Issues in the Normativity of Logic

and the Logic as Model View

by

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ABSTRACT

After surveying the literature on the normativity of logic, the paper answers that logic is normative for reasoning and rationality. The paper then goes on to discuss whether this constitutes a new problem in issues in normativity, and the paper affirms that it does. Finally, the paper concludes by explaining that the logic as model view can address this new problem.

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§1: Introduction

What was the charge that Plato and Socrates levied against to sophists? Simply put, it's that they, "made the weaker argument appear the stronger?" Surprisingly, this charge was brought against Socrates in his trial. How can one substantiate such claims? Philosophers would come to believe that logic—Aristotle's *Organon*—is the tool for evaluating arguments. That is, Aristotle's works on logic, for their breath, rigor, and insight would become near orthodoxy for centuries to come. I say near orthodoxy both because they were often considered to have exhausted the field and because they were required texts for any student of philosophy.

Modern logic has abandoned Aristotle's logic (or, often, any logic) as orthodox, but there remains a sentiment that one can hardly imagine abandoning. Namely, the necessity of adhering one's argument to and its being assessed by the standards of logic. Students of philosophy are still required to learn logic, and we evaluate our peer's arguments with the tools of logic. If we find that his argument has violated a rule of logic, we can inform him or another about the fault. When a peer is unmoved by our charge, we clarify, eliminate potential misunderstandings, try to locate the source of disagreement, or reassess the dialectic (is my peer even offering an argument?). Finally, one may conclude that our peer is not arguing rationally, at least not in this case.

Despite there being various alternatives, one we find hard to accept is that logic must not have anything to do with our assessment of our peer's argument. In essence, we find it difficult to deny that logic has a normative role in argument. A well-known objection to this point is found in Harman's book, *Change in View*[1]. He argues that good reasoning doesn't always

[1] Harman, Gilbert. *Change in View.* Cambridge, Massachusetts: The MIT Press, 1986.

follow the logical notions of *consequence* and *consistency*. I will go into further detail in section two[2].

Harman's reflections have inspired two main questions in the literature. Does logic have a normative component? And if so, what is it? I will argue that it does, but I won't answer the second question. Nevertheless, I will justify leaving this unanswered. My purposes for taking a position in this area is to address another question. It is known that there are philosophical problems concerning normativity. There's the metaphysical problem of accounting for normativity in a natural world and the epistemological problem of how we come to know normative truths. What I am asking is, "does the normativity of logic constitute a different problem?" A few things are required to answer this question. First, we must understand the metaphysical and epistemological problems thoroughly enough to be able to distinguish them from other problems. Secondly, we must establish that logic is normative. I take on the first task in the remainder of this section. Section two will be devoted to establishing that logic is normative. Section three will explain what this different problem is. Finally, section four will be an attempted solution.

To begin, let's survey the known issues in normativity well enough to distinguish them from the different problem—the one I will introduce in section three. First is the epistemological problem. A classic formulation of this problem is found in Benacerraf's *Mathematical Truth.*[3] His account focus solely on mathematical truth, but what he says about it applies to normative

[2] Harman distinguishes 'argument' and 'reasoning,' but I think the above sentiment also applies to reasoning.

[3] Benacerraf, Paul. *Mathematical truth*. Journal of Philosophy, 70, (1973): 661–679.

truth, so I shall summarize his views and apply them. Benacerraf observes that we need a philosophical theory that includes a semantical and epistemological theory of mathematics. By a semantical theory, Benacerraf means a theory that accounts for the truth of mathematical statements, and by "accounts," he just means that it specifies the truth conditions of mathematical statements. By an epistemological theory, he means a theory of how we come to know mathematical truths. He notes that a philosophical account that brings together these theories will do two things. First, the semantical account must provide the truth conditions for all those statements that we take to be true. Secondly, the semantical theory must not make it such that it is impossible for us to have any mathematical knowledge whatsoever. It could be that there are some unknowable mathematical truths, but at least some mathematical truths must be knowable.

