Logical Omniscience and Acknowledged vs. Consequential Commitments

Niels Skovgaard Olsen[1]

Abstract. The purpose of this paper is to consider the explanatory resources that Robert Brandom's distinction between acknowledged and consequential commitments affords in relation to the problem of logical omniscience. With this distinction the importance of the doxastic perspective under consideration for the relationship between logic and norms of reasoning is emphasized, and it becomes possible to handle a number of problematic cases discussed in the literature without thereby incurring a commitment to revisionism about logic.

1 INTRODUCTION

The purpose of this paper is to consider the explanatory resources that Brandom's [1] distinction between acknowledged and consequential commitments affords in relation to the problem of logical omniscience. Hence, one of its goals is to use existing literature to identify a number of problems that any adequate account of the relation between norms of reasoning and logic should meet. A second goal is to show how a particular approach based on the abovementioned conceptual distinction is capable of delivering (what appears to be) satisfactory answers to all of them. However, this paper is not in itself an attempt to adjudicate in the general dispute about whether to prefer classical or non-classical views on logic. What it does is rather to investigate the properties of a particular approach to the problem of logical omniscience, which is capable of handling a number of problematic cases, and then leave it to the reader to decide, where this leaves us in regard to this general issue.

Whereas we have a move away from theories based on deductive logic in psychology of reasoning [2, 3, 4, 5], it is customary to treat deductive closure and consistency as minimal conditions for belief sets in formal epistemology [6] [7, ch. 4]. This is so in spite of the fact that it is readily acknowledged by all parties that being aware of all the deductive consequences of one's beliefs imposes unrealistic demands on the agent [8, ch. 13-14], [9, ch. 2], and [10, ch. 1]. As a result, the deductive consequences of beliefs are automatically added to the set of the agent's beliefs irrespectively of the poor logical performance documented in the psychological literature [4]. And if the object of beliefs is taken to be propositions, then logically equivalent sentences are automatically treated as being believed to the same degree irrespectively of well-known psychological findings such as the framing effect [11].

As we shall see, these rationality principles have also come under considerable pressure from the philosophical literature. So both the psychological and philosophical literatures suggest that the status of these minimal constraints on belief sets needs to be carefully scrutinized.

However, it should be noted that the normative principles in question are as much a part of logic-based approaches like belief revision theory as they are of the probabilistic models that psychology of reasoning has begun to import from Bayesian epistemology [7, ch. 3-5].

Moreover, Christensen [12: 15ff.] argues that the probability calculus should not be seen as a new logic for graded belief, but rather as "a way of applying standard logic to beliefs, when beliefs are seen as graded". He makes his case by showing on the basis of the axioms of the probability calculus how the logical properties of propositions impose restrictions on probabilistic coherence. An example is that probabilistic coherence requires of the agent that he believes $p \vee q$ at least as strongly as p, which follows directly from the fact that $p \vee q$ is entailed by p. Hence, just as logical closure for binary beliefs would require that the ideally rational agent does not believe p while not believing $p \vee q$, so probabilistic coherence for graded beliefs requires of him that he does not believe p to degree x while believing $p \vee q$ to a degree less than x. Moreover, just as logical consistency of binary beliefs would require that this agent doesn't believe both p and $\neg (p \vee q)$, probabilistic coherence of graded beliefs requires that his degree of belief in p and $\neg (p \vee q)$ does not sum up to more than one [12, p. 15-16].

So no matter whether binary, formal representations of beliefs are preferred (as in the old paradigm in psychology of reasoning), or probabilistic representations of degrees of beliefs are preferred (as in the new paradigm in psychology of reasoning), it holds that: "the prominent proposals for imposing formal constraints on ideal rationality are rooted in logic" [12, p. 18]. It is only recently that there has been an awareness of this fact in the psychological literature. Evans [5, p. 6] has aptly put his finger on the implication this has for the celebrated paradigm shift in psychology of reasoning when he says:

> By around 2000 many researchers using the paradigm were questioning the idea that logic could provide a description of human reasoning, and many were also casting doubt on logic as an appropriate normative system (Evans, 2002; Oaksford & Chater, 1998). While these authors complained about ''logicism'' in the psychology of reasoning, it is again standard bivalent logic that they had in mind. Any well-formed mathematical system is a closed deductive system that can be regarded as a logic in which theorems (proven conclusions) are deduced from axioms (assumptions). Probability theory, which is much used in the new paradigm, actually reduces to binary logic when probabilities are set to 1 or 0. For example, if we set P(A and B) = 1, we can conclude that P(A) = 1, thus preserving

[1] Dept. of Philosophy, Univ. of Konstanz, Germany. Email: Niels.Olsen@uni-Konstanz.de.

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> certainty (truth). So it is more accurate to say that authors were objecting to binary logic, which does not allow beliefs represented as subjective probabilities that range freely from 0 to 1, rather than logic per se.

