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Logical principles of agnosticism

Luis Rosa

Abstract Logic arguably plays a role in the normativity of reasoning. In particular, there are plausible norms of belief/disbelief whose antecedents are constituted by claims about what follows from what. But is logic also relevant to the normativity of *agnostic* attitudes? The question here is whether logical entailment also puts constraints on what kinds of things one can suspend judgment about. In this paper I address that question and I give a positive answer to it. In particular, I advance two logical norms of agnosticism, where the first one allows us to assess situations in which the subject is agnostic about the *conclusion* of a valid argument, and the second one allows us to assess situations in which the subject is agnostic about one of the *premises* of a valid argument.

Keywords Suspended judgment · Bridge-principles · Normativity of logic

1 Logic and the norms of belief

Even if Harman (1984, 1986) was right to say that logic plays no *special* role in the normativity of reasoning, it is far from clear that it is *not relevant at all* to the normativity of reasoning.[1] There is something epistemically wrong with someone who believes that *Jane loves Alex* and at the same time believes that *Jane loves no one*; and that is so even if there are situations—e.g. preface paradox-like situations—in which one seems to harbor inconsistent beliefs in a rational manner.[2] Furthermore, rational subjects are at the very least committed to the logical consequences of their views, even though it would be a waste of their cognitive resources to clutter their minds with the infinitely many trivial consequences of their beliefs (see Harman 1986, p. 12).

Harman not only points out that sometimes it is reasonable for us to hold inconsistent views and that we should not clutter our minds with trivial logical consequences; he also points out that logic-based norms of reasoning—e.g. the one saying that *one's beliefs should be closed under logical consequence*—are overly demanding for cognitively limited reasoners like us (1986, pp.

Luis Rosa
Cologne Center for Contemporary Epistemology and the Kantian Tradition, University of Cologne.
Email: lmunaret@uni-koeln.de

[1] In this paper I am concerned with the normative import of logic/logical entailment to the normativity of *doxastic attitude*-management, where the relevant type of normativity is *epistemic* normativity. For a different perspective on the normativity of logic—one according to which it comprises norms for multi-agent dialogical interactions—see Dutilh Novaes (2015).

[2] See Makinson (1965) for the original formulation of the preface paradox, and Steinberger (2017, §4.2) for discussion concerning the importance of that paradox to the normativity of logic. The relevant pattern here is as follows: one rationally believes each of $\phi_1, ..., \phi_n$ individually but at the same time believes that it is not the case that (ϕ_1 *and...and* ϕ_n).

12-14). Taken together, these points would indeed seem to undermine the claim that there is a special (tight, universal, exceptionless) connection between logic and the norms of reasoning.

Philosophers have responded to Harman's challenge in different ways. Their views can be concisely expressed through so-called 'bridge principles': principles that establish a positive connection between logical entailment and doxastic norms.[3] The following bridge principles were advanced by MacFarlane (M1, M2), Streumer (S) and Field (F) respectively:[4]

(M_1) If $\phi_1, ..., \phi_n \models \psi$ then one ought to see to it that if one believes all of $\phi_1, ..., \phi_n$ one does not disbelieve that ψ.

(M_2) If $\phi_1, ..., \phi_n \models \psi$ then there is a reason for one to see to it that if one believes all of $\phi_1, ..., \phi_n$ one believes that ψ.

(S) If $\phi_1, ..., \phi_n \models \psi$ then there is a reason against one's both believing all of $\phi_1, ..., \phi_n$ and believing that *not*-ψ.

(F) If $\phi_1, ..., \phi_n$ obviously entail ψ then one's degrees of belief in $\phi_1, ..., \phi_n, \psi$ should be related as follows: $Cr(\psi) \geq Cr(\phi_1) + \cdots + Cr(\phi_n) - (n-1)$.

Neither of (M_1), (M_2) and (S) require reasoners to actively form beliefs in the logical consequences of their beliefs. Suppose that $\phi \models \psi$; then (M_1) says that one ought to be such that one does not believe that ϕ and disbelieve that ψ at the same time; and (M_2) only says that *there is a reason* for one to be such that one believes that ψ if one believes that ϕ or, equivalently, to be such that either one does not believe that ϕ or one believes that ψ (if we interpret that conditional as a *material* conditional, as MacFarlane does and as I will do it here); (S) only says that there is a reason for one not to believe that ϕ and believe that *not*-ψ at the same time. The reasons concerned in (M_2) and (S) are to be understood as *prima facie*, *pro tanto* reasons (see Broome 2000, pp. 79-81).

So one can rationally believe that ϕ *without* yet believing that ψ and still be in conformity with all of these norms. In this way MacFarlane and Streumer avoid Harman's *clutter avoidance* objection, which says that a bridge principle better not require us to clutter our minds with all the logical consequences of our beliefs. It is not clear that Field's principle (F) fares well in that regard, however. To be sure, the entailment relation is here required to be *obvious* to the reasoner—but that does not really address the problem of clutter avoidance, since there are many entailment relations that are obvious to us whose conclusions would equally clutter our minds.[5]

[3] Sometimes it is not the sheer relation of logical entailment that figures in these bridge-principles—but rather the subject's *grasp* of that relation. E.g. Harman (1986, pp. 18-19) formulates principles in which one needs to *recognize* that a certain proposition is implied by (the contents of) one's beliefs. MacFarlane (2004, pp. 22-23) on the other hand talks about a subject *apprehending* a pair of premises and conclusion as an instance of an inference schema. Notice, however, that MacFarlane eschews bridge principles that only allow us to derive normative claims from the fact that *one knows that* $\phi_1, ..., \phi_n$ entail ψ (as opposed to just the fact that $\phi_1, ..., \phi_n$ entail ψ)—not on account of the fact that they are false principles, but rather because they are not general enough: they fail to constrain the attitudes of those who have no knowledge of logical truths. And so MacFarlane writes: 'The more ignorant we are of what follows logically from what, the freer we are to believe whatever we please' (MacFarlane 2004, p. 12). For more on the drawbacks of 'attitudinally constrained' bridge principles, see Steinberger (2017, 4).

[4] For the sake of notational uniformity, I am rewording these author's bridge principles (e.g. they use different propositional variables). For the original versions, see MacFarlane (2004, pp. 7-8), Streumer (2007, p. 362) and Field (2009, p. 255) respectively. Notice that these are all *wide-scope* bridge principles, i.e. their deontic operators take wide-scope in the consequent. For the advantages of wide-scope over narrow-scope bridge principles, see again MacFarlane (2004) and also Steinberger (2017).

[5] To address this worry, Field (2009, p. 255) suggests restricting (F) to agents who already have degrees of belief in all of $\phi_1, ..., \phi_n$ and ψ. But then (F) would not be general enough. Field's principle is already a restricted one, since it does not apply to those cases in which the entailment relation is not obvious to one. With this further restriction, the rule is now also silent about those who lack the relevant degrees of belief.

When it comes to Harman's objection of *apparently rational inconsistent beliefs*, (M_1) would appear to be in trouble. There are preface-like situations in which one believes all of $\phi_1, ..., \phi_n$ (make n as large as you wish) and at the same time disbelieves the conjunction of all of those propositions ($\phi_1 \wedge \cdots \wedge \phi_n$) in an apparently rational manner.[6] Both (M_2) and (S) avoid this problem since, again, reasons are *prima facie* and *pro tanto*. And so it may turn out that the reasons one has to avoid inconsistencies are counterbalanced by one's reasons to believe that one's judgments are not always accurate, in such a way that one does not have all-things-considered reasons to avoid the inconsistency. Field's (F) (or one of its amended versions) avoids the problem in a different way: one is permitted to have a high degree of belief in each of $\phi_1, ..., \phi_n$ individually and yet not a high degree of belief in their conjunction ($\phi_1 \wedge \cdots \wedge \phi_n$).[7]

With respect to Harman's objection of *excessive demands*, Field's (F) softens it again by including a cognitive constraint in that principle's antecedent. If an entailment relation is not obvious to one, one's degrees of belief are not required to be as described in (F). (M_1) also does not impose excessive demands, but for a different reason: it only *forbids* the subject to disbelieve the consequences of her beliefs, as opposed to requiring the subject to actively believe them. (M_2) and (S) do not impose excessive demands either, for they just say that there is a reason for one to be/not to be a certain way, not that one ought to be/not to be that way.

And so it seems that, in the face of Harman's objections, (M_2) and (S) are the bridge principles that are better off among the ones I have listed above. A defender of (F) would still have to address the problem of clutter avoidance, whereas a defender of (M_1) would still have to address the problem of apparently rational inconsistent beliefs. The bottom line of this discussion for my present purposes is that, if either of those bridge principles is true ((M2) and (S) being the ones that have a better chance here), then logical entailment puts a normative constraint on our beliefs. I won't take issue with whether MacFarlane's, Streumer's or Field's proposals establish (*contra* Harman) that there is indeed a *special* connection between logic and the normativity of reasoning. Suffice it to say that *there is a connection*, and that principles like (M2) and (S) are good candidates for establishing that connection.