Benacerraf's thesis is that the desired philosophical accounts tend to forfeit one condition by meeting the other. For example, on the standard account the truth, statements referring to physical kinds such as "there is a dog outside" are true iff there is a dog outside. Applied to mathematical statements, "there are prime numbers" is true iff there are prime numbers. If we use the same account of truth, then this, he suggests, implies Platonism. In such a case, we would not have mathematical knowledge. This is because for X to have knowledge of S, X must have an "appropriate" causal connection with S. Whatever an appropriate causal connection amounts to, it will not be a relation we can bear to mathematical objects in this platonic sense because they are casually effete. Another option is to give what he calls "combinatorial" or "syntactical" truth conditions, where to be a true mathematical statement just is to be part of a proof. Since proofs are things mathematicians can do, this accounts for mathematical knowledge. But Benacerraf is left unsatisfied, "I wonder… what such a sprinkling of the word

'true' would accomplish."[4] He points out that merely postulating a system of rules is insufficient for mathematical truth, for those axioms could be inconsistent. Even if consistency is achieved, truth may not be, for consider the game of chess. It is a system of rules, but we don't regard a valid move as truth preserving. In summary, Benacerraf's worry is accounting for both the truths of mathematics and our knowledge of it.

I think the epistemological worries surrounding normativity can be categorized along the same lines. We only need to replace "mathematical truth" with "normative truth" and the above argument flows just as well. We need an account that a) accounts for all the true normative statements and b) allows for the possibility for us to come to know some normative truths. Let's consider one case. Suppose, for the sake argument, that what an agent should do is a function of his reasons for action. Thus, an agent should do what he has decisive reason to do. What, then, does he have reason to do? Normative desire theory provides one answer: an agent has a reason to do that which would fulfill his desires. Construed this way, desire theory functions as a semantical theory in that it tells us which normative statements are true. Namely, the true statements are those imperatives that tell an agent to act in such a way as to fulfill his desires. However well it fulfills the first condition, it fails to meet the second. How do we come to know the truth of the statements stipulated by a normative desire theory? Normative facts don't seem to be the sort of thing that can stand in an "appropriate" causal relation to agents. And hence we have a Benacerraf-style worry. Perhaps this can be resolved by appealing to reductive desire theory, where an agent's reason for action is identical, the very same thing as, the agent's desire. This fulfills the second criterion since knowing our desires is something agents with functioning cognitive faculties could do, at least partially. But again, this condition is achieved at the

[4] Ibid, 677

expense of the other, for then it seems that the normative facts have been eliminated. What explains an agent's action becomes a psychological fact, and this leaves open the question of whether acting on a desire is the right thing to do. Thus, I take it that Benacerraf's worries about mathematical truth carry over into the issues of normativity.

Next on our list is a summary of the metaphysical problem. As Mackie (1991) famously put it, "If there were objective values, then they would be entities or qualities or relations of a very strange sort, utterly different from anything else in the universe."[5] (p. 38). This has come to be known as "the placement problem." It stems from the fact that normative facts don't seem to fit in, or a find a place, within the realm of natural facts. Why don't they fit in? Objects in our usual experience, such as tables and chairs, fit in because they are amendable to experience and scientific investigation, which implies their causal relations, physical properties, and objectivity. In short, they are of the same ontological category, whereas moral properties would not be.

Mackie goes on to wonder about the relation between a natural kind—causing pain for fun—and its moral quality—wrongfulness. He is puzzled because their relation is not one of semantic entailment, yet it cannot be that they are coincidentally related; otherwise, it wouldn't be an objective property. He further questions how the two can be related by a relation of supervenience. As a naturalist, unable to deal with the placement problem, supervenience problem, and epistemological problem, Mackie writes in what reads more like poetic yearning than philosophical argument: "How much simpler and more comprehensible the situation would be if we could replace the moral quality with some sort of subjective response which could be causally related to the detection of the natural features on which the supposed quality is said to

[5] Mackie, J. L. Inventing Right and Wrong. New York. Penguin Group, 38.

be consequential."[6] The objectivity of moral values presents a metaphysical problem for Mackie. Feeling the force of an either-or situation, Mackie does not give up naturalism and instead seeks to give up moral objectivity. These are rather interesting philosophical issues. However, I want to see if the normativity of logic presents a different issue—one different from the ones considered so far. Before doing that, however, I have to answer the more basic question of whether logic plays a normative role.