Accordingly, the shift in psychology of reasoning is to be viewed as one concerning the need for representing degrees of beliefs that are concerned with our confidence in propositions rather than necessary truth preservation of full beliefs. Yet because the minimal constraints on belief sets have not been abandoned, we are still confronted with the problem of logical omniscience. In this context, Brandom [1] has made an interesting conceptual distinction between acknowledged and consequential commitments, which can potentially throw new light on the normative issues at stake.

2 ACKNOWLEDGED AND CONSEQUENTIAL COMMITMENTS

Instead of theorizing about belief, Brandom [1] chooses to theorize about public, doxastic *commitments*, which conversation partners attribute to one another on the basis of the assertions they make and whether they later withdraw them. In this type of interaction, the interlocutors alternate between taking up the role of *the speaker*, who makes the assertions, and *the scorekeeper*, who keeps track on the assertions made by the speaker by keeping score on the speaker's commitments and entitlements.

A doxastic commitment to p can be thought of as an obligation to defend p when appropriately challenged. For some of an agent's doxastic commitments it holds that the agent already counts as has having redeemed his obligation to defend the corresponding claims (either because there are no standing challenges to his warrant that cannot be met, or because the claims are so trivial that they *per default* have a defeasible status of not being in need of justification). For the commitments for which this holds, the agent is said to be (defeasibly) *entitled* to his claims. Moreover, when a claim is attributed entitlement, it becomes possible for others to adopt a commitment to the claim in question while deferring back to the original speaker for the burden of justification.

To introduce the distinction between acknowledged and consequential commitments, Brandom says:

> The commitments one is disposed to avow are *acknowledged* commitments. But in virtue of their inferentially articulated conceptual contents, assertional commitments have consequences. Undertaking a commitment to a claim with one content involves undertaking commitments to claims whose contents are (in the context of one's other commitments) its committive-inferential consequences. Undertaking a commitment to the claim that Pittsburgh is to the West of Philadelphia is one way of undertaking commitment to the claim that Philadelphia is to the East of Pittsburgh. These *consequential* commitments may not be acknowledged; we do not always acknowledge commitment to all the consequences of the commitments we do acknowledge. They are commitments nevertheless. [1, p. 194]

One way of thinking about the underlying issue is this: by making an assertion one adopts a conditional task responsibility to defend the claim in light of appropriate challenges. And if a doxastic commitment has other doxastic commitments as its consequences, then their (perceived) falsity can be made part of the challenge posed to attempts of justifying the original claim, even if the speaker is ignorant of the consequences of what he is saying.

To take an example, suppose a speaker asserts both that 'Berlin is to the North of Behrendorf' and 'Copenhagen is to the South of Behrendorf', then the scorekeeper may challenge these claims by pointing out that they introduce a consequential commitment to the claim that 'Berlin is to the North of Copenhagen' due to transitivity, and that we know the latter claim to be false.

For some of the doxastic commitments undertaken by the speaker, the scorekeeper will in other words note that they are acknowledged by the speaker. For others the scorekeeper can note that they are consequences of the acknowledged commitments, which the speaker might not acknowledge. So if a challenge is to arise—and a scorekeeper finds a fault with a doxastic commitment undertaken due to a problem with its consequential commitment—then the scorekeeper can make it part of his argument to convince the speaker that the consequential commitment follows from what has been said and that it is in fact false.

But to connect the present considerations to the issue of deductive closure above, it must be observed that Brandom talks about consequential commitments in relation to material, (committive) inferences like the inference from one location being west of a second location to the second being east of the first. Nowhere does he raise the issue in relation to the logical consequences of one's beliefs that I am aware of. However, this shortcoming can easily be remedied, because Brandom analyzes the inferential articulation of conceptual content as consisting in the following relations [1, 13]:

> *Commitment preservation*: The inference from premises Γ to q is *commitment-preserving* if a commitment to Γ counts as a commitment to q.
>
> *Entitlement preservation*: The inference from premises Γ to q is *entitlement-preserving* if an entitlement to Γ counts (defeasibly) as an entitlement to q.
>
> *Incompatibility*: p is incompatible with q if a commitment to p precludes an entitlement to q.

Since Brandom says that commitment-preserving inferences generalize the category of *deductive inferences*, and entitlement-preserving inferences generalize the category of *inductive inferences*, it seems reasonable as a first approximation to explicate the underlying reason relations in terms of a probabilistic version of Spohn's [7, ch. 6] account of reasons as follows:

> *Commitment preservation*: $P(q|\Gamma) > P(q|\neg\Gamma)$, $P(q|\Gamma) = 1$
>
> *Entitlement preservation*: $P(q|\Gamma) > P(q|\neg\Gamma)$, $P(\Gamma) > a$, $P(q|\Gamma) > a$, for $a \geq 0.5$[3]

where a denotes a contextually set threshold of when the speaker counts as having fulfilled his obligation to defend his assertions.