Both Harman and his critics have concentrated on bridge principles involving belief, disbelief and degrees of belief.[8] But perhaps we should not expect logic to be relevant *only* to the rational management of assertive and negative types of doxastic attitudes. Perhaps logic is also relevant to the rational management of *agnostic* attitudes, or attitudes of suspending judgment. That is the idea I am going to explore now.

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[6] What is it *to disbelieve* a proposition? In one natural interpretation, it is just to believe the negation of that proposition. MacFarlane (2004, p. 8) decides not to adopt that interpretation, however. One of his reasons for not doing so is that one already has to make a decision about the correct logic/semantics for negation if one is to opt for that interpretation, and he wants to avoid that. E.g. by 'disbelieving that ϕ is just believing that *not-*ϕ' one could mean: (a) that disbelieving that ϕ/believing that *not-*ϕ is like believing that ϕ *is false*, in which case negation behaves classically, or (b) that disbelieving that ϕ/believing that *not-*ϕ is like believing that ϕ *is not true*, in which case negation *need not* be classical—one might believe that ϕ *is not true* without believing that ϕ *is false*, because e.g. ϕ has a 'gappy' value (it is undetermined); etc. His other reason for not adopting that interpretation and being more neutral about the nature of disbelief is that some dialetheists reject the equivalence between 'S disbelieves that ϕ' and 'S believes that *not-*ϕ': for some ϕ, one is allowed to believe both that ϕ and that *not-*ϕ, even though one is not allowed to both believe and disbelieve that ϕ—see Priest (1998, p. 425). I will not take a stand on these issues here, as what I propose below does not really hang on it.

[7] E.g. suppose that you have a degree of belief of 0.9 in each of $p_1, p_2, ..., p_5$ (five different propositions); so $Cr(p_1) + \cdots + Cr(p_5) - (5-1) = 4.5 - 4 = 0.5$; so your degree of belief in ($p_1 \wedge \cdots \wedge p_5$) is only required to be bigger than or equal to 0.5. Even if *it is* equal to 0.5, your degrees of belief are as they should be according to (F). That number gets smaller and smaller as we add more conjuncts.

[8] I will briefly discuss the interpretation according to which agnostic attitudes are degrees of belief in a moment.

2 Suspension of judgment

In what follows, I will flesh out bridge principles involving ascriptions of agnostic attitudes (or 'bridge principles of agnosticism' for short). But before I do that, let me make a few important observations about the very notion of suspended judgment.

First, suspended judgment is supposed to be an *attitude* that one takes toward a proposition, not merely *a lack of belief and disbelief* toward that proposition. If we let '$S_x\phi$' stand for 'x suspends judgment about ϕ', '$B_x\phi$' for 'x believes that ϕ' and '$D_x\phi$' for 'x disbelieves that ϕ', then that means that the following is false:

(E) Necessarily, for all x, ϕ: $S_x\phi \equiv (\neg B_x\phi \wedge \neg D_x\phi)$,[9]

where '$\equiv$' is a symbol for (material) equivalence and '$\neg$' for (classical) negation. In the way I am using these verbs here—i.e. 'believes', 'disbelieves' and 'suspends judgment'—all of $S_x\phi$, $B_x\phi$ and $D_x\phi$ imply that x has taken an attitude toward ϕ (even if only implicitly so), or that x has an opinion about whether ϕ is the case. And since $(\neg B_x\phi \wedge \neg D_x\phi)$ may be true even when x has not yet taken any attitude whatsoever toward ϕ, it does not imply that $S_x\phi$. To give an example by Jane Friedman (2013a, p. 168), when I came to the world I did not believe that *The bumblebees hibernate during the winter*, and I did not disbelieve that proposition either; but that hardly makes it the case that I used to suspend judgment about whether *The bumblebees hibernate during the winter* when I was a newborn.[10]

It is not my goal to fully analyze or explicate the notion of suspending judgment here, or to say what it is more precisely to take that attitude toward a proposition. It is good enough for my present purposes (i.e. that of fleshing out bridge principles of agnosticism) to assume that suspending judgment consists in taking a *neutral* stance or opinion regarding the truth of a proposition—but a stance regarding the truth of that proposition nonetheless.

Second, this much of logical behaviour is implied by the very nature of suspension: to suspend judgment about ϕ is to be agnostic about both ϕ and $\neg\phi$. This is more effectively captured by the idiom 'suspends judgment about whether ϕ', which can be abbreviated by the idiom 'suspends judgment about ϕ' (see again Friedman 2013a, Fn. 4). And so whichever bridge principles we get that involve ascriptions of the form $S_x\phi$ will automatically give us principles that involve ascriptions of the form $S_x\neg\phi$. Thus, I will rely on the following equivalence (which as we will see will be very useful below):

(EQ) Necessarily, for all x, ϕ: $S_x\phi \equiv S_x\neg\phi$.[11]

[9] Something similar to (E) was endorsed by Chisholm (1976, p. 27)—but he uses the verb 'to withhold' instead of the verb 'to suspend', and so I am not quite sure that he wants to capture the same type of doxastic state as I and others do when we use the latter verb.

[10] The view according to which suspending judgment is an *attitude* (on a par with believing and disbelieving) is argued for by Friedman (2013a). She finds problems with different attempts to capture suspended judgment through lack of belief and disbelief (sometimes with additional clauses that do not yet amount to the requirement of an agnostic attitude in its own right), and concludes that taking a neutral/undecided stance toward ϕ is needed for suspending judgment about ϕ. The latter account of suspended judgment avoids the problems with (E) and its variants. I won't rehearse Friedman's arguments here, and so I direct the interested reader to her paper (2013a).

[11] One might worry about the fact that (EQ) plus $S_x\phi$ entail that $S_x\neg\neg\phi$, $S_x\neg\neg\neg\phi$, $S_x\neg\neg\neg\neg\phi$ and so on, because it looks as if e.g. I don't need to suspend judgment about *It is not the case that it is not the case that it is not the case that it is not the case that the Democrats will win* when I suspend judgment about *The Democrats will win*. Huge concatenations of negations like that would seem to be intractable for cognitively limited reasoners like us. But $\phi/\neg\phi$ in (EQ) are supposed to stand for more or less coarse-grained *propositions*, and I am assuming that one does not need to token the sentence 'It is not the case that it is not the case that it is not the case that it is not the case that the Democrats will win' in order to suspend judgment about the proposition that *It is not the case that it is not the case that it is not the case that it is not the case that*

Third, whether or not it is *possible* for one to suspend judgment about ϕ and believe that ϕ at the same time, I will at the very least assume that *one has reasons* not to do so; and the same applies to suspending judgment about ϕ and disbelieving that ϕ/believing that $\neg\phi$ at the same time (see Hájek 1998, p. 203 for a similar point).[12] Let 'R' stand for '*there is a reason for one to be such that*'. We can therefore avail ourselves of the following 'minimal' principles of agnosticism below:

(R_1) $R\neg(B\phi \wedge S\phi)$,

(R_2) $R\neg(D\phi \wedge S\phi)$.

(Here I am using '$R\neg(B\phi \wedge S\phi)$' as an abbreviation of the universally quantified 'For all x, ϕ: $R\neg(B\phi \wedge S\phi)$', and similarly for the other cases. This convention is adopted throughout the paper).

Fourth, in what follows I will talk about suspension of judgment understood as a categorical attitude, as opposed to a middling degree of belief or credence. If agnostic attitudes were identical or reducible to credences, Field's principle (F) would already establish (if true) a connection between logical entailment and norms for suspension of judgment. The question would be, then: which subinterval $[r, s] \subseteq [0, 1]$ is such that a subject suspends judgment about ϕ if and only if her degree of belief in ϕ falls in that subinterval? But the problem is that the view according to which suspending judgment is a matter of having credences in this way has already been shown to be deeply problematic. Friedman (2013b) presents examples in which one is entitled to suspend judgment about a series of contingent propositions $p_1, ..., p_n$ (on account of lack of evidence for or against each of these propositions) but one is at the same time entitled to suspend judgment about both the conjunction $(p_1 \wedge \cdots \wedge p_n)$ and the disjunction $(p_1 \vee \cdots \vee p_n)$ of those propositions.[13] If one were to have middling credences toward each of $p_1, ..., p_n$ (i.e. credences that lie in the relevant subinterval $[r, s]$), however, one *would not* be entitled to have middling credences in $(p_1 \wedge \cdots \wedge p_n)$ and $(p_1 \vee \cdots \vee p_n)$ respectively.[14]

Of course, there might be alternative ways of analyzing suspension of judgment in terms of credences or degrees of belief (though some of these alternatives have already been criticized

the Democrats will win, which is the same as the proposition that *The democrats will win.* This is compatible with saying that, in order to count as suspending judgment about that proposition, one must have considered it *under the guise of one sentence or other* (not a particular sentence—any sentence that expresses the relevant proposition), or that one would use one sentence or other to express one's attitude toward that proposition. And so in general one may suspend judgment about $\neg\neg\neg\neg\phi$ under the guise of the sentence 'ϕ', without even considering the sentence '$\neg\neg\neg\neg\phi$' (or one would use the former sentence but not necessarily the latter to express one's agnosticism about that proposition).