§2. A Romp Through the Normativity of Logic: Harman and the Normativity of Logic.

Is logic normative for reasoning? Many take it that Harman argued that deductive logic has no normative relation to reasoning. Indeed, Macfarlane (unpublished),[7] Field (2009),[8] and Steinberger[9] (unpublished)—some of Harman's main commentators—go through painstaking detail responding to Harman and showing how logic can be normative. I take their positions to be defensible, but I do so for a surprising and simpler reason: Harman never intended his arguments to show that logic plays no normative role in reasoning. Moreover, even if someone intends to use Harman-esque arguments to call into question the normativity of logic, such objections only provide defeasible reason. There are less hasty conclusions one could draw from them—conclusions consistent with logic playing some normative role in reasoning. This will confirm my main thesis that Harman-esque objections are insufficient to conclude that logic plays no normative role in our reasoning.

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[6] Ibid, 41

[7] Macfarlane, John. *In What Sense (if any) is Logic normative for Thought?* Unpublished.

[8] Field, Hartry, *What is the Normative Role of Logic? Aristotelian Society Supplementary Volume*, *83*(1), 251-268

[9] Steinberger, Florian. Three Ways in Which Logic Might be Normative. Unpublished. https://floriansteinberger.weebly.com/uploads/5/7/9/5/57957573/three_ways_jp.pdf (2017)

The first claim I want to defend is that Harman never intended his arguments to show that logic has no normative role in reasoning. To accomplish this, I start by summarizing his view. Then, I illustrate how some of his main commentators have interpreted him. Finally, I bring out inadequacies in their interpretation of Harman as arguing that logic has no normative role. Meanwhile, I argue for an interpretation of Harman consistent with logic playing some normative role—thus making his objections insufficient to conclude that logic plays no normative role in our reasoning. To clarify, I am only critiquing the *interpretation of* Harman's commentators. I won't be assessing the commentator's main arguments for logic having a normative role. I include their views only because their interpretations have had a significantly influence on the literature concerning logic and normativity. So, let us begin.

Harman identifies reasoning with a change in view. He begins by asking whether "…logic has some special relevance to the theory of reasoning."[10] He concludes that, "it turns out that logic is not of any special relevance."[11] He observes that if logic is going to be *specially* relevant to reasoning, then it must be via the principles of implication and inconsistency. But neither of these is without exception. He then proceeds to explain. First, rational agents do not have to follow all the rules of implication. Mary believes that if she looks in the cupboard, then she will see cheerios. Mary also believes that she is looking in the cupboard, but she doesn't see Cheerios. However, Mary should not conclude via modus ponens that she is seeing Cheerios. We can make the same point differently. It is a fact about logical implication that a true statement can be formed by any true statement, the "or" disjunct, and some other statement. Thus, Mary's true belief, B, implies a plethora of beliefs, most of which are useless. These are

[10] Ibid., 11
[11] Ibid., 11

beliefs such as "B or unseen wild elephants wear pajamas." Similarly, "B or toys have an active life when we are not looking." And the list goes on and on. It would be irrational for Mary to follow all the implications of her beliefs. A third way to make the same point is that one is reasonably expected to not believe all the consequences of her beliefs if doing so is overly demanding. For instance, one may believe the axioms of Peano's arithmetic, but the average person is not held accountable for not proving theorems based on the axioms he believes. Thus, it seems that there are exceptions between rules about logical consequence and rules of rational agency.