[3] Extension: to allow for cases where $P(\Gamma) < 1$, the third condition could be replaced by Jeffrey conditionalization as follows:
$\sum_{i=1}^{n}\left[P_{initial}\left(q|\gamma_i\right) \cdot P_{new}\left(\gamma_i\right)\right] > a$, for $P_{initial}\left(\gamma_i\right) > 0$.

Moreover, it is possible to formulate both a weak and a strong notion of incompatibility, where the latter is the limiting case of the former and the case of logical inconsistency is an instance of strong incompatibility:[4]

Weak Incompatibility: $P(q|p) < P(q|\neg p)$, $P(q|p) < a$, for $a \geq 0.5$

Strong Incompatibility: $P(q|p) < P(q|\neg p)$, $P(q|p) = 0$

Hence, what was said about consequential commitments above should *ipso facto* apply to the logical consequences of the speaker's doxastic commitments, and what Brandom says about incompatibility should *ipso facto* apply to the case of logical inconsistency, and we can thus begin to apply our conceptual distinctions to the problem of logical omniscience.

The point of introducing the distinction between acknowledged and consequential commitments is to avoid an ambiguity in belief talk:

> In one sense, one believes just what one takes oneself to believe, what one is prepared to avow or assert. In another sense, one believes, willy-nilly, the consequences of one's beliefs (…). The sense of belief in which one is taken actually to believe what one ideally *ought* to believe (at least given what else one believes), call it *ideal* or *rational* belief, can conflict with the sense of belief for which avowal is authoritative. (…) The conflict arises precisely because one can avow incompatible beliefs, and fail to avow even obvious consequences of one's avowals. [1, p. 195]

When we leave beliefs behind and focus on public, doxastic commitments, the analog to cases of incompatible beliefs gets analyzed as unproblematic cases, where incompatible obligations to defend claims have been undertaken. That is, such cases are viewed as the doxastic counterpart to cases, where agents have undertaken incompatible practical commitments by, for example, promising to be in two different places at once [1, p. 196]. So insofar as acknowledged commitments go, their occurrence is entirely unproblematic, and they should merely be viewed as an instance of our general shortcoming as agents that we sometimes undertake multiple obligations that cannot all be redeemed at the same time.

Where things begin to get interesting is in relation to consequential commitments. As Kibble [15, p. 37] points out, just as it would be an inappropriate response to an agent, who has undertaken incompatible practical commitments, to attribute any arbitrary intention, it is a central feature of Brandom's pragmatic model of giving and asking for reasons that it would be inappropriate to follow the principle of *ex falso quodlibet* and attribute any arbitrary doxastic commitment to an agent, who has undertaken incompatible doxastic commitments. Instead the appropriate response is to withhold attributions of entitlement to incompatible commitments [1, ch. 3], which accordingly blocks any further inheritance of the speaker's claims through testimony that would have allowed other agents to adopt a commitment to the speaker's claims while deferring back to him for the burden of justification. However, this need not commit us to revisionism about logic as we shall see in section 3.

One way of viewing this feature of Brandom's account is to view the minimal rationality constraints on beliefs sets introduced in section one as constraints governing the score of commitments and entitlements that the scorekeeper keeps on the speaker in the course of an argumentative dialogue. That is, in deciding whether the speaker has a constellation of commitments for which it both holds that there are no serious unmet justificatory challenges and that others would be permitted to inherit claims while deferring back to the speaker for the obligation of justification, the scorekeeper can be seen as engaged in the task of constructing a belief set based on the speaker's public utterances that is to be consistent and closed under logical consequence.

Viewing matters from this perspective allows us to regard the importance of these rationality principles as not consisting in whether speakers actually succeed in only avowing to consistent beliefs and all their logical consequences (which would be a claim of which the empirical literature suggests that we should be highly skeptical). But rather as consisting in there being norms that we impose on others, when deciding whether it is safe to accept what they say, which we hold them accountable to in justificatory challenges.

That is, what matters in this context is not so much the speakers' actual performance in their own individual reasoning, but whether they would accept challenges of their claims based on: (1) documented inconsistencies, (2) logical consequences of their claims that are themselves unacceptable, and (3) logically equivalent formulations of their claims that are themselves unacceptable. If the speakers accept such challenges, they can be taken to display the recognition of being bound by these norms even if they are unable to comply with them by their own efforts.

3 FOUR POSSIBLE GAPS BETWEEEN LOGIC AND NORMS OF REASONING

In an unpublished manuscript that is too good not to be cited, MacFarlane [16] considers 36 possible bridge principles between norms of reasoning and logical consequence that take the following form:

> If A, B, $\vDash$ C, then (normative claim about believing A, B, and C)[5]

[4] Explication: By exploiting the idea from [7] that p is a reason *for* q whenever $P(q|p) > P(q|\neg p)$, and that p is a reason *against* q whenever $P(q|p) < P(q|\neg p)$, the weak and the strong notions of incompatibility are treated as cases of when p is an inductive or a deductive reason *against* q, and entitlement preservation and commitment preservation are treated as cases, where the set Γ counts as an inductive or a deductive reason *for* q. This explication treats inferentialism as a probabilistic reason-relations semantics, and it is in general agreement with Dorn's [14] account of the strength of arguments. However, this explication can only be partial, because it needs to be supplemented with Brandom's pragmatic account of the conditions under which the scorekeeper should add and subtract commitments and entitlements from the speaker's score, which Kibble has begun to formalize in [15].