[12] I am not hereby making any *concession* to the defender of the view that one can believe/disbelieve that ϕ and suspend judgment about ϕ at the same time. As two anonymous reviewers have pointed out to me, this view is highly implausible. It is just that I can rely on a weaker claim to get where I want here.

[13] This result won't *always* obtain when the p_i are contingent. E.g. suppose that I rationally suspend judgment about whether card *c is a Jack* and also about whether *c is a Queen* (its face is turned down). In this case I am not entitled to suspend judgment about whether *c is a Jack and c is a Queen*, since I know that the two conjuncts are incompatible with each other. Similarly, I would not be entitled to suspend judgment about whether *c is either a Jack or a Queen* if the dealer (whom I take to be honest and reliable) had told me that c is one of these two. Friedman's examples, however, are such that one does not have reasons to believe that the p_i are incompatible with each other, and one does not have reasons to believe that at least one of them must be true either.

[14] Or at least not if we assume that those credences are *standard*, or that they uniquely represent a subject's total doxastic standing and are normatively bounded by the axioms of the standard probability calculus—see Friedman (2013b, pp. 57-58). When credences are standard in the envisioned scenarios, one's rational credence in $(p_1 \wedge \cdots \wedge p_n)$ would go *below* r (unless we stipulate $r = 0$) and one's rational credence in $(p_1 \vee \cdots \vee p_n)$ would go *above* s (unless we stipulate $s = 1$). Would those problems remain if we were to interpret agnostic attitudes as *non-standard* credences? Perhaps, but it is on the proponent of the reduction thesis to come up with a theory of non-standard credences that avoids those objections—I will not try to do that here.

earlier in the literature),[15] but it is safer for me now to assume that suspending judgment is not a matter of having middling credences.

3 Logical principles of agnosticism modeled after (M_1) and (S)

It might be expected that the following would do as a bridge principle of agnosticism:

(A_1) If $\phi_1, ..., \phi_n \models \psi$ then one ought to see to it that if one believes all of $\phi_1, ..., \phi_n$ one does not suspend judgment about ψ.

Or equivalently: If $\phi_1, ..., \phi_n \models \psi$ then one ought to see to it that if one suspends judgment about ψ one does not believe all of $\phi_1, ..., \phi_n$. In this case, suspended judgment about a proposition constrains one's other doxastic attitudes not by virtue of what that proposition entails—but by virtue of what entails *it*. We should not believe propositions that entail the propositions we are agnostic about.

E.g., those who are agnostic about the existence of God better not believe things that entail that *God exists*; and they better not believe things that entail that *God does not exist* either, since suspension of judgment about the former is also suspension of judgment about the latter (EQ). Another example: suppose I am a skeptic about the existence of the external world, in the sense that I suspend judgment about whether *There are mind-independent objects out there*; at the same time, however, I act as if there are external objects in my surrounding environment: I try to avoid crashing into the tree when riding my bike, I go back to pick up my keys where I left them, etc. To the extent that these actions of mine manifest my *beliefs* that there are mind-independent trees, keys, etc. I am failing to abide to (A_1). I am not as I ought to be: I should either give up on my beliefs that there are mind-independent trees, keys, etc. or cease to be a skeptical about the existence of a mind-independent world.

Familiar objections soon present themselves against (A_1), however. If ψ is a logical consequence of one's beliefs then, according to (A_1), one's doxastic state is in order only if one does not suspend judgment about ψ. But if ψ is a very complex logical consequence of one's beliefs, and one would not be able to deduce it on the basis of one's beliefs, then it hardly seems wrong for one to suspend judgment about ψ. This is again the problem of *excessive demands*. Notice furthermore that this is a problem for (A_1) despite the fact that it is not a problem for (M_1). We do find it problematic for one to *disbelieve* the complicated consequence ψ when one has no idea whatsoever of whether ψ is true, or when one has no means of inferring that ψ from the other things one believes; suspending judgment about ψ on the other hand seems to be exactly the type of attitude that is called for in this situation. Of course, we could try and evade this objection by restricting the normative claim to those cases in which the subject recognizes the entailment relation, or those cases in which that relation is obvious to the subject. But we would lose generality in this way: the norm would apply only to those subjects who are able to grasp the relevant entailment relation, or to those subjects who find it obvious. Nothing is said about the agnostic states of non-logically insightful subjects (the latter ones would have

[15] See Monton's (1998) and Hájek's (1998) critiques of van Fraassen's Bayesian approach (1989, p. 194), where agnostic attitudes are represented instead by an interval $[0, r]$ of probabilities. As pointed out by both Monton (1998) and Hájek (1998), using 0 as a lower limit here would mean that one cannot change from an agnostic attitude towards ϕ to a belief-attitude toward ϕ upon update on new evidence—and clearly this should be allowed. According to Monton, any other choice of lower limit (bigger than 0 but still small) would still be problematic for other reasons—see his (1998, pp. 208-209).

more freedom in managing their doxastic lives—see MacFarlane 2004, p. 12 for the same point concerning logical norms of belief).

Another source of trouble for (A_1) are preface-like situations in which one believes each of $\phi_1, ..., \phi_n$ and yet suspends judgment about $(\phi_1 \wedge \cdots \wedge \phi_n)$ in an apparently rational manner. To be sure, these situations are clearly possible. One way to see this is in terms of a series: begin with the attitude that a rational subject has toward $(\phi_1 \wedge \phi_2)$ given her (strongly yet not maximally) justified beliefs that ϕ_1 and ϕ_2 respectively (for simplicity, assume that all the ϕ_i are atomic contingent propositions); not a sufficient amount of risk has been accumulated in the transition from ϕ_1 and ϕ_2 to $(\phi_1 \wedge \phi_2)$, and our subject believes the latter accordingly. But now consider the other end of the series: our subject is in the preface-like situation in which she disbelieves $(\phi_1 \wedge \cdots \wedge \phi_m)$, or she believes that $\neg(\phi_1 \wedge \cdots \wedge \phi_m)$ (for a sufficiently large m) and yet she rationally believes all of $\phi_1, ..., \phi_m$. In-between these two extremes, for a certain $n < m$, there will also be a situation in which the subject suspends judgment about $(\phi_1 \wedge \cdots \wedge \phi_n)$ and believes all of $\phi_1, ..., \phi_n$. To the extent that one can be normatively on the clear in this kind situation, (A_1) is in trouble again.

The following bridge principle avoids both objections:

(A_2) If $\phi_1, ..., \phi_n \models \psi$ then there is a reason against one's both believing all of $\phi_1, ..., \phi_n$ and suspending judgment about ψ.

This principle is modelled after Streumer's principle (S).[16] Notice that 'there is a reason against' is to be read as 'there is a reason for one not to be such that'. So the formal version of (A_2) is:

($\equiv A_2$) If $\phi_1, ..., \phi_n \models \psi$ then $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_n \wedge S\psi)$.

Since (A_2) does not *require* one not to suspend judgment about complex propositions that follow from one's beliefs (as (A_1) does), it makes no excessive demands; it just says that there is a *prima facie*, *pro tanto* reason for one not to do so. Furthermore, a reason for one not to believe all of $\phi_1, ..., \phi_n$ and suspend judgment about $(\phi_1 \wedge \cdots \wedge \phi_n)$ at the same time might be counterbalanced by considerations concerning the likelihood that one has made at least one mistake in making up one's mind about the members of the series $\phi_1, ..., \phi_n$. So (A_2) also has an advantage over (A_1) in the face of preface-like situations.

(I take the reasons mentioned in (A_2) and similar bridge principles to be *true propositions*. They are the very truths about what follows from what ($\phi_1, ..., \phi_n \models \psi$), perhaps in combination with other epistemically relevant truths—e.g. true propositions about how close certain doxastic attitudes are to the goals of getting at truths and avoiding falsehoods given that some other attitudes have successfully promoted those goals.[17] The subject does not need to be aware of those truths in order for us to say that *there are* reasons for her to be a certain way. One might

[16] To repeat: If $\phi_1, ..., \phi_n \models \psi$ then there is a reason against one's both believing all of $\phi_1, ..., \phi_n$ and believing that $\neg\psi$.