Those observations are about implication. What about inconsistency? It turns out that sometimes rational agents are permitted to hold inconsistent beliefs. In the preface paradox, one is imagined having written a non-fiction book. Imagine further that each claim in the book was thoroughly examined to the best of the author's ability to assess the evidence. However, despite his great caution, the author realizes that probably not all the claims are true since he is fallible. Thus, he believes all the claims in the book, meanwhile believing that at least one of them is not true. It seems that although believing each of his claims is contradictory to his belief that he must be mistaken about one of them, the author is within his rational rights to believe each of the claims, especially because he gathered much evidence for them. Thus, as with implication, rules of logical consistency do not necessarily prescribe rules about reasoning. Harman's conclusion is that logic and reasoning are not *specially* related[12].

That completes the summary of Harman. Next, we shall look at how his commentators have understood him. I mentioned at the outset that I wouldn't be responding to their main

[12] contemporary treatments of this problem appeal to some probability theory to avoid contradiction. I think they are on the right track, but in this first section, I am only interpreting Harman.

arguments, only their interpretations of Harman. Nevertheless, to understand their interpretation of Harman, I must bring up their main arguments. This means that laying out the argument of Harman's commentators is important, but I ask the reader to keep in mind that I bring them up for my interpretive project only. So, how do they respond? In a sentence, Macfarlane, Field, and Steinberger respond by developing bridge principles that solve the worries that Harman presents as well as other related worries[13]. This sort of response to Harman is one that Harman, in the same chapter, anticipated, though he did not use the word, "bridge principle." However, it seems to have gained traction as an objection through an unpublished—though highly read and esteemed—paper from Macfarlane (unpublished). Here, Macfarlane takes on the project of clarifying the sense in which logic may be said to be normative—as is plain from the title, *In What Sense (If Any) Is Logic Normative for Thought*? Harman is thus absorbed into the discussion because the points he makes—i.e., those already discussed—show that the relationship between logic and rationality is not straightforward.

I take it as obvious that Harman's objections do bring out the need to clarify what the connection is, but I do not take it as obvious that this was Harman's main purpose, yet already we can begin seeing him being interpreted in such a way. In my above interpretation of Harman, I tried to mimic something he did. Namely, he ubiquitously used "special" in his doubts about the relation between logic and reasoning. To doubt that there is a *special* relation between logic and reasoning is quite different from doubting that it has a normative role, or a straight forward one. I am not saying that Macfarlane endorses these latter interpretations, but I am saying that a

[13] Field, for example, worries about how there could be a rational change in logic, and how to epistemically evaluate those who reason according to different logics.

reader of his paper can come away with them. As we continue, I am going show that this interpretation is misguided.

Macfarlane goes on to discuss that to spell out a normative connection between the two disciplines, we need something that satisfies the following:

Bridge Principles: If A, B |= C, then (normative claims about believing A, B, and C)[14] The idea here is that the antecedent will contain some fact about logical consequence, which we can call the "triggering condition[15]." In the parenthesis, we should put in a normative claim. An obviously faulty example is "If A and B entail C, then one *ought* to believe C." This is not immune to Harman's criticisms, but I leave it here as an example of a bridge principle. Macfarlane continues to classify types of bridge principles and concludes that there are eighteen possible arrangements that the consequent can take. He argues for two such principles, which I will not discuss here. But the hope, then, is that with enough tinkering, one can come up with a bridge principle that will be immune to Harman's objections. Interpreting Harman as challenging the existence of such a principle would mean that finding the principle constitutes a response to Harman. Thus, Macfarlane sets the stage of the debate for the next contender.