[5] Polemic point: MacFarlane [16] says that the conditional can be read as the material implication in the formulation of these principles (at least to begin with). But I am not sure whether this is a good idea in light of the so-called paradoxes of the material implication according to which $\neg p \therefore p \supset q$ for any arbitrary q, as it could introduce bridge principles of any arbitrary degree of absurdity for when C is not a logical consequence of A and B. Alternatively a semantics for the conditional could be preferred, where the false antecedent cases are treated as irrelevant and the paradoxes of the material implication are avoided.

The different versions are produced by varying the following four parameters: (1) the type of deontic operator (i.e. whether facts of logical validity give rise to *obligations*, *permissions*, or *defeasible reasons* for beliefs), (2) the polarity (i.e. whether the obligations, permissions, or defeasible reasons concern *believing* or *not disbelieving*), (3) the scope of the deontic operator, and (4) whether the facts about logical validity have to be known by the agent.

But the preceding discussion has already brought out further parameters that MacFarlane's otherwise comprehensive discussion fails to consider: (5) beliefs vs. public commitments, (6) acknowledged commitments vs. consequential commitments, and (7) the doxastic perspective of the speaker vs. that of the scorekeeper.

So to illustrate the attractiveness of transposing the normative issues in the way outlined above by thinking of the rationality principles as not principles of private beliefs, but principles of public commitments, which are imposed from a scorekeeping perspective, it is instructive to review some of the puzzle cases that MacFarlane discusses. More specifically, we are going to look at the arguments posed by Harman [17] to show the lack of a connection between logical consequence and norms of reasoning, which have been succinctly summarized by Field [18, pp. 252-3] as follows:

> Problem 1:
> Reasoning (change of view) doesn't follow the pattern of logical consequence. When one has beliefs $A_1, \ldots, A_n$, and realizes that they together entail *B*, sometimes the best thing to do isn't to believe *B* but to drop one of the beliefs $A_1, \ldots, A_n$.
>
> Problem 2:
> We shouldn't clutter up our minds with irrelevancies, but we'd have to if whenever we believed *A* and recognized that *B* was a consequence of it we believed *B*.
>
> Problem 3:
> It is sometimes rational to have beliefs even while knowing they are jointly inconsistent, if one doesn't know how the inconsistency should be avoided.
>
> Problem 4:
> No one can recognize all the consequences of his or her beliefs. Because of this, it is absurd to demand that one's beliefs be closed under consequence. For similar reasons, one can't always recognize inconsistencies in one's beliefs, so even putting aside point 3 it is absurd to demand that one's beliefs be consistent.

An example of problem 3 is the preface paradox, where the author of a book finds that he has supporting evidence for every single claim made in his book, yet knowledge of his own general fallibility cautions him not to believe in the conjunction of all his claims. If beliefs are closed under conjunction, he thereby finds himself with an inconsistent belief set, yet it is not clear what he should do about it as all of his beliefs seem quite reasonable.[6]

Below bridge principles will be formulated that are able to handle these cases as well as others that MacFarlane [16] considers. But first we start out with some initial observations.

The first thing to notice is that we can simply grant Harman [17], Foley [19], and others that there are cases like the preface paradox, where it from the speaker's point of view may make sense to give in and learn to live with an inconsistency, if it is either too hard or costly to deal with the problem. Moreover, logic does not provide a guide for the speaker for how to manage his acknowledged commitments, if it comes to his attention that they have a logical consequence that is better avoided, because there are always more ways of resolving the issue as problem 1 indicates.

Yet this does not mean that the principles of rationality cease to impose norms of reasoning, and that the scorekeeper should cease to treat the speaker as *obligated* to avoid inconsistencies and accept the logical consequences of his acknowledged commitments (as long as they have not been withdrawn) as we shall see in detail below. Furthermore, the speaker can be seen as recognizing that these norms are still in force, if he accepts the appropriateness of challenges based on his failure to repair his "public belief set".

