

On an alleged completion of an infinite epistemic regress

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Abstract

This paper discusses the claim, issued by Peijnenburg and Atkinson, that some infinite epistemic regresses can be completed. We argue (1) that Peijnenburg and Atkinson do not really address the traditional epistemic Regress Problem, and (2) that the argument they offer does not qualify as the completion of an infinite epistemic regress.

1 The traditional epistemic regress problem

This paper is a discussion of the claim, due to Peijnenburg and Atkinson, that, contrary to what is traditionally assumed, there exist infinite epistemic regresses that can be completed. In addition to being intrinsically interesting, this claim is also extrinsically important, for if it is correct, one traditional argument for foundationalism, the Regress Argument, is undercut as this argument involves the idea that infinite epistemic regresses *cannot* be completed. In this paper we present, first, the traditional Regress Problem, or rather, various versions of it. Next, we present Peijnenburg's and Atkinson's version of it, a version in which the notion 'justified belief' is given pride of place. In the next section, we discuss the principle of justification that Peijnenburg and Atkinson seem to adopt and argue that, with that principle, the epistemic Regress Problem cannot even be addressed. Next we argue that the formal computations that Peijnenburg and Atkinson perform do not qualify as "the completion of an infinite regress". Finally, Peijnenburg and Atkinson explicate what they mean by the 'make probable relation'. We point to a problem in their account, but this is not crucial as that relation doesn't figure in their computations.

What is widely referred to as the epistemic regress problem has received rather different formulations. In this section we consider various of such

formulations in the interest of explicating criteria that a regress must meet in order to qualify as an *epistemic* regress. That will provide us with a firm basis for discussing the claim of Peijnenburg and Atkinson that there exist infinite epistemic regresses that can actually be completed.

One *locus classicus* of the epistemic regress problem is Sextus Empiricus' *Outlines of Pyrrronism*, where five "Modes" are distinguished, i.e. five lines of reasoning, that sceptics have availed themselves of as a safeguard against dogmatism. The second of these modes has to do with an infinite regress. Says Sextus:

The Mode based upon regress *ad infinitum* is that whereby we assert that the thing adduced as a proof of the matter proposed needs a further proof, and this again another, and so on *ad infinitum*, so that the consequence is suspension [of assent], as we possess no starting-point for our argument.¹

Now of what is the regress that Sextus refers to a regress? As the quote indicates, it is a regress of proofs, or, in the Annas & Barnes translation, a regress of warrant. Beyond this point, however, Sextus doesn't provide any further details. He doesn't tell what a proof is (or what 'warrant' comes to), nor what items are capable of being proved (or warranted). Others who have filled in the details, have done so in various and different ways - and some have substituted 'proof' and 'warrant' for other notions, or, alternatively, have tried to explain them in other terms.

Peter Klein for instance, commenting on Sextus, puts it like this: "The Modes were recipes for avoiding dogmatism, i.e. the disposition to assent to non-evident propositions when it is not settled whether they are true. One could locate such a non-evident proposition either by noting that there was credible disagreement about it or by merely recognizing that there could be credible disagreement. For in order to avoid epistemic hubris, the recognition that our epistemic peers could sincerely disagree with us about the truth of some proposition forces us to regard it as requiring reasons in order to rise to the desired level of credibility."² Klein, then, doesn't talk about 'proofs' but

¹Quoted from Klein 131. A rather different translation of Sextus' text reads: "In the mode deriving from infinite regress, we say that what is brought forward as a warrant for the matter in question needs another warrant, which itself needs another, and so ad infinitum, so that we have no point from which to begin to establish anything, and suspension of judgement follows". (Annas & Barnes 1985: 182) Two differences stand out. Where the quotation from Klein has 'proof', the Annas & Barnes text has 'warrant', and where the quotation from Klein has 'no starting point for an argument', the Annas & Barnes text has 'no point from which to begin to establish anything'.

²Klein 2005: 132.

about ‘reasons’. He furthermore says that for Sextus reasons are required if (and then he introduces another helpful notion not present in Sextus’ text) a proposition is to have a desired level of credibility; he restricts this requirement to non-evident propositions - a restriction not found in Sextus.