[17] This is just one example of possibly relevant truths. It might be suggested that another class of possibly relevant truths here are those concerning *accuracy dominance*: facts about how certain combinations of doxastic attitudes are dominated by other combinations of attitudes, in the sense that the latter ones always have greater epistemic utility than the former ones (strict dominance), or always have at least as great utility as the former ones and sometimes greater (weak dominance). Roughly put, epistemic utilities are measures of how epistemically good those doxastic attitudes are given the truth-values of the propositions that constitute their contents. See e.g. Easwaran and Fitelson (2015) for accuracy dominance arguments for epistemic norms. I myself am not very happy with accuracy dominance arguments, on account of their weakness: they don't allow us to justify some of the very plausible wide scope bridge principles that I have been considering here. But I invite the reader to check Richard Pettigrew's manuscript 'Epistemic Utility and the Normativity of Logic' (weblink in the references below) to make his or her own mind. As Pettigrew shows (pp. 11-12), not even believing all the n-premises and disbelieving the conclusion of a classically valid argument is guaranteed to be weakly dominated by some other combination of doxastic attitudes toward those propositions—not unless we embrace what Pettigrew

want to call those reasons 'objective' reasons. This is compatible, however, with requiring them to be in some sense accessible to the subject, or to require them to be knowable to the subject under certain ideal conditions.)

3.1 An argument for (A_2)

Pointing out that (A_2) avoids the objections that were raised against (A_1) falls short of giving an argument in support of (A_2). So why should we think that, when ϕ logically entails ψ, there is a reason against one's both believing that ϕ and suspending judgment about ψ?

One line of argument in support of that claim makes use of (M_2). Let '$\rightarrow$' be the material conditional; then (M_2) says that if $\phi \models \psi$ then $R(B\phi \rightarrow B\psi)$. The argument runs as follows:

1.	$\phi \models \psi$	(assumption for conditional proof)
2.	If $\phi \models \psi$ then $R(B\phi \rightarrow B\psi)$	(M_2)
3.	$R(B\phi \rightarrow B\psi)$	(1, 2)
4.	$R(B\psi \rightarrow \neg S\psi)$	(R_1)
5.	$(B\phi \rightarrow B\psi), (B\psi \rightarrow \neg S\psi) \models (B\phi \rightarrow \neg S\psi)$	(transitivity of $\rightarrow$)[18]
6.	$R(B\phi \rightarrow B\psi), R(B\psi \rightarrow \neg S\psi) \models R(B\phi \rightarrow \neg S\psi)$	(5, rule (C)—see below)
7.	$R(B\phi \rightarrow \neg S\psi)$	(3, 4, 6)
8.	If $\phi \models \psi$ then $R(B\phi \rightarrow \neg S\psi)$	(1-7 conditional proof, discharge 1)

The conclusion in line 8 is equivalent to: If $\phi \models \psi$ then $R\neg(B\phi \wedge S\psi)$, which is the single-premise version of ($\equiv A_2$) (the argument can easily be generalized to entailment with n-premises). A formula equivalent to our principle (R_1)—originally $R\neg(B\psi \wedge S\psi)$—is used in line 4. The principle is needed to derive $R(B\phi \rightarrow \neg S\psi)$ in line 7.

Most importantly, the argument relies on the following 'closure' principle (line 6):

(C) From $\Phi_1, ..., \Phi_n \models \Psi$ derive $R(\Phi_1), ..., R(\Phi_n) \models R(\Psi)$,

where Φ_i, Ψ stand for formulas that involve only doxastic attitude-ascriptions and the truth-functional operators ($\neg, \wedge, \vee, \rightarrow$), e.g. formulas such as $B\phi$, $\neg S\phi$, $(B\phi \rightarrow (B\psi_1 \vee B\psi_2))$ and $\neg(B\phi \wedge S\psi)$. Where $\Phi \models \Psi$, the principle says something like: since it is *impossible* for one to be such that Φ without also being such that Ψ, then the fact that there are reasons for one to be such that Φ entails that there are reasons for one to be such that Ψ. Notice that one cannot object to (C) in the manner that Dretske (2014) and others have argued against the thesis that knowledge or justified belief is closed under logical entailment/competent deduction. Let p be an empirical proposition and sh a skeptical hypothesis. Since $Bp \wedge B(p \rightarrow \neg sh)$ does not entail that $B\neg sh$, (C) does not allow us to conclude that $R(Bp \wedge B(p \rightarrow \neg sh)) \models R(B\neg sh)$. It is after all only entailment relations among logical *combinations of doxastic attitude-ascriptions* that are concerned in (C). Φ_i and Ψ in (C) are *restricted* to those kinds of formulas. E.g. given that

calls 'extreme conservatism' in deciding what are the values of getting things right and getting things wrong respectively. Let R be the value of getting things right: believing a true proposition has value R, and so does disbelieving a false one; and let $-W$ be the value of getting things wrong: believing a false proposition has value $-W$, and so does disbelieving a true one. Extreme conservatism amounts to the claim that $W > nR$, where n is the number of premises of a valid argument. Another option, and the one I find most natural, is to take those values to be such that $W = R$; this is what Pettigrew calls 'epistemic centrism'. The other options are $W < R$ and $W > R$—but none of these other options (except $W > nR$) delivers the result that, in general, believing the n-premises and disbelieving the conclusion of a classically valid argument is dominated by some other combination of doxastic attitudes toward those propositions.

[18] In general: $(\Phi \rightarrow \Psi), (\Psi \rightarrow \Sigma) \models (\Phi \rightarrow \Sigma)$.

$\neg(B\phi \wedge S\psi) \models (B\phi \rightarrow \neg S\psi)$, (C) allows us to conclude that $R\neg(B\phi \wedge S\psi) \models R(B\phi \rightarrow \neg S\psi)$; but assuming that $B\phi \not\models B(\phi \vee \psi)$, it does not allow us to conclude that $R(B\phi) \models R(B(\phi \vee \psi))$—even though $\phi \models (\phi \vee \psi)$. (C) itself makes no use of entailment relations among the *contents* of doxastic attitudes.[19]

Presumably, however, rule (C) fails: in some cases it can take us from truth to falsehood. One can fetch counterexamples where, for some Φ_1, Φ_2 and Ψ with $\Phi_1, \Phi_2 \models \Psi$, the reasons for one to be such that Φ_1 and the reasons for one to be such that Φ_2 are *in conflict* with each other, and so there is no guarantee that there will be a reason for one to be such that Ψ.

The argument can be fixed to address that issue, however. We just need to add the requirement that the reasons for one to be such that $(B\phi \rightarrow B\psi)$ and the reasons for one to be such that $(B\psi \rightarrow \neg S\psi)$ *are not in conflict* with each other (which is unlikely in this particular case anyway). If that is the case, then nothing bars the conclusion that there is a reason for one to be such that one does not believe that ϕ and suspends judgment about ψ, given that ϕ entails ψ. One can think of it in this way: rule (C)—or a new version of it—is restricted to those cases in which there is no conflict among the reasons for one to be such that Φ_1 and the reasons for one to be such that Φ_2, ..., and the reasons for one to be such that Φ_n. So there is after all a good argument that goes from (M_2) and (R_1) to (A_2). (See this footnote[20] for the general case involving n-premises).

3.2 A consequence of (A_2)

The following bridge principle follows from (A_2):

(A_3) If $\phi \models \psi$ then $R\neg(S\phi \wedge B\neg\psi)$.