As we have seen, the result of the scorekeepers' failure to construct a deontic score for the speaker that meets the minimal constraints on belief sets is not that the speaker fails to have any rational beliefs. For first of all, we are treating these principles as requirements of public commitments and not as requirements of (rational) beliefs. Secondly, the speaker's failure to comply with them does not even mean that he does not have any public, doxastic commitments. It just means that he has undertaken an obligation to defend a constellation of claims that he cannot redeem (either because they are directly inconsistent, because they have logically equivalent formulations that cannot be defended, or because they would require him to accept as consequential commitments logical consequences of his claims, which in turn cannot be defended). Thirdly, the consequence of this failure is that the speaker for the moment cannot be attributed entitlement (and be treated as a source of entitlement for others). But this may be a consequence that the speaker may have to live with at times, where there is no obvious repair to the constellation of obligations that he has undertaken. The rationale for this penalty is to avoid the propagation of error, and indeed both Foley [19, p. 119] and Harman [17, pp. 15-7] agree that it would be a mistake to base further inquiry on inconsistent propositions even if they are sometimes unavoidable.

Because the consequential commitments are only used as an aid in deciding, whether entitlement can be attributed, the possibility is not precluded that the speaker may sometimes be rationally permitted to manage his acknowledged commitments in ways that temporarily exclude him from attributions of entitlements. In such cases, the agent's assertions can be treated temporarily as not being a source of information that can be unproblematically used as a base for further inquiry. If it happens regularly, then the agent can be blacklisted (see also [15]). In this way it is possible to drive a wedge between our assessments of the agent's rationality and of the information that we want to use for further inquiry. For rational agents it need not be possible to be a source of valuable information under all circumstances—no matter how paradoxical the requirements they are confronted with.

[6] A further example: another example that Field gives in his second John Locke lecture is this: "any rational person would have believed it impossible to construct a continuous function mapping the unit interval onto the unit square until Peano came up with a famous proof about how to do it, so the belief that no such function could exist was eminently rational but inconsistent, and there are many more examples of a similar nature" (http://podcasts.ox.ac.uk/people/hartry-field).

A case in point may be the preface paradox, which we will return to shortly. In this context, it is also worth reflecting on the situation that Harman [17, p. 16] argues that most of us are in when it comes to the liar paradox:[7]

> the rational response for most of us may simply be to recognize our beliefs about truth are logically inconsistent, agree this is undesirable, and try not to exploit this inconsistency in our inferences.

Furthermore, Foley [19, pp. 115-7] discusses a number of interesting cases, where he, *inter alia*, makes the point that sometimes the optimal strategy is not the one that has a small chance of arriving at an ideal outcome, where no mistakes are made, but rather one that minimizes the expected number of mistakes (even if one can thereby be certain that mistakes are made some of the time). Indeed a case could be made that this is exactly the type of situation we find ourselves in, when we have to rely on what is known to be fallible sources of information, which is surely the normal course of events.

Of course, this leads us directly back to the preface paradox. The principle we arrived at above can be applied to this problem by saying that the author is not a source of valuable information in regard to the epistemological status of all his claims.[8] The reader is in other words well-advised not to be predisposed to accept all of the author's claims on grounds of his general fallibility in spite of the fact that each individual claim appears to be justified to the author. For what the author's fallibility means is exactly this: part of the time he makes claims that appear to him to be justified despite the fact that they are actually mistaken.

In contrast, the author is unable to weight the information about the epistemological status of his assertions in this manner, if it would mean that he should stop acting on what he perceives to be a good justification for making a particular claim. What he can do is to improve his skills at evaluating and obtaining evidence, but no matter how good he gets, there will always be a point, where he has to rely on what he perceives to be a good justification in spite of his continued fallibility.

We have thus arrived at what appears to be a satisfactory middle ground, where measures can be taken to avoid errors from propagating without it being irrational for agents to recognize their own fallibility, which Foley [19, p. 117] takes to be a desideratum for any decent theory.

So far our approach seems to be handling the problematic cases quite well (and we shall see how it handles the remaining ones below). But in fact we can go further than this, because as Milne [20, p. 276] points out, the principles of rationality have a natural justification on the basis of the norms of assertion. Extending a bit, the argument would go roughly as follows:

(P_1) Making an assertion is to be understood as licensing others to use it as an uncontroversial starting point for further inquiry while deferring back to the speaker for the burden of justification [1, p. 174], [21, p. 165].[9]

(P_2) The interlocutors would not be able to use an inconsistent set of propositions as an uncontroversial starting point for further inquiry.

(P_3) The interlocutors would not be able to use a set of propositions that have unacceptable logical consequences as an uncontroversial starting point for further inquiry.

(P_4) The interlocutors would not be able to use the speaker's assertions as an uncontroversial starting point for further inquiry, if they have logically equivalent formulations that are themselves unacceptable.

(C) Hence, the speaker's obligation to defend the assertions he makes when appropriately challenged extends to avoidance of their inconsistency and to defending their logical consequences as well as to defending their logically equivalent formulations.

Essentially the idea is that it is part of the epistemic use to which the speaker's interlocutors can reasonably put his assertions to exploit their logical properties for further computation, which means that it would constitute a failure, when the speaker feeds them assertions that fail to meet its minimum requirements. As a result, the speaker's interlocutors are entitled to enlist the logical consequences of his acknowledged commitments as consequential commitments with an equal claim to form the basis of challenges as his acknowledged commitments.