On Klein’s approach and in his terminology, then, an epistemic regress is a regress of reasons for the credibility of a non-evident proposition. Accordingly, an infinite epistemic regress is an infinite regress of reasons, so a series that contains a reason for a non-evident proposition, a reason for that reason, a reason for that reason for that reason, a reason for that reason for that reason, etc.

Michael Williams spells out Sextus’ Infinity Mode in a rather different way. “Suppose”, he says, “that I make a claim - any claim. You are entitled to ask me whether what I have said is something that I am just assuming to be true or whether I know it to be the case. If I reply that it is something I know, you are further entitled to ask me how I know. In response, I will have to cite something in support of my claim: my evidence, my credentials, whatever. But now the question can be renewed: is what I cite in defence of my original claim something that I am just assuming or something that I know? If the former, it will not do the job required of it: you can’t base your knowledge on a mere assumption. But if the latter, it will in turn need to be backed up, and so on.”³ We note that, other than Klein, Williams doesn’t talk about ‘propositions’ but about ‘claims’; not about ‘reasons’ but about ‘evidence’; not about ‘credibility’ but about ‘knowledge’. He furthermore doesn’t restrict the requirement for evidential back up to what is non-evident. Says Williams: “[W]hy [should] something striking us as self-evident [...] be a guarantee of its correctness? If we ignore this question, the sceptic will say, we are just making a dogmatic assumption. But if we try to find some further validation of intuitive self-evidence, we threaten to open up the regress all over again.”⁴

On Williams’ approach, and in his terminology, then, an epistemic regress is a regress of claims that are, or can be, backed up by evidence that the subject can cite, and the evidence cited consists of what the subject knows to be true. And an infinite epistemic regress is an infinite chain of such claims, each of which is backed up by evidence one can cite, while each piece of evidence is something that is known by the subject to be true.

Richard Feldman explicates Sextus’ regress argument invoking yet other terminology. “The argument”, he says, “begins with the observation that

³Williams 2001: 62.

⁴Williams 2001: 63.

what makes a belief justified, at least in the typical case, are other beliefs or reasons. [...] [I]f you think about this for a moment, you will notice that a problem arises. If one belief is based on some reasons, but those reasons do not have a basis themselves, then it looks as if what depends on those reasons is no better justified than a belief for which one has no reason at all. [...] In short, you need reasons for your reasons, and you need reasons for those reasons, and so on. But it does not seem as if any of us could ever have this endless supply of reasons.”⁵ Two new terms appear in this explication, ‘belief’ and ‘justification’. Whereas Klein speaks about ‘the level of credibility of a non-evident proposition’, Feldman speaks about ‘the justification of belief’. But both hold that what they have their eyes on (‘the level of credibility’ and ‘the justification of belief’) is determined by reasons - and Feldman seems to identify reasons with beliefs.

For Feldman, then, an epistemic regress is a regress of justified beliefs, and since justification depends on the subject having reasons for her belief, we might also say that an epistemic regress is a regress of reasons for a target belief. An infinite epistemic regress, accordingly, is a regress of beliefs, each of which is justified by reasons that the subject has.

Richard Fumerton, not commenting on Sextus, has argued for a principle that is much in line with Feldman’s explication of Sextus, viz. *the Principle of Inferential Justification* (PIJ):

(PIJ) To have justification for believing P on the basis of E one must not only have (1) justification for believing E , but (2) justification for believing that E makes probable P .⁶

Fumerton brings out the motivation for (PIJ) by means of the following case (that we have slightly edited). Suppose you claim to be justified in believing that Fred will die shortly and that you offer as your justification that a certain line across his palm (the infamous ‘lifeline’) is short. Then, condition (1) of (PIJ) is satisfied, for you have justification for believing that Fred’s so-called ‘lifeline’ is short - you have observed it yourself. Still, you are not justified in believing that Fred will die shortly on the basis of that evidence, because condition (2) is not satisfied. For, you have no justification for believing that Fred’s short ‘lifeline’ makes it probable that he will die shortly. If one accepts (PIJ), Fumerton argues, an infinite regress will ensue: “If all justification were inferential then for someone S to have justification for believing some proposition P , S must be in a position to

⁵Feldman 2003: 49-50.

