disagreement. Some philosophers argue that in such situations, in which two reasonable peers disagree without any apparent flaw in their reasoning, each agent should suspend judgment (e.g. [Feldman 2006](#)). In order to recognize the similarity with our scenario, we can reinterpret the balance of arguments so that one agent has reasons of diverse weight on one side of the scales and, *mutatis mutandis*, the other agent on the other side. Sometimes in this debate there is a slight difference with our setting, which can be informative of some real case scenarios, namely, that the reasons put forward by one agent are unknown to the other and vice versa—they find themselves disagreeing over something, but they do not know what reasons lead the other to think differently. So here the ignorance is manifested in a slightly different way—not as ignoring one crucial objection, but instead ignoring all the actual objections on the other side of the scales. These differences notwithstanding, one recommendation is the same, i.e. to suspend judgment (see [Feldman 2006](#), the several chapters of [Machuca, 2013](#), [Carter, 2018](#); cf. [Matheson, 2015](#), Ch. 4.3, 6.3, 7.2).

To give an example, [Kornblith \(2013\)](#) makes the case that the history of philosophy itself can be seen as an history in which several peers, the “expert” philosophers, disagree on basically most, if not all, philosophical matters. Due to this peer disagreement, the advice is then pessimistic: we should suspend judgment about these philosophical matters and discard the hope of progress in philosophy. This example again echoes our scenario, in that it is conjectured that this lack of progress will always be so, since we *could always* find some other expert philosopher who will disagree with whichever current philosophical theses.

Can peer disagreement be threatened by a similar propagation of suspension of judgment? This would amount to say that, due to the potential existence of a peer with whom we disagree about (almost) *any* proposition, we should end up suspending judgment about (almost) everything. In this case, we see more clearly that this radical skeptical scenario is quite implausible: the assumption of always having a potential peer who disagrees just seems

unwarranted. Similarly to what we are discussing here, one position in the peer-disagreement debate has been accused by another position of being too skeptical. The ‘conciliationist view’ advocates revising our beliefs in light of disagreement (adjusting our beliefs, not necessarily suspending judgment). Yet this can “over-propagate” (to use our terminology); so the opposing ‘steadfast view’ argues that this leads to an overly skeptical situation.

## 5 Conclusion

I have shown that in certain circumstances coming to know about a crucial objection  $O$ , the truth-value of which we are ignorant, influences what we should believe, leading us to suspend judgment also about the hypothesis  $H$ . We should thus not merely leave aside and forget such objections.

This phenomenon is not restricted to scientific hypotheses, but also applies to philosophical (and any other) hypotheses. Indeed, in (Filomeno, 20xx) I have applied this phenomenon to a specific philosophical argument: a major objection to the Humean account of laws. Since we all, Humeans included, suspend judgment on the major objection, I conclude that, at best, we should suspend judgment about the Humean account of laws.

This phenomenon holds in the context of epistemic rationality, i.e. when the aim is seeking truth, and when the priority is avoiding falsehood—as in scientific and philosophical inquiry. Besides our argument and our formal proof in Section 3, I include in the following appendices further logical proofs. In the discussion section I have outlined the diverse considerations to which one can appeal to resist its application, and shown the analogy in the dialectic with the epistemological topics of skepticism, scientific (anti)-realism, and peer disagreement.