So to return to MacFarlane's [16] bridge principles, the following candidates can be formulated:

(I) If A, B, $\vDash$ C, then the speaker ought to see to it that if he/she acknowledges a commitment to A and B, he/she acknowledges a commitment to C.

Commentary: the speakers' means for acknowledging a commitment to C consists in accepting challenges to A and B based on challenges to C.

(II) If A, B, $\vDash$ C, then if the speaker acknowledges a commitment to A and B, the scorekeeper is permitted/entitled to attribute a consequential commitment to C.

Moreover, since all relations of commitment preservation are entitlement preserving,[10] it holds that:

[7] Explication: one version of the liar paradox runs as follows. The second sentence in this footnote is not true. Suppose the second sentence is true, then it is true that the second sentence is not true, and so the second sentence must not be true. Suppose it is not true, then things are as the second sentence says they are, and so it must be true.

[8] Explication: it is by noticing this meta-level at which the preface paradox operates that we avoid having to be committed to the claim that no authors would be entitled to anything, which would have been a most unwelcome consequence. More generally, I take it that one of the useful functions that prefaces can serve is exactly to reflect on this meta-issue of the epistemological status of the assertions made in a book.

[9] Clarification: actually on Brandom's view making an assertion is putting forward a claim as something that the hearer can *use as a premise in his/her own reasoning* and not: putting it forward as *an uncontroversial starting point for further inquiry*. The reason why the argument was formulated in the latter way nevertheless was to bracket the issue of reductios. The point is that while reductios use the speaker's assertions as premises in one's own reasoning, the premises in reductios cannot be thought of as uncontroversial starting points for further inquiry. Rather I take it that reductios can be seen as a dialectical tool that scorekeepers use to show that there is a problem with the speaker's constellation of commitments. (I thank Michael De for forcing me to clarify this point.)

[10] Caveat: the explication in section 2 did not quite capture this feature of Brandom's account by adding the requirement that $P(\Gamma) > a$ on

(III) If A, B, ⊨ C, then if the speaker acknowledges a commitment to A and B, and the scorekeeper both attributes an entitlement to A and B and a consequential commitment to C, the scorekeeper ought to attribute an entitlement to C.

(IV) If A, B, ⊨ C, then if the speaker is entitled to adopt a commitment to A and B, the speaker is entitled to adopt a commitment to C.

It is to be noted that the deontic operator is given a wide scope over the whole conditional in (I). As a result, (I) describes the conditional task responsibility of the speaker to acknowledge a commitment to C, *if* he/she acknowledges a commitment to A and B. However, this is an obligation that can be fulfilled by either acknowledging a commitment to C or by withdrawing the commitment from A or B, so the first of Harman's problems is avoided.

One of the ramifications of making it the task of the scorekeeper to construct a (public) belief set for the speaker on the basis of his assertions is that problem two and four need to be addressed both from the perspective of the speaker and from that of the scorekeeper.

If we start out with the speaker's perspective, the first observation to be made is that the speaker has only adopted the conditional task responsibility to defend his commitments whenever appropriately challenged. Hence, the speaker need not worry about the excessive demand of having to defend all the consequences of his claims in the absence of scorekeepers, who are capable of identifying the corresponding consequential commitments and posing suitable challenges.

However, as the knowledge of the implications grows, the speaker continues to run the risk of having to retract his earlier claims, if he cannot provide an adequate response to the novel challenges.

So to see how the speaker can fulfill the requirements of bridge principle (I) in light of problem 4, it suffices to notice that the context in which the speaker would have to acknowledge a commitment to the logical consequence of his acknowledged commitments is, when challenges are posed to the consequential commitments as a way of challenging his acknowledged commitments. So what the speaker would need to do to comply with this bridge principle is merely to accept such challenges and be prepared to withdraw his commitment to A or B in the case the challenges to C turn out to be too severe.

Moreover, problem 2 is easily avoided. To the extent that challenges are hardly going to be based on trivial (and irrelevant) logical consequences of the speaker's acknowledged commitments, the speaker does not stand in danger of having to devote precious cognitive resources to dealing with irrelevancies.

When we turn to the scorekeeping perspective, one way of dealing with this same problem of clutter avoidance would be to hold that "the algorithm" for adding logical consequences to the speaker's score as consequential commitments terminates, whenever its operation does not immediately contribute to the task of finding out whether entitlement can safely be attributed. That is, there will be no need for the scorekeeper to go through infinite sequences of conjuncts and disjuncts, if it is already clear from the outset that they are irrelevant for determining whether entitlement can be attributed.