⁶Fumerton 2002: 211.

legitimately infer it from another proposition E_1 . But E_1 could justify S in believing P only if S were justified in believing E_1 , and if all justification were inferential, the only way for S to be justified in believing E_1 would be to infer it from some other proposition E_2 justifiably believed, a proposition which in turn would have to be inferred from some other proposition E_3 , which is justifiably believed, and so on ad infinitum. But finite beings cannot complete an infinitely long chain of reasoning, and so, if all justification were inferential, no one would be justified in believing anything at all to any extent whatsoever.”⁷ In this rendering of the regress argument, no use is made of such notions as ‘proof’, ‘warrant’, ‘claim’, ‘evidence’, ‘reason’, and ‘knowledge’. The only notions involved are ‘belief’, ‘justification’, ‘proposition’, and ‘making probable’. The latter notion is one we haven’t seen yet. Still it might have been present just below the surface of other notions, esp. ‘proof’, ‘evidence’ and ‘reason’. After all, all these notions have been introduced without proper analysis, and the analysis of each of them could easily be given in terms of ‘making probable’. So, ‘ x proves y ’, ‘ x is evidence for y ’ and ‘ x is a reason for y ’ could all be analyzed as ‘ x makes y probable’.

On Fumerton’s approach, then, an epistemic regress is a regress of *justified beliefs* - and a belief is justified provided it satisfies (PIJ). This regress, as Fumerton has indicated, is infinite.

These, then, are strikingly different ways of rendering what is supposedly the same thing: the epistemic regress argument. Nevertheless, there are a few constants in the arguments that we must note:

[A] The arguments concern a subject that is trying to decide whether a certain proposition is credible; or alternatively, they concern a subject that is trying to decide whether a belief of hers is justified, whether she has (good, or sufficient) reasons for it.

[B] Whatever it is that makes a proposition credible, whatever it is that makes a belief justified, the subject must be aware of it, she must be capable of citing it, she must be capable to access⁸ it. Or: whatever it is that makes a proposition credible, if a subject holds it is credible, she must be able to *show* that it is; if a subject’s belief is justified, she must be able to *show* that it is.

As William Alston has pointed out, the notion of ‘justification’ is am-

⁷Ibid.

⁸See for this also Cling 2008: 402.

biguous.⁹ The justification of a belief might be a certain *process* or *activity* - the process or activity of *showing* that the attitude of believing has some positive status. The justification of a belief might on the other hand also be a certain *state* one's belief is in - the state namely of being justified. This is a real and important distinction, obviously. For your belief that you are, for example, a native Dutch person may be entirely justified, but this is very different from your being able to show that your belief has that status; the latter might be a rather difficult thing to do. Standard modes of expression in the epistemological literature such as that '*S*'s belief is justified' and '*S* has a justified belief', are hence typically difficult to interpret. It should be clear however that the notion of justification as used in [A] and [B] is the activity concept - the showing concept of 'justification'.

There is a further constant, a principle that hasn't explicitly surfaced so far, but that is implicit in all of the above versions of the epistemic regress argument:

[C] In order to show that a certain proposition is credible it is insufficient to show that the proposition is entailed by another; in order to show that belief in a certain proposition is justified, it is insufficient to show that it is entailed by another proposition.

The reason for this is simple enough: if you see that 'I have 10 million Euro' entails 'I have at least 5 million Euro' this doesn't render the latter proposition credible, nor does it justify belief in it.¹⁰ Entailment of a proposition by another is perhaps necessary but insufficient for credibility, nor does it render the belief in it justified.

One point that has been made over and over again by those who have reflected on epistemic regresses, is that if an epistemic regress is infinite, no proposition will be rendered credible by it, no belief rendered justified by it.