Despite correctly introducing his view, Field develops the dialectic of his paper as responding to the incorrect view—that Harman takes there to be no viable bridge principle. That is, Field goes through painstaking detail to develop such a principle and show how it is immune to Harman's criticisms, as well as other related criticisms. Here is how he starts off on the same

[14] Macfarlane, John. *In What Sense (if any) is Logic normative for Thought?* Unpublished, 6.
[15] Steinberger's terminology

topic as Harman and subtly slides away. "What is the connection between (deductive) logic and rationality[16]" (p. 252), he asks. And he continues:

> … Harman has cited a large number of obstacles to there being a close connection between logic and rationality, and has argued that logic has no more of a connection to rationality than any other important discipline does…Rational people will try to have the right views about this, but they will try to have the right views about physics and sociology too, so there is no more essential tie between logic and rationality than between physics or sociology and rationality.[17]

Here, Field is engaging with Harman's question—what is the connection between logic and rationality? Furthermore, he correctly identifies his view as there being nothing special about such connection. Harman never compares the relationship between rationality and logic as akin to that between rationality and other sciences. But without an explanation of what he meant by "specially relevant," it's hard to see what else Harman could have meant. Objects that are special are special in comparison to other objects. So, if we are wondering what makes logic "special," compared to science, then it must be its normative role. The rest of Harman's chapter showing how logic is not always normative can understandably be interpreted as him claiming that logic does not have this role and hence not specially related to reasoning. Nevertheless, this comparison of logic and science in their relation to reasoning is foreign to Harman's paper. Its imported to make sense of his demand for "special relevance." It's a small difference that determines whether Field is truly responding to Harman.

Whereas Macfarlane takes the challenge to be that of clarifying the relation between the disciplines, and Field takes it to be that of showing that there is such a relation, Steinberger offers a hybrid between these two: "logic… is normative for reasoning. Famously, the tradition

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[16] Field, Hartry, *What is the Normative Role of Logic? Aristotelian Society Supplementary Volume, 83*(1), (2009): 252

[17] Ibid., 251-252

was challenged by Gilbert Harman who argued that there is no straightforward connection between logical consequence and norms of reasoning."[18] The issue begins with the use of, "straightforward." It suggests that the connection is simply unclear, and spelling it out will satisfy Harman. This is in line with Macfarlane. But the quote could also mean that there exists no connection, and "straightforward" serves to relax the claim: maybe there is an occasional connection, but nothing significant. This latter interpretation is closer to Field's because it suggests that the appropriate response to Harman is to present a viable bridge principle. What the authors do have in common is a reliance on bridge principles as a means of replying to Harman. Would a bridge principle, as 'straightforward' as it may be, truly be an answer to Harman's skeptical worry? How and in what way would it constitute such a special connection? I think Macfarlane, Field, and Steinberger all have in mind that with this principle, one can show that logic has a normative role, and assuming that nothing else plays this role, then this role must be *special*.

What I take to be significantly telling is that in his reply to Field, Harman (2009) did not object that the principle is not 'straight forward,' nor did he attempt to find faults in applying it to reasoning. Steinberger does an excellent job at clarifying the exchange by introducing different ways logic can be normative: via evaluations, directives, and appraisals. Steinberger suggests that Harman and Field might be talking past one another. Yet Harman's reply to Field never mentions whether Field and he are talking across purposes. What is his reply to Field's bridge principle? It is that they agree. "Far from disagreeing with any of this, Field (2009) eventually proposes basically the same thing. Where I appeal to recognized implication and

[18] Steinberger, Florian. Three Ways in Which Logic Might be Normative. Unpublished, 1.

psychologically immediate implication, he initially appeals to *obvious entailment* and degrees of belief."[19] If we are to understand Harman's challenge as doubting that there is no bridge principle, or as doubting that there is a straightforward way in which logic is normative, or that logic simply does not have a normative role, then this response should be puzzling. Why, once given a bridge principle specifying a normative role between logic and reasoning does he not object? We can make sense of his response if we do not interpret his challenge as his commentators have.