Notice that in the passage from (A_2) to (A_3) the attitude of suspending judgment has changed its position from the entail*ed* proposition to the entail*ing* one. Here is a way of deriving (A_3) from (A_2):

1.	$\phi \models \psi$	(assumption)
2.	$\neg\psi \models \neg\phi$	(1, contraposition of entailment)
3.	If $\neg\psi \models \neg\phi$ then $R\neg(B\neg\psi \wedge S\neg\phi)$	(A_2)
4.	$R\neg(B\neg\psi \wedge S\neg\phi)$	(2, 3)

[19] It might be thought however that rule (C) delivers 'strange' results. In being such that I believe that ϕ I am also such that either I believe that ϕ or I do not believe that ϕ, i.e. $B\phi \models (B\phi \vee \neg B\phi)$; so if there is a reason for me to be such that $B\phi$, is there also a reason for me to be such that $(B\phi \vee \neg B\phi)$? 'This looks strange', one might say. (For a similar problem involving the 'ought' operator in the context of deontic logic, see Ross 1941—I thank an anonymous reviewer for calling my attention to that similarity here). But strangeness aside, there is indeed a reason for me to be such that $(B\phi \vee \neg B\phi)$ in this case. One can think of it in this way: suppose that there is a reason for me to believe that ϕ and that I believe that ϕ accordingly; so far, I am doing the rational thing, in the sense that there are reasons for me to be the way I am. But now notice that in being such that $B\phi$ I am also such that $(B\phi \vee \neg B\phi)$. And, if there is no reason for me to be such that $(B\phi \vee \neg B\phi)$, then I am less than perfectly rational: there are no reasons for me to be the way I am. Since this is so for every case in which I have reasons to be such that Φ (for *any* Φ, e.g. $B\phi, (B\phi \rightarrow B\psi), \neg(B\phi_1 \wedge B\phi_2 \wedge S\psi)$, etc.) and I am such that Φ accordingly, that would result in massive irrationality. Every time I am such as I have reasons to be, I am also such as I do not have reasons to be. I submit that this is false, and therefore it is way more problematic than embracing (C) with all its 'strangeness' (in the trade-off between strangeness and falsehood, we should opt for strangeness).

[20] Notice, first, that a similar proof to the one from 1-8 above can be constructed, with *If* $\phi_1, ..., \phi_n \models \psi$ *then* $R((B\phi_1 \wedge \cdots \wedge B\phi_n) \rightarrow B\psi)$ in line 2 and $((B\phi_1 \wedge \cdots \wedge B\phi_n) \rightarrow B\psi), (B\psi \rightarrow \neg S\psi) \models ((B\phi_1 \wedge \cdots \wedge B\phi_n) \rightarrow \neg S\psi)$ in line 5. Next we make a similar observation about the possibility of counterexamples to (C): we add that the reasons for one to be such that $((B\phi_1 \wedge \cdots \wedge B\phi_n) \rightarrow B\psi)$ and the reasons for one to be such that $(B\psi \rightarrow \neg S\psi)$ are not in conflict with each other (which again is unlikely to be the case).

5.	$R\neg(S\neg\phi \wedge B\neg\psi)$	(equivalent to 4)
6.	$R\neg(S\phi \wedge B\neg\psi)$	(equivalent to 5, given EQ: $S\phi \equiv S\neg\phi$)
7.	If $\phi \models \psi$ then $R\neg(S\phi \wedge B\neg\psi)$	(1-6 conditional proof)

(A_2) and (A_3) together allow us to make normative claims about both types of situations: those in which one is agnostic about the *conclusion* of a valid argument and those in which one is agnostic about the *premise* of a (single-premise) valid argument. E.g., (A_2) tells us that there is a reason against one's suspending judgment about whether *God exists* and at the same time believing a proposition that entails that *God exists*. (A_3) on the other hand tells us that there is a reason against one's suspending judgment about a proposition that entails that *God exists* (e.g. that *God has spoken to men*) and at the same time believing that *God does not exist*.[21] I.e. there is a reason for one to be such that if one suspends judgment about whether *God has spoken to men* one does not believe that *God does not exist* (after all, if God does not exist then *it is not the case* that God has spoken to men). As different as these two principles might look, however, (A_3) is already 'contained in' (A_2), as the proof presented above shows us.

The proof, however, only gives us a single-premise principle. Since (A_2) itself is not restricted to single-premise entailment, there should also be a proper generalization of (A_3) that can be derived from (A_2). There are two obvious candidate generalizations of (A_3):

(A_4) If $\phi_1, ..., \phi_n \models \psi$ then $R\neg(S\phi_1 \wedge \cdots \wedge S\phi_n \wedge B\neg\psi)$,

(A_5) If $\phi_1, ..., \phi_n \models \psi$ then $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \wedge S\phi_n \wedge B\neg\psi)$.

It looks as if (A_5) is the proper generalization—for we can use (A_2) to give an argument in support of (A_5) that is analogous to the one given in support of (A_3) above:

1'.	$\phi_1, ..., \phi_n \models \psi$	(assumption)
2'.	$\phi_1, ..., \phi_{n-1}, \neg\psi \models \neg\phi$	(1')
3'.	If $\phi_1, ..., \phi_{n-1}, \neg\psi \models \neg\phi$ then $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \wedge B\neg\psi \wedge S\neg\phi_n)$	(A_2)
4'.	$R\neg(B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \wedge B\neg\psi \wedge S\neg\phi_n)$	(2', 3')
5'.	$R\neg(B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \wedge S\neg\phi_n \wedge B\neg\psi)$	(equivalent to 4')
6'.	$R\neg(B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \wedge S\phi_n \wedge B\neg\psi)$	(equivalent to 5', given EQ)[22]
7'.	If $\phi_1, ..., \phi_n \models \psi$ then $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \wedge S\phi_n \wedge B\neg\psi)$	(1'-6' conditional proof)

So we also get (A_5) as a bridge principle of agnosticism, (A_3) being just a special case of it. What is to be made of (A_4)? It simply does not seem right. Being agnostic about all the premises and believing the negation of a conclusion of an entailment relation is not always by itself problematic. I suspend judgment about whether *Merkel is in Germany*, and (therefore) I suspend judgment about whether *Merkel is not in Germany*;[23] that *Merkel is in Germany* and that *Merkel is not in Germany* together entail that *Merkel is in Germany and Merkel is not in Germany* (in general, $\phi, \neg\phi \models (\phi \wedge \neg\phi)$); but I believe that *It is not the case that Merkel is in Germany and not in Germany*. If we let p stand for the proposition that *Merkel is in Germany*,

[21] For the sake of this illustration, interpret *God exists* as being equivalent to $\exists x(x = God)$.
[22] To repeat: $S\phi \equiv S\neg\phi$ (see Section 2).
[23] Here the intended reading of 'not' is the *de dicto* reading, so that 'Merkel is not in Germany' is short for 'It is not the case that Merkel is in Germany'.

we can describe my doxastic state as follows: $(Sp \wedge S\neg p \wedge B\neg(p \wedge \neg p))$. I suspend judgment about some contingent matter and I also believe a logical truth—what is wrong about that?[24]

Of course, if I have good evidence concerning the whereabouts of Merkel, perhaps I have a reason not to be in that state. But that is simply because (in this case) I have a reason not to suspend judgment about whether *Merkel is in Germany*. However, as in any other bridge principles involving the R operator that we have considered so far, the reasons concerned in (A_4) are *prima facie* reasons for one to be a certain way (they are also *objective* reasons, as we saw above). These are reasons that we take to 'be there' *before* we start considering more specifically what other reasons are there for the subject to hold this or that doxastic attitude. And so making reference to those possible additional reasons in the case at hand does not give any support to (A_4).

My doxastic state $(Sp \wedge S\neg p \wedge B\neg(p \wedge \neg p))$ is not by itself problematic in view of the logical facts—and that is because there isn't any *tension* among the attitudes that constitute that state given those facts. But a bridge principle that tells us that if $\phi_1, ..., \phi_n \models \psi$ then $R\neg\Phi$ (where Φ is some logical combination of doxastic attitude-ascriptions toward $\phi_1, ..., \phi_n, \psi$) is true only when the attitudes that constitute Φ are in tension with each other in view of the logical facts.

3.3 The tension test

But when or in which cases is there such a tension? One might rightly demand clarification here, given the use that I make of this notion of 'tension' in rejecting principles like (A_4) or motivating principles like (A_5) (more on this below). We can call the relevant kind of tension 'logical incoherence'.[25] I am not assuming that this is the *only* way of setting those doxastic states whose attitudes are in tension with each other (in view of the logical facts) apart from those whose attitudes are not, but here is one way of testing for that.

Let Φ be a doxastic state $(X_1\phi_1 \wedge \cdots \wedge X_n\phi_n)$, where each X_i with $i \in \{1, ..., n\}$ is either B, S, $\neg B$ or $\neg S$; so every $X_i\phi_i$ either ascribes a doxastic attitude toward ϕ_i or denies ascription of a doxastic attitude toward ϕ_i.[26] Now we make the supposition that all conjuncts of Φ except $X_j\phi_j$ have positive epistemic status and we check whether, in that case, the epistemic status of $X_j\phi_j$ is somehow impaired (we repeat this process for all $j \in \{1, ..., n\}$). More specifically, we check whether *one has reasons not to be such that* $X_j\phi_j$ under that supposition (if X_j denies an ascription of attitude, i.e. $X_j\phi_j$ is $\neg Y\phi_j$ where Y is B or S, we say that one has reasons not to be such that $\neg Y\phi_j$ iff one has reasons to be such that $Y\phi_j$). So that means checking whether one has reasons not to be such that $X_n\phi_n$ when each of $X_1\phi_1, ..., X_{n-1}\phi_{n-1}$ has positive positive epistemic status, checking whether one has reasons not to be such that $X_{n-1}\phi_{n-1}$ when each of

[24] Notice that neither (A_3) nor (A_5) tell against my doxastic state in this case. The former does not tell against it because it is a single premise bridge principle, and neither $p \models (p \wedge \neg p)$ nor $\neg p \models (p \wedge \neg p)$ are the case; the latter does not tell against it because I suspend judgment about all the premises (p, $\neg p$) of the relevant entailment relation $(p, \neg p \models (p \wedge \neg p))$, as opposed to suspending about one of the premises and believing the remaining premise (which in this case would already be problematic in itself).