It is this conditional claim that Peijnenburg and Atkinson are attacking. They don't commit themselves to the claim that all epistemic regresses are infinite; for all they say, some such regresses may be finite. Nor is their claim that all epistemic regresses that are infinite can render propositions credible, or beliefs justified. Theirs is the still weaker claim that some epistemic regresses that are infinite, are nonetheless capable of rendering certain propositions credible, or certain beliefs justified. Let us now turn to the argument advanced for it.

⁹See for this Alston 1989: 43, 55, 70.

¹⁰We borrow this example from Cling 2008: 402, who makes the same point as we in [C].

2 Peijnenburg's and Atkinson's version of the epistemic regress problem

As indicated, Peijnenburg and Atkinson have argued for the claim that “beliefs may be justified by an infinite chain of reasons that can actually be completed” (Peijnenburg 2007: 598; also Atkinson & Peijnenburg 2009) and they explicitly frame their discussion by reference to the Regress Problem. They intend to provide a non-sceptical solution to it that differs from the foundationalist, coherentist and infinitist solutions.

In order to be able to discuss their solution we first provide, and then discuss, some relevant quotations in order to find out how they think about the notions involved in formulating their version of the epistemic regress problem, viz. belief, propositions, justification and probability:

(i) If a person S is epistemically (rather than prudentially) justified in believing proposition E_0 , and if this justification is inferential (rather than noninferential or ‘immediate’), then typically S believes a proposition E_1 which makes E_0 probable. (Peijnenburg 2007: 597)

(ii) Consider the following process of epistemic justification: proposition E_0 is made probable by E_1 , which in turn is made probable by E_2 , which is made probable by E_3 , and so on. (Peijnenburg 2007: 597)

(iii) How to justify E_1 epistemically? [...], if the justification is inferential, then there is a proposition E_2 that makes E_1 probable. Imagine that E_2 is in turn made probable by E_3 , and that E_3 is made probable by E_4 , and so on, ad infinitum. Is such a process possible? Does the ‘ad infinitum’ make sense? (id.)

(iv) Against sceptics, foundationalists, and coherentists I will show that an infinite regress can make sense; against infinitists I will show that beliefs may be justified by an infinite chain of reasons that can actually be completed. (Peijnenburg 2007: 598)

(v) Can we continue this repetition, thus allowing for propositions made probable by other propositions, made probable by still other propositions, and so on, ad infinitum? (id.)

(vi) (A belief in) a target proposition E_0 is justified by (a belief in) proposition E_1 , which in turn is justified by E_2 , and so on. (Atkinson & Peijnenburg 2009: 1)

(vii) How close should the connection between E_n and E_{n+1} be in order to say legitimately that the one is justified by the other? [...] In this paper [...] we regard the justification relation as a probability relation. (id.: 2)

A first thing to note is that the ambiguity of ‘justification’ is fully present in the quotes. In quote (i) the concept seems to refer to a state, whereas in (ii) and (iii) it refers to an activity. We construe the authors as holding that the activity or showing concept of ‘justification’ is leading.

A next thing to note is that whereas some quotations, notably (i) and (iv), identify *beliefs* as the objects of justification, others, notably (ii), (iii), (vii), seem to identify *propositions* as the objects of justification, while (vi) leaves open both possibilities. Of course, there is a connection between beliefs and propositions: beliefs are attitudes towards propositions. Still, as we have highlighted in the previous section under [A], one constant in the various formulations of the traditional regress problem is that they concern a subject that is trying to decide whether a belief of hers is justified (or whether a certain proposition is credible). Hence, in order to secure a maximal interface with the traditional regress problem, we construe the authors as taking beliefs to be the objects of justification, and interpret quotes (ii), (iii) and (vi) as abbreviated statements of that idea. It is charitable to construe Peijnenburg and Atkinson in this way. For if justification were to be construed as involving propositions only and not beliefs, this would have a most unpalatable consequence. To see this we refer back to what we said in the previous section about what motivated [C], and where we explained why it is insufficient for justification to show that one proposition is entailed by another.