The difficulty that now confronts us is, "what else could he have meant by 'specially relevant?" A couple of his comments, scattered throughout the first two chapters, prove useful. First, in chapter one, Harman notes that he is unclear whether he is looking for a normative or a descriptive theory of reasoning, and he mentions that the distinction may not be sharp. Secondly, in chapter two, he considers a bridge principle, "*Recognized Implication Principle:* One has a reason to believe P if one recognizes that P is logically implied by one's view."[20] However, he still has scruples because the scope of application would be limited to people who have concepts of classical logic—concepts such as logical implication and inconsistency. One of the examples he gives is that the statement "today is Saturday" implies "tomorrow is Sunday," and the statements "X or Y" and "not Y" imply X. Although these are ways that we actually reason, only the latter is an implication in the classical sense. So, he revises the bridge principle by

[19] Harman, Gilbert. *Field on the Normative Role of Logic*. Proceedings of the Aristotelian Society,*109*, 334

[20] Harman, Gilbert. *Change in View.* Cambridge, Massachusetts: The MIT Press, 18.

deleting "logically." Harman believes that the modified principle is preferable since it captures classical as well as non-classical implications—such as a days-of-the-week logic.

Next, why would he take the second principle to be an improvement? It isn't because it has more normative force in the sense of demanding more of an agent[21], nor is it because it is more straightforward. They seem to be equal in these respects. It must be because the second one describes more cases. For Harman, it is not enough for logic to have a normative role for it to be special. It must have it in a rich, broad, and more encompassing sense. His main complaint is that deductive logic will not be "exception less." The aforementioned authors understand this to challenge the existence of a normative role. It could equally and alternatively challenge its universality or its descriptivity. We have already seen that, regarding the latter (i.e., descriptivity and normativity), Harman draws no sharp distinction. Given these comments and his reply to Field, I conclude that the interpretations that paint Harman as saying that there is no normative role for logic to play are inadequate. Harman is questioning whether standard reasoners employ classical logical rules as norms, not whether there is any normative role for logic to play.

Before making a transition in this section, I want to respond to a potential objection[22] to my argument. The objection begins by pointing out that Harman could have easily proven that deductive logic isn't identical to reasoning/rationality or that it isn't a complete theory of reasoning/rationality. Namely, by pointing to cases of inductive reasoning, such as inference to the best explanation. Harman does not do this, and one may wonder why he didn't. Doing so

[21] Although, the revised principle might have more normative force in the sense that it has a wider scope, i.e., it applies to more agents. Preferring the principle for this reason confirms my main point, which is coming up.

[22] Thanks to Shyam Nair for pointing this objection out.

would have put him in a very rhetorically persuasive position. The view that interprets Harman as merely saying that logic is not identical to reasoning has no clear answer to this question. However, on the view that interprets Harman as arguing that logic is not normative, there is a clear answer. Namely, to show that deductive logic is not normative for reasoning, one needs specifically to appeal to cases where such logic does not apply to reasoning.

Now, I am not entirely sure how pressing this objection is for my view. I don't think Harman was entirely clear as to what he took the problem to be, so the question seems to demand precision that it not there, but let's consider what he says in another, related paper. This will be for the interpretative task only and I will not endorse the conclusions he arrives at.

In a 2002 paper,[23] Harman explicitly argues for a view that is in line with what I have been saying here. This becomes evident as soon as one reads the title, "Internal Critique: A Logic is not a Theory of Reasoning and a Theory of Reasoning is not a Logic." In a section of this paper, Harman notes that many misleadingly talk about two types of reasoning: inductive and deductive, where the only difference is one type always preserves truth. In contrast to this, Harman points out that the rules of deduction are just rules that a proof must satisfy to be a proof, not rules one must follow in some temporal order. He continues. When reasoning, one could accept a conclusion because one has constructed a proof for that conclusion. However, one could have started off believing the conclusion and then looked at what assumptions account for it. Thus, "…the conclusion that one accepts might be a premise of the proof;" He concludes that

[23] Harman, Gilbert. *Internal critique: A logic is not a theory of reasoning and a theory of reasoning is not a logic*. Vol 2. 2002: 171-186

"the connection between proofs and reasoning is… complex."[24] Harman then turns to a discussion of induction and basically makes the same complaint:

> The conclusion of an argument is not to be identified with the conclusion of reasoning in the sense of what you end up with or "conclude" as the result of your reasoning. Even when reasoning culminates in the construction of an argument, the conclusion of the argument may be something one started off believing, and the conclusion of one's *reasoning* may be to accept something that is a premise of an explanatory argument constructed as the result of inference to the best explanation.[25]

Harman is saying that "deduction and induction are not two kinds of reasoning; they are not two kinds of anything."[26] (p. 177). He means that they are not reasoning insofar as reasoning doesn't follow the pattern of deductive or inductive rules. So, when the objector above asks why didn't Harman appeal to cases of inductive reasoning if all he was saying is that logic is not a theory of rationality, I can respond that, in a way, he does. He says induction 'on the model of deduction' isn't reasoning either. Yet Harman believes this is consistent with saying that we can reason inductively: "…it would be stupid, indeed highly irrational, not to engage in inductive reasoning."[27] I wish Harman would have explained more. He did not. But here is what is clear. Harman is saying that deduction in not a theory of rationality, and insofar as induction is construed on the model of deduction, it neither is a theory of rationality/reasoning. However, 'inductive reasoning,' whatever he thinks that is, is reasoning. Thus, the demand of the objector that Harman appeal to inductive forms of reasoning is met because Harman implicitly appeals to cases of inductive reasoning that are not "on the model of deductive reasoning." This all might be a bit vague, but that is the best I could do given the information available to me.

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[24] Ibid., 179

[25] Ibid., 179
[26] Ibid., 177
[27] Ibid., 179

If the ambiguity leaves one unconvinced, then consider Harman's clearest endorsement of the way I am interpreting him: "It is true that deductions, proofs, and arguments do seem relevant to reasoning. It is not just that you sometimes reason about deduction in the way you reason about your finances or where to go on your summer trip. It's an interesting and nontrivial problem to say just how deductions are relevant to reasoning…"[28] Clearly, these aren't the words of a person who thinks there is no connection between logic and rationality. At most, he is saying that the connection isn't clear, or that he isn't clear about it. But I've already argued that this can't be all he is saying, for when Field presented a straightforward bridge principle, Harman's response was that they agree, and he did not say that the principle was unclear. Interpreted correctly, Harman's view that rational agents do not reason in complete accordance with deductive logic is consistent with saying that deductive logic can have some normative significance for reasoning.

§2.1 Can Harman-esque Worries Lead to Normative Skepticism?

Harman's worries aren't sufficient to say logic has no normative role in reasoning. I have argued that the reason for this is simple: Harman didn't intend to argue for this. But what if someone did? Then, they'd be offering a Harman-esque worry[29]. In such a case, we may ask what sort of objection is a Harman-esque objection? It is an exception to a general rule, such as logical rules give us rules of reasoning. A Harman-esque argument objects to something such as the following: "Fs give us Gs." Here, the Fs refer to logical facts. The Gs refer to normative

[28] Ibid., 178

[29] By "Harman-esque," I mean an objection to thinking that there is a connection between logic and rationality. The "esque" is added because the objection begins with observations of the kind that Harman made but it drives towards the conclusion that, I have argued, Harman did not, i.e., that there is no connection between logic and rationality/reasoning.

claims. And one fills in how they relate. Merely for purposes of illustration, we could fill in "Fs give us Gs" with, "the laws of logic (Fs) give us (the relation) the laws of correct reasoning (Gs)." A Harman-esque worry presents us with situations where logical rules do not prescribe rules of reasoning. Schematically, it presents Fs that do not give us Gs. If so, then what should our conclusion be? Here is one option: Fs and Gs are unrelated.