[25] It is an unfortunate feature of many accounts of coherence out there that they concentrate on *assertive* attitudes only, thus leaving agnostic attitudes aside: those accounts do not tell us how well or bad agnostic attitudes fit with a web of belief. This goes back to C. I. Lewis's (1946) account of coherence as 'congruence': a set of *asserted* facts is congruent only when every element of that set is probabilistically supported by the remaining members of that set. Agnostic attitudes are also left out of the picture by BonJour (1985), Lehrer (1990) and Thagard (2000).

[26] For the sake of simplicity, I am leaving disbelief aside for now, understood as a *sui generis* attitude—for my present purposes we can do with $B\neg\phi$ instead of $D\phi$.

$X_1\phi_1, ..., X_{n-2}\phi_{n-2}, X_n\phi_n$ has positive epistemic status, etc. If in each of these cases one has reasons not to be such that $X_j\phi_j$ given that all the other conjuncts of Φ are in good epistemic standing, and that is so in virtue of the fact that $\phi_1, ..., \phi_n \models \psi$, then we can say that there is the relevant sort of tension among the attitudes in Φ, or that Φ is logically incoherent. (Of course, if there is a single doxastic attitude in Φ that is by itself problematic—in that it already is in bad epistemic shape in view of the logical facts—perhaps we cannot suppose that it has the relevant type of positive epistemic status. But in that case we can already conclude that the state Φ is logically incoherent: the state is by itself problematic because one of its doxastic attitudes is by itself problematic). Call that test the 'tension test'.

There are different options available as to what type of epistemic status we will ascribe to the relevant conjuncts of Φ in each stage of the test. Notice, however, that since not all X_i are *belief* attitudes (they can also be agnostic attitudes) and since not all X_i are *ascriptions* of doxastic attitudes (some of them deny an ascription of doxastic attitude), we cannot always run the test by ascribing the same epistemic status (e.g. *knowledge*) to all conjuncts of Φ except $X_j\phi_j$ and checking whether one has reasons not to be such that $X_j\phi_j$ under that supposition. So we have to be sensitive to these features of a state Φ and choose the epistemic notions we are going to use in the test adequately. To a first approximation, we can perform the test by ascribing the *best* epistemic status we can to each $X_i\phi_i$.[27]

E.g. here is a way of submitting the doxastic state $(Bp \wedge B(p \rightarrow q) \wedge Sq)$ to this test:

(a) Suppose that one knows that p and one also knows that $(p \rightarrow q)$; given that much, there are excellent reasons for one to *believe* that q—reasons *not* to suspend judgment about q.

(b) Now suppose that one knows that p and one justifiably suspends judgment about q (one's total evidence does not decide it one way or the other, and one is properly sensitive to that); in that case, how could one justifiably maintain that $(p \rightarrow q)$? If one knows the antecedent (p) but is justifiably agnostic about the consequent (q), then it should not be clear to one whether the conditional is true either. If q is true the conditional is true—but if q is false the conditional is false; and since as far as one knows q could be either true or false, also $(p \rightarrow q)$ could be either true or false. So in this case one has reasons not to believe that $(p \rightarrow q)$.

(c) Finally, suppose that one knows that $(p \rightarrow q)$ and one justifiably suspends judgment about q; given that much, one has reasons not to believe that p. For the truth of $(p \rightarrow q)$ (which one knows to be true) and the truth of p would guarantee the truth of q—i.e. they would 'decide q for the truth'—but, as far as one knows, q could be either true or false.[28]

(E.g. consider: I know that *If the number of stars is infinite then the universe is infinite* but I justifiably suspend judgment about whether *The universe is infinite*. Now the question is raised to me as to whether *The number of stars is infinite*; since I am justifiably agnostic

[27] If X_i is negative, e.g. $X_i\phi_i = \neg B\phi_i$, we can say things like 'the subject is warranted/justified in being such that she does not believe that ϕ' (for believing that ϕ would be unwarranted or unjustified for that subject).

[28] A more detailed way of making the point would be, given that I justifiably suspend about q and I know that $(p \rightarrow q)$: (1) My evidence e does not give sufficient support to q (the probability of q conditional on e does not get above the threshold for evidential support); (2) If e gives sufficient support to p (above the threshold), it also gives sufficient support to q; (3) Therefore, my evidence e does not give sufficient support to p (1, 2); (4) Therefore, there are reasons for me not to believe that p (i.e. the fact that my evidence does not give sufficient support to p). If one is to interpret the support relation as confirmation, it is important not to take 'sufficient support' to mean *incremental* confirmation ($Pr(p \mid e) > Pr(p)$), but rather *absolute* confirmation ($Pr(p \mid e) \geq t$), e.g. with $t = 0.8$)—otherwise premise (2) would fail on account of the usual counterexamples to the principle that if e (incrementally) confirms p then it also (incrementally) confirms the logical consequences of p.

about the infinity of the universe, I have reasons not settle the question thus: *Yes, the number of stars is infinite.*)

So the test says that there is *tension* among the attitudes in $(Bp \wedge B(p \rightarrow q) \wedge Sq)$.[29] Assuming that $p, (p \rightarrow q) \models q$, that doxastic state is 'by itself problematic' in view of the logical facts. Now consider again the doxastic state $(Sp \wedge S\neg p \wedge B\neg(p \wedge \neg p))$. Suppose I justifiably suspend judgment about p (*Merkel is in Germany*), and I justifiably suspend judgment about $\neg p$; do I thereby have any reasons *not to believe* that $\neg(p \wedge \neg p)$? I do not: my not being able to tell whether Merkel is Germany in no way gives me a reason to refrain from believing that *It is not the case that Merkel is and is not in Germany.* So the doxastic state $(Sp \wedge S\neg p \wedge B\neg(p \wedge \neg p))$ does not test positive for tension. For it is not the case that, whenever two among the attitudes that compose that state have good epistemic status, the epistemic status of the remaining attitude is impaired. That in turn gives us reasons to conclude that (A_4) does not hold. There are counterexamples to it, i.e. examples in which $\phi_1, ..., \phi_n \models \psi$ but it is not the case that $R\neg(S\phi_1 \wedge \cdots \wedge S\phi_n \wedge B\neg\psi)$. And that is because there are instances of $(S\phi_1 \wedge \cdots \wedge S\phi_n \wedge B\neg\psi)$ with $\phi_1, ..., \phi_n \models \psi$—our example being the doxastic state $(Sp \wedge S\neg p \wedge B\neg(p \wedge \neg p))$—whose attitudes are not in tension with each other in view of the logical facts.[30]

4 Are there other bridge principles of agnosticism?

Let me briefly recap what I have done so far. First, I pointed out that (A_1): if $\phi_1, ..., \phi_n \models \psi$ then $O\neg(B\phi_1 \wedge \cdots \wedge B\phi_n \wedge S\psi)$ falls prey to both the excessive demands objection and the preface-like situation objection. These problems are avoided by (A_2): if $\phi_1, ..., \phi_n \models \psi$ then $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_n \wedge S\psi)$, since reasons are not strict in the way that obligations are (that there are also reasons for one to be such that $(B\phi_1 \wedge \cdots \wedge B\phi_n \wedge S\psi)$ is not a problem for (A_2)). (A_2) can furthermore be derived from (M_2): if $\phi_1, ..., \phi_n \models \psi$ then $R(B\phi_1 \wedge \cdots \wedge B\phi_n \rightarrow B\psi)$, and ($R_1$): $R\neg(B\phi \wedge S\phi)$. ($A_2$) entails yet another bridge principle of agnosticism, i.e. (A_5): if $\phi_1, ..., \phi_n \models \psi$ then $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \wedge S\phi_n \wedge B\neg\psi)$. Together, ($A_2$) and ($A_5$) allow us to make normative claims about both types of situations: those in which the subject suspends judgment about the *conclusion* of an entailment relation and those in which the subject suspends judgment about one of the *premises* of an entailment relation.