What do the authors say about how a subject should go about when she wants to decide to what extent a belief of hers is justified? What does the process of epistemic justification (which is in effect the process of showing that one of one’s beliefs has a positive standing) look like? Quotes (v), (vi) and (vii) indicate the following: suppose subject S wants to decide to what extent her belief in E_0 is justified. Then what S must do is this: find another proposition E_1 such that (a) S believes E_1 , and (b) E_1 makes E_0 probable. Then find another proposition E_2 such that (a) S believes E_2 , and (b) E_2 makes E_1 probable, etc. By ‘makes probable’, our authors mean

the following: E_1 makes E_0 probable if $P(E_0|E_1) > P(E_0|\neg E_1)$, that is, if E_0 is more likely given E_1 than given the complement of E_1 . This notion will turn out to be somewhat problematic itself; we will come back to this point in Section 4 and 5.

Given these explications, then, an infinite epistemic regress is an infinite series of beliefs, each member of which has as its object a proposition that meets the two conditions specified in the previous paragraph, so it is a proposition (a) that the subject believes, and (b) that is made probable by yet another proposition.

The claim to be discussed is stated in (iv), viz. that there are regresses that satisfy these conditions so there are infinite epistemic regresses that can actually be completed. ‘Completion’, according to Atkinson and Peijnenburg, means that the *unconditional* probability $P(E_0)$ is well defined, given a certain explicit infinite sequence of conditional probabilities $P(E_n|E_{n-1})$ and $P(E_n|\neg E_{n-1})$. By well defined is meant that any simultaneous assignment of probabilities to the collection E_0, E_1, \dots which satisfies these conditional probabilities, necessarily have the *same* probability $P(E_0)$.¹¹

So we see that what Peijnenburg and Atkinson call the completion of an infinite epistemic regress boils down to the computation of a probability, in line with quote (vii) which explicitly identifies justification and probability.

We will argue that the claim of Peijnenburg and Atkinson is unconvincing. The next section points out various problems with the notion of justification that is used. After that we argue that even if these problems were non-existent, the computations that the authors provide do not qualify as the completion of an *infinite* epistemic regress.

3 Problems with justification

On the basis of our discussion in the previous section we can say that Peijnenburg and Atkinson adopt the following principle of justification (PJ):

(PJ) If S believes that E_0 and there is a proposition E_1 such that (a) S believes it, and (b) it makes E_0 probable, then S 's belief is justified.

This principle, however, is not without problems. It doesn't require that S knows or believes that E_1 makes E_0 probable; it only requires that in fact

¹¹Having the same probability $P(E_0)$ does not imply that the assignment of simultaneous probabilities is uniquely defined. For the current discussion, this is not important however.

E_1 makes E_0 probable. But this has unlovely consequences, as the following example bears out.

Let E_0 be the proposition that Dora will develop breast cancer during her life. Now there are known genotypes which dramatically increase the probability of developing breast cancer. However, it is strongly suspected that a number of yet unknown genotypes also increase the probability of developing breast cancer. Suppose now that Dora has one of those yet unknown genotypes - a genotype, let's say that includes a certain allele A , which makes it highly probable that she develops breast cancer. Suppose furthermore that E_1 is the proposition that Dora's genotype includes allele A . Given these suppositions, we can easily see that E_1 makes E_0 probable. But now suppose also that S believes both E_0 and E_1 , so believes that Dora will develop breast cancer during her life, and also believes that Dora's genotype includes allele A . Then according to (PJ) S 's belief that E_0 is justified. But that is unlovely. For how can S 's belief be justified when S doesn't even know, or believe, or have any inkling of the fact that E_0 is made probable by E_1 ?

The problem with (PJ) is, in effect, that it doesn't incorporate the idea that we identified under [B] in Section 1 as a constant underlying the traditional regress argument, the idea namely that whatever it is that renders a belief justified, it must be something the subject is aware of, something she has cognitive contact with, something she can cite.

When we inject this idea into (PJ) we get:

(PJ*) If S believes that E_0 and there is a proposition E_1 such that (a) S believes it, (b) it makes E_0 probable, and (c) S believes that it makes E_0 probable, then S 's belief that E_0 is justified.