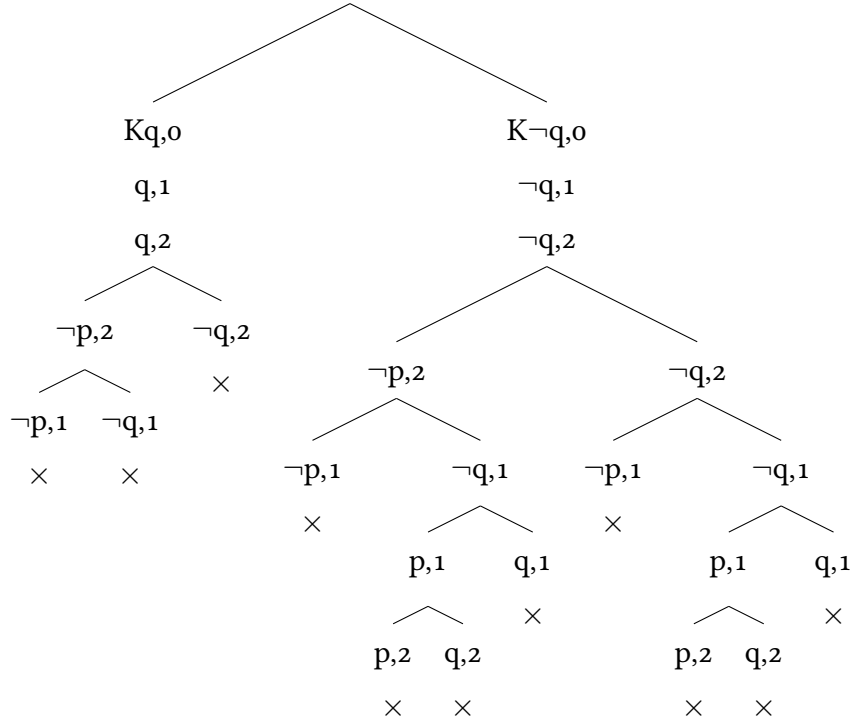
## A Appendix. Proof in epistemic logic

The following tableaux shows by *reductio ad absurdum* that the argument is valid.<sup>15</sup>

1.  $K(p \rightarrow \neg q)$ , 0
2.  $I p$ , 0
3.  $K(\neg p \rightarrow q)$ , 0
4.  $\neg I q$ , 0
5.  $(Kq \vee K\neg q)$ , 0; [4, def. of 'I']
6.  $\diamond p$ , 0; [2]
7.  $\diamond \neg p$ , 0; [2]
8.  $0r1$ ; [6]
9.  $p$ , 1; [6]
10.  $0r2$ ; [7]
11.  $\neg p$ , 2; [7]
12.  $(p \rightarrow \neg q)$ , 1; [1]
13.  $(p \rightarrow \neg q)$ , 2; [1]
14.  $(\neg p \rightarrow q)$ , 1; [3]
15.  $(\neg p \rightarrow q)$ , 2; [3]

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<sup>15</sup>We write down the 3 premises and then the negation of the conclusion, and verify that every branch closes. The numbers 0, 1, ... refer to the worlds  $\omega_0, \omega_1, \dots$  where the sentences are evaluated. I do not assume that the reader knows or remembers the rules involved, so here are the main ones (for more details, see Priest 2008, ch. 3; cf. Goble 2001, ch.9): The operator 'K' follows the properties of the operator ' $\square$ ' in S5 modal logic, and it is interpreted as 'the agent knows that'. Steps 5, 6, and 7 come from the definition of I (see above). 8 to 11 from the definition of ' $\diamond$ '. 12 to 15 from the definition of 'K' (applied to premises 1 and 3 respectively). The first branching comes from the definition of ' $\neg$ ' (applied to premise 4). The next two branchings come from the definition of ' $\rightarrow$ ' applied to premises 12 and 13. The final two branchings come from the definition of ' $\rightarrow$ ' applied to premises 14 and 15.



Therefore,  $Iq$ .

## B Appendix. Proof in 3-valued logic

We can also model our argument in 3-valued logic, where the truth-values T, F, and  $i$  are understood epistemically:

‘ $v(p) = T$ ’ is interpreted as ‘the agent believes  $p$ ’;

‘ $v(p) = F$ ’ is interpreted as ‘the agent disbelieves  $p$ ’;

‘ $v(p) = i$ ’ means that the agent is ignorant as to whether  $p$  is the case; in other words, the agent suspends judgment about  $p$ .

Moreover, in 3-valued logic we can add symbols for expressing that a proposition can be ‘definitely true’ (T), with the symbol  $+$  and ‘not definitely true’, i.e. either false (F) or indeterminate (i), with the symbol  $-$ . Here we do not capture the degrees or strengths of beliefs, just full beliefs or disbeliefs: we only need the objection to be crucial, so that it implies disbelief in the hypothesis (which can be captured with a material conditional, as in premise 1 above). (Cf. our remarks in Sect. 3 p. 14.)