It is not quite correct to say that the good standing of (A_2)/(A_5) strictly depends on there being a proof of these principles from (M_2) (which I assume *is* in good standing). Taken by themselves, (A_2)/(A_5) do deliver 'intuitively correct' assessments, or they do what we expect such normative principles to do. There is again something wrong (at least *prima facie*) with someone who believes that *There was a Big Bang* and that *If there was a Big Bang then the universe had a beginning* but suspends judgment about whether *The universe had a beginning.*

[29] Other bridge principles were used in each of these stages of the test but they are even less controversial ones. In particular, in (a) I have assumed that if one knows that p and one knows that $(p \rightarrow q)$ then there are reasons for one not to suspend judgment about q (one knows that p, knows that $(p \rightarrow q)$, and that entails that q is true). In (b) I have assumed that if one knows that p and one justifiably suspends judgment about q then there are reasons for one not to believe that $(p \rightarrow q)$. And in (c) I have assumed that if one knows that $(p \rightarrow q)$ and one justifiably suspends judgment about q then there are reasons for one not to believe that p. Reasons are again *prima facie* and *pro tanto* reasons. These principles are not wide-scope but, if they are true, there is no reason why we should not avail ourselves of these principles to put wide scope bridge principles to a test and gain some insight into their correctness. Again, this test is just supposed to capture the tension among the attitudes in the relevant doxastic state $(Bp \wedge B(p \rightarrow q) \wedge Sq)$, and there is no implication here that wide-scope principles are reducible to narrow-scope principles, or that the latter ones are more fundamental.

[30] When I write that Φ is/is not problematic in view of the logical facts, this is supposed to be compatible with saying that Φ is not/is problematic in view of some other facts.

Those attitudes are in tension with each other. Accordingly, (A_2) tells us that that person has a reason not to be in that doxastic state. In order to be responsive to that reason (in the absence of better reasons to remain in that state), the person would need to revise her attitudes, e.g. by also suspending judgment about the conditional while still maintaining her agnostic attitude toward the proposition that *The universe had a beginning*; or she could revise her views by accepting that, after all, *The universe did have a beginning* while maintaining her previous beliefs. Similarly, there is something wrong (at least *prima facie*) with someone who believes that *Andy is not a singer* and at the same time suspends judgment about whether *Andy is a singer and a designer*. Accordingly, (A_5) tells us that that person has a reason not to be in that doxastic state. In order to be responsive to that reason (in the absence of better reasons to remain in that state), the person would need to revise her attitudes, e.g. by also believing that *It is not the case that Andy is a singer and a designer* while maintaining her previous belief that *Andy is not a singer*.

And so we already have two good candidates for logical principles of agnosticism. It might be asked, however, whether this is the most we can do in this respect. In particular, one might be wondering if there are also (true and universal) bridge principles in which agnostic attitudes are ascribed to *both* the conclusion and at least one of the premises of a logically valid argument. That is the idea I am going to briefly explore now.

4.1 Suspension on both sides of the entailment relation

One initial proposal is: if $\phi \models \psi$ then one has a reason to be such that if one suspends judgment about ψ one also suspends judgment about ϕ. Or, in general (n-premises): if $\phi_1, ..., \phi_n \models \psi$ then one has a reason to be such that if one suspends judgment about ψ and believes all of $\phi_1, .., \phi_{n-1}$, then one also suspends judgment about ϕ_n. But that principle is falsifiable. Let p again be the proposition that *Merkel is in Germany*; even though $(p \wedge \neg p) \models p$, suspending judgment about p and believing that $\neg(p \wedge \neg p)$—as opposed to also suspending judgment about $(p \wedge \neg p)$—is not by itself problematic (as we already saw).[31]

Perhaps there is something to a principle that goes in the other direction, however. The idea would be that, in general, if $\phi_1, ..., \phi_n \models \psi$ then if one suspends judgment about all of $\phi_1, ..., \phi_n$ one also suspends judgment about ψ. I suspend judgment about whether *Merkel is in Germany* and I suspend judgment about whether *Aneni is in Zimbabwe*; I then consider the conjunction *Merkel is in Germany and Aneni is in Zimbabwe* and I suspend judgment about that as well; that looks like it is the right thing to do (assuming that I rationally maintain my previous agnostic attitudes toward each of those conjuncts, and that I have no evidence to believe that Merkel being in Germany and Aneni being in Zimbabwe are somehow incompatible states). So the principle appears to have some traction. But it does not survive scrutiny either. Even though $p \models (p \vee \neg p)$, suspending judgment about p and believing that $(p \vee \neg p)$ at the same time is not by itself problematic. I suspend judgment about whether *Merkel is in Germany*—but I do not suspend judgment about whether *Merkel is either in Germany or not in Germany* (I rather believe that the latter is the case).[32]

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[31] In fact, assuming that $\models \neg(p \wedge \neg p)$, ($A_2$) tells us that I have a reason not to suspend judgment about $(p \wedge \neg p)$. For a special case of (A_2) is that in which there is entailment with no premises (i.e. logical truth): if $\models \psi$ then $R\neg(S\psi)$. Assuming, then, that $\models \neg(p \wedge \neg p)$, it follows that $R\neg S\neg(p \wedge \neg p)$; but since $S\neg(p \wedge \neg p) \equiv S(p \wedge \neg p)$, it follows that $R\neg S(p \wedge \neg p)$.

[32] Similarly, if it is indeed the case that $\models (p \vee \neg p)$, (A_2) would also tell us that I have a reason not to suspend judgment about $(p \vee \neg p)$.

Both of these principles can be tentatively fixed in a similar manner. In both cases we have found counterexamples—i.e. situations in which there are no reasons for one to be such as described in those principles—where logical truths are involved (either in the premises or in the conclusion). The idea, then, is to include in the antecedent of our new principles the requirement that the relevant propositions are not logical truths, like so:

(A_6) If $\phi_1, ..., \phi_n \models \psi$, $\not\models \phi_n$ and $\not\models \neg\phi_n$ then $R(S\psi \wedge B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \rightarrow S\phi_n)$,

(A_7) If $\phi_1, ..., \phi_n \models \psi$, $\not\models \psi$ and $\not\models \neg\psi$ then $R(S\phi_1 \wedge \cdots \wedge S\phi_n \rightarrow S\psi)$.

Again, however, (A_6) doesn't seem to work. I suspend judgment about whether *Toby is an animal* (q), I believe that *If Toby is a dog then Toby is an animal* ($p \rightarrow q$)—and yet I do not suspend judgment about whether *Toby is a dog* (p); in fact I believe that *Toby is not a dog.* As far as I know, Toby could be some other animal than a dog, or it could be something else, say, a cartoon character. Notice that all the three conditions in (A_6) are satisfied in this case, i.e. $(p \rightarrow q), p \models q$, $\not\models p$ and $\not\models \neg p$. And my doxastic state $(Sq \wedge B(p \rightarrow q) \wedge \neg Sp)$ is not by itself problematic in view of those logical facts—i.e. there is no tension among my attitudes in view of those facts.[33] So there is no reason for me to be such that $\neg(Sq \wedge B(p \rightarrow q) \wedge \neg Sp)$ in view of those facts—we have a counterexample to (A_6).

(A_7) is also in trouble. I suspend about whether *Aneni is in Zimbabwe* (p), I also suspend judgment about whether *Aneni is in Germany* (q), but I do not suspend judgment about whether *Aneni is in Zimbabwe and Aneni is in Germany* ($p \wedge q$)—I rather believe that *It is not the case that Aneni is in Zimbabwe and Aneni is in Germany.* As far as I know Aneni could be anywhere, including Zimbabwe or Germany, but I know that she could not be in both at the same time. Notice that all the three conditions in (A_7) are satisfied, i.e. $p, q \models (p \wedge q)$, $\not\models (p \wedge q)$ and $\not\models \neg(p \wedge q)$. And yet there is no tension among the components of my doxastic state $(Sp \wedge Sq \wedge B\neg(p \wedge q))$ in view of those logical facts. So there is no reason for me to be such that $\neg(Sp \wedge Sq \wedge B\neg(p \wedge q))$ in view of those facts—we also have a counterexample to (A_7).

4.2 An attempt to improve upon (A_6) and (A_7)

In view of the previous counterexamples to (A_6) and (A_7), one might want to try and improve upon those principles as follows:

(A_8) If $\phi_1, ..., \phi_n \models \psi$, $\not\models \phi_n$ and $\not\models \neg\phi_n$ then $R(S\psi \wedge B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \rightarrow \neg B\phi_n)$,

(A_9) If $\phi_1, ..., \phi_n \models \psi$, $\not\models \psi$ and $\not\models \neg\psi$ then $R(S\phi_1 \wedge \cdots \wedge S\phi_n \rightarrow \neg B\psi)$.