If this is to work, we must presumably require that the belief referred to in condition (c) must itself be justified - for if S 's belief that E_1 makes E_0 probable is itself unjustified, S 's belief that E_0 will also remain unjustified. If we inject this requirement into (PJ*) we get:

(PJ**) If S believes that E_0 and there is a proposition E_1 such that (a) S believes it, (b) it makes E_0 probable, and (c) S *justifiably* believes that it makes E_0 probable, then S 's belief that E_0 is justified.

With this principle it is as with Fumertons (PIJ): its application leads to an infinite regress. That need not be a problem for Peijnenburg and

Atkinson as they claim that some infinite epistemic regresses can actually be completed.

The gain of the discussion so far is that the principle of justification (PJ) as it is used by our authors has been shown to be unconvincing as it stands. And we have suggested a way to bold it against an objection that we think Peijnenburg and Atkinson should take seriously - a suggestion furthermore that is very much in the spirit of the traditional regress problem, and also in the spirit of our authors.

Our suggestion, as incorporated in (PJ**), however, means that an ensuing infinite epistemic regress (even the so-called simple linear ones) will have a more complex form than the regresses that are referred to in quotes (ii), (iii), (vi), and (vii) in the previous section. An infinite epistemic regress, contrary to what the quotations suggest, doesn't have form I:

I: E_0 is made probable by E_1 ; and E_1 is made probable by E_2 ; and E_2 is made probable by E_3 ; etc.

but the more complex form II¹²:

II: (a) S believes $E_0, E_1, E_2, E_3, \dots$
(b) E_0 is made probable by E_1 , E_1 is made probable by E_2 , E_2 is made probable by E_3 , etc.
(c) S is justified in believing that E_0 is made probable by E_1 ; that E_1 is made probable by E_2 ; that E_2 is made probable by E_3 ; etc.

As we can see from the quotations, the regress that Peijnenburg and Atkinson claim can be completed, is of form I, not of form II. This poses the problem that their claim in fact doesn't touch on what is traditionally conceived to be the regress problem. For, to repeat, an infinite regress requires an infinite number of beliefs, while beliefs are absent in form II! It is at this point that the problem of viewing the justification relation as a probability relation (quote (vii) above) becomes apparent.

This conclusion, that the claim of Peijnenburg and Atkinson doesn't touch the regress problem, should already be enough to dismiss their conclusions. However, we have a few more things to say about their setup and conclusions. In the next section we will argue that what our authors offer, even if it isn't the completion of an infinite *epistemic* regress, doesn't even qualify as the completion of a infinite regress full stop.

¹²At least when one adopts (PJ**). If one adopts (PJ) as Peijnenburg and Atkinson seem to do, an infinite regress will have form II without (c).

4 The main examples of Peijnenburg and Atkinson are not infinite regresses

We first recall the basic mathematical setup of Peijnenburg and Atkinson. They define two sets of conditional probabilities, namely α as the probability of a proposition E_m given that proposition E_{m+1} is true, and β as the probability of E_m given that E_{m+1} is false. In formulas, this reads

$$P(E_m|E_{m+1}) = \alpha \text{ and } P(E_m|\neg E_{m+1}) = \beta, \quad (1)$$

for $m = 0, 1, \dots$. For simplicity, they assume that neither of these two conditional probabilities depend on m . Hence they deal with a situation in which the occurrence of E_1 leads to a certain conditional probability of E_0 , while E_1 in its turn has a certain conditional probability given E_2 , and so on. According to Peijnenburg and Atkinson, E_{m+1} makes E_m probable if $\alpha > \beta$, but this requirement (that, as we will argue in the next section, is in itself problematic) is not used in their computations. After two pages of elementary algebra (including taking a limit), they conclude (correctly) that this implies that $P(E_0)$ is well defined and equals

$$P(E_0) = \frac{\beta}{1 - \alpha + \beta}. \quad (2)$$

This is the ‘‘completion’’ of the infinite regress that Peijnenburg claims makes her reject the Regress Argument: despite the fact that there is an infinite chain of conditional probabilities, the probability of E_0 is still well defined, and hence an infinite chain of reasons can actually be completed.