**Preliminary justification of the formalism.** There are different 3-valued logics; the most appropriate to model our epistemic scenario is arguably Łukasiewicz’s version. The crucial difference with strong and weak Kleene logic is the conditional, which according to Łukasiewicz is:

		$q$		
$p \supset_L q$		T	i	F
	T	T	i	F
$p$	i	T	T	i
	F	T	T	T

The center cell, with value T, distinguishes Łukasiewicz’s from the Kleene’s conditionals. The latter give an *i* in this place. We must justify that this is the correct conditional to represent the logic between crucial objections and hypotheses.<sup>16</sup> A sufficient reason seems to be that which leads Łukasiewicz to justify his conditional. He introduced the value T in the center cell in order to preserve the logical truth in classical logic that  $(p \rightarrow p)$ . We are in fact interested in preserving it; this is especially clear given that we are interpreting the truth-values epistemically: strange epistemological reasons would be needed to deny that a conditional with identical antecedent and consequent is known to be true whatever the epistemic status of  $p$  (T, F, or *i*). The controversial case in  $(p \rightarrow p)$  is when  $v(p) = i$  (the center cell in the truth-table above). In this case I think that the conditional should be true, for it states that: if we are ignorant as to whether  $p$ , then we are ignorant as to whether  $p$ . This is trivially known to be true. (This, however, does not show that Łukasiewicz’s conditional captures the semantic values of an objection  $p$  which would refute a hypothesis  $q$ . This could still be disputed, as I have not provided a justification of this.)

For the sake of completeness, and to better understand the conditions that are needed for the propagation to occur, we can take the opportunity to express a slightly different version of our argument. In particular, we will get rid of the stronger premise 3, which described a scenario, optimistic for the opponent, in which if the objection was not the case, then the hypothesis was true. The expressive capabilities of 3-valued logic easily capture the argument

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<sup>16</sup>This conditional gives the results that I have been arguing for. The other conditionals, instead, give an even stronger conclusion, which seems too strong, namely: if we know of a crucial objection to H about which we suspend judgment, then we should *disbelieve* H (rather than suspend judgment about H).



we are looking for:

$$\frac{\begin{array}{l} 1. (p \rightarrow \neg q), + \\ 2. (p \vee \neg p), - \end{array}}{C. q, -}$$

The untrue disjunction of premise 2 is a way to express that the value of  $p$  is indeterminate, that is,  $i$ ; that is to say, that we suspend judgment about  $p$ . (This is a convoluted way of expressing that  $p$  is neither true nor false.)

We can see that the argument is valid by looking at the corresponding truth-table of a conditional with the consequent negated (where, still, the left-column values represent  $p$ 's values and the top-row values represent  $q$ 's values (not  $\neg q$ )), which follows from the table for the conditional above:

		q		
		T	i	F
p	T	F	i	V
	i	i	T	T
	F	T	T	T

Focusing on the row where the crucial objection  $p$  has an indeterminate epistemic truth-value (the row in the middle), we have two cases for the hypothesis  $q$  where the conditional is, as we are supposing, true: the values where  $q$  is *false or indeterminate*. That is, as C states, the hypothesis  $q$  is known to be not true.

Additionally, if we would agree that our meta-language follows a 3-valued logic—and we have been doing so from the beginning, where I introduced suspension of judgment as an acceptable doxastic state alongside belief and disbelief—we could interpret the ‘or’ above accordingly, concluding that the value of  $q$  is just indeterminate, that is, that *we should suspend judgment about the hypothesis q*.<sup>17</sup>

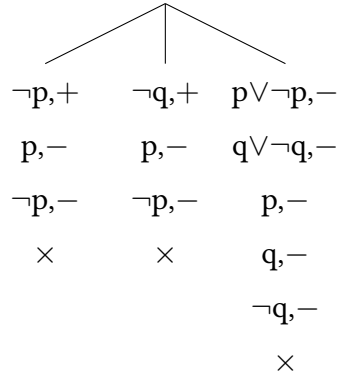
We can also see that the argument is valid with a proof by *reductio* in the following