The only (but important) difference between (A_6) and (A_8)—and also between (A_7) and (A_9)—is in the consequent of the conditional that is under the scope of the R operator: suspending judgment about ϕ_n *versus* simply not believing that ϕ_n. Since it takes more to suspend judgment about ϕ_n than it takes to just fail to believe that ϕ_n (suspending judgment is just one possible way of *not believing*), (A_8) is weaker than (A_6), and (A_9) is weaker than (A_8).

[33] Running the tension test for $(Sq \wedge B(p \rightarrow q) \wedge \neg Sp)$: suppose I justifiably suspend judgment about q and I know that $(p \rightarrow q)$; do I thereby have reasons *not* to be such that $\neg Sp$? That is: do I thereby have reasons to suspend judgment about p as well? I do not—for believing that $\neg p$ in that situation would also be perfectly coherent. Notice the difference between that and one of the stages (i.e. (c)) by means of which I have established that there is tension in the doxastic state $(Sq \wedge B(p \rightarrow q) \wedge Bp)$ above (§3.3): under the assumption that I justifiably suspend judgment about q and I know that $(p \rightarrow q)$, I do have reasons *not to believe* that p (for the truth of p would decide q for the truth, and I am justifiably agnostic about q/my evidence does not decide q). But having reasons not to believe that p does not guarantee having reasons to suspend judgment about p—one may refrain from believing that p by disbelieving that p instead.

Thus (A_8) does not tell us that I have reasons not to be in the (non-problematic) state of suspending judgment about whether *Toby is an animal* (q), believing that *If Toby is a dog then Toby is an animal* ($p \to q$) and also believing that *Toby is not a dog* ($\neg p$); believing that $\neg p$ is one way of being such that $\neg Bp$. Rather, (A_8) just tells us that I have reasons not to be in the state ($Sq \wedge B(p \to q) \wedge Bp$)—which is a state that is by itself problematic. Also, notice that whereas (A_6) says that I have reasons to be such that I suspend judgment about every proposition that entails what I already suspend judgment about, (A_8) only says that I have reasons not to believe those propositions that entail what I suspend judgment about. And so if there are also worries of excessive demandingness with respect to the (*prima facie*, *pro tanto*) reasons operator, (A_8) again fares better than (A_6) in this regard.[34] But (A_2) already tells us all of that: (A_8) is just a trivial consequence of (A_2).[35] Even though (A_8) is true, it does not say anything terribly new when compared to (A_2).

(A_9) on the other hand is not really better off than (A_7). There are states of type ($S\phi_1 \wedge \cdots \wedge S\phi_n \wedge B\psi$) with $\phi_1, ..., \phi_n \models \psi$, $\not\models \psi$ and $\not\models \neg\psi$ such that those attitudes are not in tension with each other. E.g. suppose I suspend judgment about whether *a is red* (r), and also about whether *a is green* (g)—I do not know what the color of object a is—even though I know that *a is either red or green* ($r \vee g$); all conditions in the antecedent of (A_9) are satisfied: $r, g \models (r \vee g)$, $\not\models (r \vee g)$ and $\not\models \neg(r \vee g)$; and yet the doxastic attitudes of my state ($Sr \wedge Sg \wedge B(r \vee g)$) are not in tension with each other in view of the logical facts. So there is no reason for me to be such that $\neg(Sr \wedge Sg \wedge B(r \vee g))$ in view of those facts.

To sum up this section: the two bridge principles that we have considered with suspension of judgment on both sides of the entailment relation, i.e. (A_6) and (A_7), are false; furthermore, if we try to fix (A_6) in the manner of (A_8), we get a true principle, but one that is just a trivial consequence of (A_2), not much more informative than the latter; and if we try to fix (A_7) in the manner of (A_9) we get yet another false bridge principle. So we have not succeeded in fleshing out any other (true, universal) bridge principles of agnosticism that are more informative than (A_2)/(A_5).

5 Concluding remarks and future directions

Are there bridge principles of agnosticism? I.e. is logic also relevant to the normativity of agnostic attitude-management? I submit that (A_2)/(A_5) are on solid grounds and, therefore, that the answer is 'yes'. Where to go from here?

A natural next step is to try and use those principles of agnosticism to address issues in philosophy of logic, along the lines of MacFarlane's (2004) proposal (see also Steinberger (2016)). In particular, if a given notion of entailment tells us that $p_1, ..., p_n$ entail q (for certain propositions $p_1, ..., p_n, q$) but it does not look as if there is any reason against one's being such that ($Bp_1 \wedge \cdots \wedge Bp_n \wedge Sq$), or it does not look as if there is any reason against one's being such that ($Bp_1 \wedge \cdots \wedge Bp_{n-1} \wedge Sp_n \wedge B\neg q$) (there is no tension among the attitudes in those states), then perhaps we can use (A_2)/(A_5) to make a case against that notion of entailment.[36]

[34] I thank an anonymous reviewer for pointing that out to me.

[35] Suppose that (A_2): if $\phi_1, ..., \phi_n \models \psi$ then $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_n \wedge S\psi)$; adding $\not\models \phi_n$ and $\not\models \neg\phi_n$ to the antecedent of (A_2) does not change anything, so we also have: if $\phi_1, ..., \phi_n \models \psi$, $\not\models \phi_n$ and $\not\models \neg\phi_n$ then $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_n \wedge S\psi)$; but $R\neg(B\phi_1 \wedge \cdots \wedge B\phi_n \wedge S\psi) \equiv R\neg(S\psi \wedge B\phi_1 \wedge \cdots \wedge B\phi_n) \equiv R\neg(S\psi \wedge B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \wedge B\phi_n) \equiv R(S\psi \wedge B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \to \neg B\phi_n)$; therefore, if $\phi_1, ..., \phi_n \models \psi$, $\not\models \phi_n$ and $\not\models \neg\phi_n$ then $R(S\psi \wedge B\phi_1 \wedge \cdots \wedge B\phi_{n-1} \to \neg B\phi_n)$, i.e. ($A_8$).

[36] Of course, I have relied on certain logical principles *in order to motivate* (A2)/(A5)—but I cannot quite see how one can completely avoid making use of some such principles here. In particular, I have used the logical

Relatedly, one might wonder whether there are logical principles of agnosticism that are *stricter* than (A2)/(A5), in the sense that they do not just tell us that *there are reasons* for one to be such-and-such,[37] but they also impose some sort of *obligation* to be such-and-such. Stronger bridge principles are better suited for the task of motivating revisions in logic. We saw above that (A_1) was too demanding, and so it is still an open question whether there are (true, universal) logical principles of agnosticism that are less strict than (A_1) and yet stricter than (A_2). But obviously pursuing these questions is beyond the scope of this paper, which can be seen as a prompt to that (deeper) investigation.[38]

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connectives ($\neg, \wedge, \rightarrow$) of classical logic to formulate those bridge principles. But let me point out that it is possible to do this while still allowing for the possibility that the logic that governs the contents of the subject's doxastic attitudes *is not* classical logic, or that the right semantics for the connectives that we use to represent the contents of one's doxastic attitudes differs from the semantics of those connectives as used by us to flesh out and reason about bridge principles (this observation is similar to the observation that it is possible to use a logic L in the metalanguage to talk about an object-language that obeys to some other logic L^*). And so I have tried to remain as neutral as possible regarding the correct logic/semantics of the connectives that I used to represent the *contents of doxastic attitudes.* Here I have relied on the following: (a) $(\phi \wedge \psi) \models \psi$, (b) $\phi \models (\phi \vee \neg\phi)$, (c) $(\phi \wedge \neg\phi) \models \phi$, (d) $\neg\phi \models \neg(\phi \wedge \psi)$, (e) $\phi, \neg\phi \models (\phi \wedge \neg\phi)$ and, more generally, $\phi, \psi \models (\phi \wedge \psi)$, (f) $\phi, (\phi \rightarrow \psi) \models \psi$; finally, I have also relied on the fact that one can derive $\neg\psi \models \neg\phi$ from $\phi \models \psi$. These are compatible with many logics (classical and non-classical). Furthermore, the fact that I have used the classical connectives to formulate those bridge principles and to reason about them is not *essential* to the project. One might formulate the relevant bridge principles with the natural language connectives *not*, *if... then...*, etc. and motivate them in similar ways (e.g. by showing that there is tension among the attitudes that compose the relevant doxastic states, by pointing out that those principles deliver intuitive or expected results, etc.), even though that would leave those bridge principles somewhat more vague (which I chose not to do).

[37] Echoing Broome (2000), MacFarlane (2004, p. 12) also points out that (M_2) does not have the strictness that one might expect from these bridge-principles: a subject can believe things without yet believing their logical consequences and still be normatively on the clear. (Even though that is a *complaint* about (M_2)—a complaint about its strength—it does not show that that principle is *false*).

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