The computation of $P(E_0)$ above gives the correct answer (even though we have seen that it does not mean that belief in E_0 is justified) but we claim that it does not qualify as the completion of an infinite regress. To see this, we use (1) to compute

$$\begin{aligned} P(E_m) &= P(E_m|E_{m+1})P(E_{m+1}) + P(E_m|\neg E_{m+1})P(\neg E_{m+1}) \\ &= \alpha P(E_{m+1}) + \beta(1 - P(E_{m+1})) \\ &= \beta + (\alpha - \beta)P(E_{m+1}). \end{aligned} \quad (3)$$

We claim that $P(E_0)$ follows from this equation immediately. Why? Well, note that the assumptions (1) of Peijnenburg and Atkinson entails $P(E_m)$ to be the *same* for all m (this already is a somewhat strange state of affairs of course) since instead of ‘starting’ at E_0 , we could also start at E_1 , E_2 or any E_m for that matter. No matter where we start, the outcome must

always be the same since the probabilities α and β do not depend on m . Hence in equation (3), we are allowed to substitute $x = P(E_m) = P(E_{m+1})$, arriving at

$$x = \beta + (\alpha - \beta)x,$$

which is immediately solved, without any infinite regress, to give

$$x = \beta / (1 - \alpha + \beta),$$

and (2) follows without any infinite regress whatsoever. It is, therefore, simply not the case that $P(E_0)$ is the result of a completion of an infinite regress.¹³

Perhaps the following analogy helps here: the fact that

$$2 = 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$$

does not imply that the number 2 should be seen, viewed or defined as the result of summing an infinite series. Similarly, it is hardly reasonable to say that $P(E_0)$ is the result of completing an infinite regress, if there is another, much better, way of computing it.

The computation of $P(E_0)$ without infinite regress above relies on the assumption that the conditional probabilities $P(E_m|E_{m+1})$ and $P(E_m|\neg E_{m+1})$ do not depend on m . At the end of her paper, Peijnenburg (2007) remarks that this condition is in fact too strong. As an explicit example she claims that it suffices to require that there is a constant $c < 1$ such that

$$0 < \alpha_m - \beta_m < c, \tag{4}$$

for all m , where

$$P(E_m|E_{m+1}) = \alpha_m \text{ and } P(E_m|\neg E_{m+1}) = \beta_m. \tag{5}$$

Under these circumstances, a recurrence relation as in (3) cannot be written down. Nevertheless, under condition (4), it is indeed the case that $P(E_0)$ is well defined.

Is this an example of a completed infinite epistemic regress? No. First of all, the aforementioned problems with justification remain valid so the fact

¹³There is much more to say about this computation and its consequences. Technically speaking, the computation shows that *any* probability distribution on the (non)-occurrence of the propositions involved which satisfies (1) has the same so called *marginal probability* $P(E_m)$. This is not to say that the full probability distribution is now specified. Strictly speaking, this is no problem for the issue under consideration here, but it shows that introducing probabilities in this context is a very delicate issue.

that $P(E_0)$ is well defined does not suffice for any epistemic justification of E_0 whatsoever, and neither does it mean that we can *compute* $P(E_0)$.

Furthermore, condition (4) involves *all* possible values of m , of which there are - of course - infinitely many. In fact, it is easy to see that *any* condition that would make $P(E_0)$ well defined would either be essentially stationary, that is, with conditional probabilities independent of m , as in (1), or necessarily include a condition for *infinitely* many values of m . So how can one check whether or not (4), or any other sufficient condition, holds? This would involve a priori knowledge of all propositions E_m - note condition [B] stated above. But giving all propositions and conditional probabilities in advance can hardly be called an *infinite* regress: one sets up the full structure in one swap, and if we know all the relevant quantities in advance, then we simply do not need a regress. In contrast, in a genuine infinite regress, one is interested in a proposition E_0 . One then chooses another proposition E_1 conditional on which E_0 has a certain probability, and one expresses the probability of E_0 in terms of E_1 , etcetera. At no stage of this procedure, unless one is allowed to look at the infinite future, does one know whether or not this leads to a well defined probability of E_0 .