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<sup>17</sup>This is because we have arrived to the conclusion C, which says that we should believe that the hypothesis  $q$  is false or suspend judgment about  $q$ . But this disjunction, with one disjunct indeterminate and another false, entails that we should suspend judgment about  $q$ —as, in fact, the truth-table of the disjunction says (an indeterminate disjunct and a false disjunct give an indeterminate disjunction).

tableaux:<sup>18</sup>

1.  $(p \rightarrow \neg q), +$
2.  $(p \vee \neg p), -$
3.  $q, +$



Therefore,  $q, -$ .

## C Appendix. Propagation from a premise to its conclusion

This phenomenon can also be rephrased so that it occurs from the premise of an argument to its conclusion.

Rosa (2019) denotes as the ‘logical principle of agnosticism’ (A5) the principle according to which one shouldn’t disbelieve a conclusion and suspend judgment about one of the premises. Formally (with irrelevant variations for the sake of clarity),

$$(A5) : \quad \text{If } \Phi_1, \dots, \Phi_n, \models \Psi \text{ then } \neg(K\Phi_1 \wedge \dots \wedge K\Phi_{n-1} \wedge S\Phi_n \wedge K\neg\Psi).$$

where, relative to an agent,  $Kp$  stands for ‘knows that p’ and  $Sp$  stands for ‘suspends judgment about whether p’.<sup>19</sup> In our case, it follows from (A5) that, since one is agnostic about one of

<sup>18</sup>The main rules involved are: a branch closes in Łukasiewicz’s logic if there is:  $A, +$  and  $A, -$ ; or  $A, +$  and  $\neg A, +$  (Priest, 2008, ch. 7, 8). The triple-branching is due to the conditional (of premise 2), whose truth-table I have written above (p. 25): it branches in the cases where the antecedent is true, the consequent is false, or both are indeterminate (the cell at the center) (Priest, 2008, 150).

<sup>19</sup>I could have used here the modal operator ‘B’, indicating “not necessarily veridical beliefs” and everything would hold. I use the operator ‘K’ indicating veridical beliefs for convenience with the previous notation.

the premises, one should not believe that the conclusion is false. That is,

$$(S\Phi_n \rightarrow \neg K\neg\Psi)$$

The conclusion  $\Psi$  is the objection’s conclusion, as in the example of §2, that ‘the evidence from the unobservable universe may completely differ from the evidence of the observable region’. From (A5) we thus arrive at the result that one does not know that  $\neg\Psi$ ; that is to say, *one should not believe that the evidence from the unobservable universe describes a universe similar to that from the observable region*. This is to say, as I have argued above, that one should not believe the objection’s conclusion to be false.

An informal explanation of why (A5) holds is that, given that there are premises that lead to  $\Psi$  and we are ignorant as to whether one of those premises is the case,  $\Psi$  is an open possibility; hence, you are not justified in believing that  $\Psi$  is not the case. (A5) is deduced in (Rosa, 2019, §3.2) from another plausible principle of agnosticism, (A2).<sup>20 21</sup>

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<sup>20</sup>(A2) states that:

$$(A2) : \quad \text{If } \Phi_1, \dots, \Phi_n, \models \Psi \text{ then } \neg(K\Phi_1 \wedge \dots \wedge K\Phi_n \wedge S\Psi).$$

So it states that one should not believe in the premises and suspend judgment about the conclusion. (A2) is defended in (Rosa, 2019, §3.1). To be precise, the author phrases it slightly more modestly, adding to the consequent a clause ‘R’ standing for “there is a reason for one not to be such that” (and uses the operator B).

<sup>21</sup>Notice that this is not symmetrical, in that one can still believe that  $\Psi$  is the case, i.e.,  $K\Psi$  (for there might be other reasons that lead one to believe in  $\Psi$ ). In our example, this is to say that one might still believe that the evidence from the unobservable universe may completely differ from the evidence from the observable region.

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