This way of addressing problem 2 moreover opens up for a way to avoid being committed to revisionism about logic due to the restriction of *ex falso quodlibet* noted above. Accordingly, one way of getting around this problem would be to hold that "the algorithm" for adding logical consequences to the score terminates for a particular set of commitments as soon as an inconsistency has been detected. For then the task of assessing whether entitlement can be attributed has already been solved, and the scorekeeper can proceed to challenge the speaker and criticize others that adopt commitments to the claims in question through deference to the speaker.

If we apply bridge principle (II) to problem 4 for the scorekeeping perspective, we notice that the task of assessing whether entitlement can be attributed does not impose excessive demands on the scorekeeper, because although the scorekeeper is *permitted* to add all the logical consequences as consequential commitments to the speaker's score—and to challenge him on this basis—he is *not required* to do so. Similarly, although the scorekeeper is *permitted* to run complete consistency checks on the speaker's score using all the logical consequences as consequential commitments, he is *not required* to do so. Nor is he required to check every logical equivalent formulations of the speaker's acknowledged commitments.

As we have seen, the scorekeeper is entitled to take these measures to prevent error from propagating, when the speaker puts forward his assertion as something that others can use as an uncontroversial starting point for further inquiry. But the scorekeeper can, of course, refrain from fully exercising this right by not investigating *all* the logical consequences of the speaker's assertions, if he is willing to run the risk of letting an error slip in. Indeed at some point he must terminate prematurely due to the undecidability of logical consequence. But even if consequence were decidable, he would still have to terminate prematurely due to: (1) the complexity involved in discovering that A, B, ⊨ C may exceed what he would be able to process in even a lifetime given the best proof systems available, (2) the fact that there are infinitely many consequences of A & B, which cannot be investigated in a finite amount of time, and (3) his limited logical competence.[11]

Potentially the algorithm for executing this task takes the form of a fast and frugal heuristics [cf. 22], which only adds the most salient consequential commitments that would be needed for the context of conversation. For surely there is a trade-off to be made between the cost of continuing to probe the speaker's (public) belief set by adding logical consequences and the potential cost of sometimes adopting error-prone claims through testimony.

However, this does not mean that we have to give in to problem 4, because as Levi [9, ch. 2], [10, ch. 1] has emphasized the important question is not, whether our actual performance succeeds in implementing the requirements of the principles of rationality. But rather whether we continue to recognize that we

entitlement preservation, which found no parallel in the explication of commitment preservation. So this is one of the senses in which it was only offered as a first approximation. Another related sense in which it is only offered as a first approximation is that it does not yet contain a formal representation of a commitment to *p*. Yet one might argue that just as a formal representation of entitlement had to be part of the explication of entitlement preservation, so a formal representation of commitment has to be part of the explication of commitment preservation.

[11] I thank Michael De for helping me to clarify this point.

are in need of improvement whenever they don't. That is, to the extent that we continue to refine our abilities to detect consequential commitments through, for instance, education and technological assistance (e.g. use of computers, paper and pencil, and handbooks of tables), we express our recognition that there is a regulatory ideal that we stand under an obligation to approximate.

4 THREE FURTHER CONSTRAINTS

In addition to the cases we have already considered, MacFarlane [16, pp. 11-2] uses the following constraints to adjudicate between possible bridge principles. Since his concern is with the relationship between logical consequence and rational beliefs, we will need to consider whether something equivalent holds for the case of public commitments.

The first is *the strictness test*, which holds that for the general case, the agent has not done everything that he ought to, if he only believes *p* but not its logical consequence *q*.

Although our first bridge principle did not capture the exact wording of this constraint, a case could be made that it managed to capture the gist of it by requiring that the speaker accepts challenges based on the logical consequences of his acknowledged commitments. At this point it is unclear whether anything further is needed or whether this conditional task responsibility already succeeds in making the relation between *p* and its logical consequences sufficiently strict.

The second is whether the proposed bridge principle is capable of getting the priority right so that we can still say that:

> We seek logical knowledge so that we will know how we ought to revise our beliefs: not just how we *will* be obligated to revise them when we acquire this logical knowledge, but how we are obligated to revise them even now, in our state of ignorance.

This concern arises, because if we were only normatively constrained by known logical consequences, it seems that "[t]he more ignorant we are of what follows from what, the freer we are to believe whatever we please" (ibid.), which seems to get things backwards.

More specifically, the concern in our context might be that since the speaker only has to acknowledge the logical consequence of his acknowledged commitments as consequential commitments by accepting suitable challenges, the speaker gets off the hook more easily the more ignorant his scorekeepers are. In response, it can be pointed out that the speaker's responsibility to accept such challenges does not come with an expiration date.[12] So he will continue to be liable to criticism, if his assertions are shown to be logically incoherent as our knowledge about the logical consequences grows. Or rather, the expiration date is the point, where we can no longer consider the agent's assertions as an uncontroversial starting point for further inquiry, because our knowledge has grown too much in the intermediary time. But this does not guard the original agent from revision through ignorance, because what it means is merely that the assertions will lose their epistemic significance once the ignorance is overcome, if there was anything problematic about them in the first place.