This is not to deny that regresses can play a positive role. We argued in the previous paragraph that one can never know whether or not the infinite regress leads to a well defined $P(E_0)$, unless we deal with a stationary situation, but we already concluded that a stationary situation is not an infinite regress at all. However, we can use the conditional probabilities $\alpha_m = P(E_m|E_{m+1})$ and $\beta_m = P(E_m|\neg E_{m+1})$ to give bounds for the probability of E_0 . Indeed, it is easy to compute (this is equation (13) in Peijnenburg's paper) that

$$\begin{aligned} P(E_0) &= \beta_0 + (\alpha_0 - \beta_0)\beta_1 + \cdots + \\ &\quad + (\alpha_0 - \beta_0)(\alpha_1 - \beta_1) \cdots (\alpha_{m-1} - \beta_{m-1})\beta_m + \\ &\quad + (\alpha_0 - \beta_0)(\alpha_1 - \beta_1) \cdots (\alpha_m - \beta_m)P(E_{m+1}). \end{aligned}$$

Since in the 'future' of the regression, $P(E_{m+1})$ is always between 0 and 1, this means that $P(E_0)$ will always be between the two values obtained from the right hand side by substituting $P(E_{m+1}) = 0$ and $P(E_{m+1}) = 1$, even if $P(E_0)$ is not well defined in the infinite limit of the regress.¹⁴

¹⁴In Atkinson and Peijnenburg 2009, a remark to - essentially - this effect is made by discussing the consequences of substituting $P(E_m) = 0$ and $P(E_m) = 1$ for some m .

5 The ‘make probable’-relation

In this section we return to the notion of ‘making probable’. As Peijnenburg and Atkinson state explicitly, this notion should be taken in the following way: proposition E_0 is made probable by E_1 , provided $P(E_0|E_1) > P(E_0|\neg E_1)$, or, in terms of the previous section, if $\alpha > \beta$. We already mentioned that this requirement plays no role in the computation, but we would like to point out nevertheless that this interpretation of ‘making probable’ has strange consequences.

To see this, suppose that $P(E_0|E_1) = .0002$ and $P(E_0|\neg E_1) = .0001$. Then given the explication of ‘making probable’ relation, we should say in this case that E_0 is made probable by E_1 . And given (PJ) we should furthermore say that if someone believes both E_0 and E_1 , then his belief that E_0 is justified. But both of these things are, of course, unacceptable. It is unacceptable to say that E_0 is made probable by E_1 , when $P(E_0|E_1)$ is as small as .0002. Why the second thing is unacceptable can best be brought out by an example.

Suppose at the local fair a 10.000 ticket lottery is held in which buyers are allowed to purchase at most two tickets. All tickets are sold. Suppose you know you are the only one who bought two tickets and suppose furthermore you believe both E_1 and E_0 below:

E_1 : I bought two tickets;
 E_0 : I will win the lottery.

Then given (JP) you are justified in believing that E_1 (i.e. that you will win the lottery). For the probability that you will win given that you bought two tickets is higher than the probability that you will win given that you did not buy two tickets (that is, by buying one ticket). But this cannot be right. Your belief that E_0 isn’t justified even though you believe E_1 and it is also the case that $P(E_0|E_1) > P(E_0|\neg E_1)$. Hence, the ‘makes probable’-relation as interpreted by our authors, renders (PJ) as well as its successors (PJ*) and (PJ**) unacceptable.

6 Conclusions

Peijnenburg and Atkinson argue that the Regress Argument for epistemic foundationalism is wrongheaded because, contrary to what the argument assumes, an infinite regress is not, from an epistemological point of view, lame or impotent because some infinite regresses can actually be completed. We

have argued that the justificatory principle they adopt suffers from serious problems.

We have also argued that their set-up is not an epistemic regress (in the classical sense - the sense in which it is meant in the Regress Argument) but a mere computation of probabilities, and sidesteps the crucial issue of justification. Moreover, their main example is not even an example of an infinite regress in the mathematical sense - the computation can be done with finitely many operations, and the secondary example does not support their claim either.

So, we have argued that the Regress Argument for epistemic foundationalism stands unrefuted by the arguments of Peijnenburg and Atkinson.

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