Moreover, it will still be possible to maintain on the basis of the present approach that we seek logical knowledge so as to prevent error from propagating. Hence, there will still be a pressure towards overcoming our state of ignorance on the present proposal.

Similarly it holds for the scorekeeper that—although he is only permitted and not required to add the logical consequences as consequential commitments to the speaker's score according to bridge principle (II)—he risks contributing to the propagation of error, whenever he refrains from exercising this right. So he too is under pressure to overcome a state of ignorance.

The final constraint consists in being able to maintain that an agent, who refuses to take a stand on a logical consequence (e.g. their conjunction) of his beliefs is acting in a way that ought to be assessed negatively.

As we have seen, bridge principle (I) postpones the need for the speaker to take a stand on the logical consequences of his acknowledged commitments until a suitable challenge emerges, and it is this feature of the present account that ensures that excessive demands are not imposed on the speaker. But on the other hand, it is not clear why the agent should be forced to take a stance on all the logical consequences of his acknowledged commitments in the absence of a well-grounded suspicion about unmet, severe challenges. It might be prudent for the speaker to consider some of the most obvious logical consequences of his assertions before making them to avoid having to withdraw them immediately in the face of embarrassing challenges. But it is not obvious why it would constitute a failure of his epistemic responsibility as long as he is prepared to withdraw them if severe challenges emerge. And, of course, at that point (I) no longer licenses him to refrain from taking a stance on the logical consequences of his acknowledged commitments.

According to bridge principle (II), the scorekeeper is not required to take a stance on all the logical consequences of the speaker's acknowledged commitments. And it is this feature of the present account that ensures that excessive demands are not imposed on the scorekeeper. But here too it is unclear why it should be problematic that the scorekeeper refuses to take a stance on whether a logical consequence could be added to the speaker's score as a consequential commitment, unless there was some well-grounded suspicion that the scorekeeper might thereby contribute to avoiding the propagation of error. So here too our bridge principles don't seem to collide with MacFarlane's [16] criteria of adequacy.

5 CONCLUSIONS & FUTURE WORK

It appears that the present account is capable of handling the problematic cases that Harman [17] discusses as well as the further constraints that MacFarlane [16] considers.

By theorizing about public commitments instead of beliefs, we are able to treat cases of inconsistency as harmless cases of incompatible obligations that cannot all be redeemed at once. By invoking the distinction between doxastic perspectives and making it the task of the scorekeeper to construct a deontic score for the speaker that meets the minimal requirements of belief sets to decide whether entitlement can be attributed, we are able to drive a wedge between assessments of the speaker's

[12] Illustration: as the practice of defending the works of deceased philosophers shows, the deontic score of an agent can outlive his biological time in virtue of other agents stepping in and administering the commitments of a deceased agent either as he would have been disposed to or in the way that would have been most optimal.

rationality and assessments of which information we want to use for further inquiry.

This move allows the speaker to be rationally permitted to maintain inconsistent doxastic commitments, when confronted with conflicting requirements while allowing his scorekeepers to take measures to prevent errors from propagating. Moreover, we have seen that it comes with the further nicety that we can continue to remain uncommitted about revisionism about logic while avoid letting *ex falso quodlibet* ruin the deontic score of the speaker by adding commitment to random propositions, whenever the speaker finds himself in situations of this kind.

An area for further investigation is a general comparison between the respective advantages and disadvantages of formulating the bridge principles in terms of public commitment or rational beliefs. It is surely of central importance when dealing with this issue that while it is not completely voluntarily what we believe (in the sense that if we really believe something, we cannot just decide to stop believing in it whenever we want [16, p. 15]), our acknowledged commitments is something that we can exercise full control over. For this reason it might be more natural to think about potentially conflicting obligations in terms of public commitments than in terms of beliefs, which would thereby restrict a central tool for dealing with inconsistencies to bridge principles formulated in terms of public commitments.

In this context, Foley [19] has furthermore made the interesting suggestion that purely deductive reasoning is typically carried out in terms of propositional attitudes like presuming, positing, assuming, supposing, and hypothesizing, which he suggests are to be treated as a form of commitment rather than as beliefs. This opens up for the possibility that deductive logic is rather to be viewed as a calculus for consequential commitments than as something that is directly related to beliefs.

Also of interest in this regard is that while Milne [20] starts out with an approach to the problem of logical omniscience that is very much cogent to the one explored here, he later attempts to establish a connection to rational beliefs by arguing that although public commitments need not express the beliefs of the agent, the rationality principles governing public commitments extend to beliefs for the subset of our beliefs that either are expressed through our public commitments or concern their evidential grounds. Finally, Field [18] has undertaken the task of formulating a bridge principle for belief in terms of probabilistic constraints on rational beliefs imposed by logical consequence, which along with MacFarlane's [16] own proposed solution would have to be investigated in a more general comparative discussion.

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