However, this conclusion is too hasty. First, in science, predictions are not always correct and predictions for all phenomena are not always expected, yet the theories are still rationally held. In the latter case, a Newtonian physics won't be able to predict the exact trajectory of a falling feather in the Grand Canyon given certain atmospheric conditions, although it could model it imprecisely. In the former case, where scientific predictions aren't always correct, theories often admit of predictive failures. The predictions of Newtonian Mechanics failed to account for the orbit of Hayley's comet, but scientists didn't thereby discard the theory.[30] Thus, failed predictions—such as Fs without Gs—do not necessarily imply the rational abandonment of a theory. Of course, failed predictions point towards a need for a better theory. Relativity best explained the orbit of Hayley. But it is only when a competing theory solves a problem that one is rationally moved to switch one's previous theory. Following the norms of scientific rationality, Harman-esque worries don't guarantee the rationality of claiming that logical rules and rules of rationality are completely unrelated. Sometimes, imperfect theories are rationality held. And such imperfections contain most weight only in light of a theory that improves these imperfections.

[30] Weinberg, Steven. *Dreams of a final theory* (1st ed.). New York: Pantheon Books. (1992).

Even in light of a new theory, it does not follow that there will be no relation between Fs and Gs. In a less hasty conclusion, one can nuance the "Fs" or the "Gs." We can say that "Fs_1, but not Fs_2, give us Gs." Or, "Fs give us Gs_1 but not Gs_2." For example, the fact that A implies B is not an obligation to believe B on the basis of A, say because the implication is very complicated. Yet we can be more nuanced: the implication is a rational requirement when one has noticed it. I don't mean to endorse this or any other schema as immune to Harman-esque criticisms. I just wish to show that even given such objections, there are other conclusions one could draw.

Finally, instead of nuancing the relatum (the Fs and Gs), one could nuance the relata (predicts/gives/ect…). From a Harman-esque scenario, one could conclude that Fs "probabilistically" relate to Gs. This is how some theories in the social sciences function, for example: crime is a result of poverty. Such a theory can be rationally held even though not all victims of poverty are criminals. Similarly, we can admit that the relation between rules of logic and reasoning is probabilistic, or admitting of exceptions.

§2.2 Is Logic Normative?

Thus far, I have argued that neither Harman nor Harman-esque objections are sufficient to conclude that logic and reasoning/rationality bear no normative relation to each other. So, is logic normative for reasoning? I endorse the affirmative, but I have not argued for it per se. This is because it is prima facie justified that logic plays a normative role in reasoning and rationality. Historically, logic has been understood to have normative force. This is not the fallacy from tradition, for it is scholars in logic who have historically attested to this.

Steinberger[31] and Field interpret Frege[32] as believing that the laws of logic are the laws of thought. Or consider other logicians. "…all rational inquiry depends on logic…" write Barker-plummer, Barwise, and Etchemendy.[33] I've said that this is not a fallacy from tradition. Neither is it a fallacy from authority. The fallacy from authority is committed when a statement is said to be true solely in virtue of one's authority or when the authority's credentials do not put him or her in an epistemically relevant position although they are presented as doing so. But appeal to authority is warranted when the authority in question is pertinent to the subject matter. In this case, I believe that the testimony of logicians regarding what their trade is should be given some cognitive weight, even if this doesn't constitute the final say on the matter. And so, it seems to me that the burden of proof would lie on the claimant arguing that deductive logic does not have a normative role in reasoning/rationality.

One could object as follows. Since none of the principles delineating a normative role for logic have worked, then why think there is one? At this point, it seems a mere promise to say that logic is normative. So, you need a plausible principle delineating logic's normative role to know that logic is normative. I think there are three things wrong with this objection. First, philosophy is hard and it is not easy to come up with uncontroversial principles in any of its domains. This domain is no exception. The problem might just be due to limitations of human ingenuity.

Secondly, from the fact that there is no consensus on which principle best captures moral facts rarely do we conclude that there are no principles governing moral facts. The parallel

[31] Steinberger, Florian. Frege and Carnap on the normativity of logic. *Synthese, 194*(1), 143-162.
[32] I must disclose that what Frege means is a matter of contention.

[33] Barker-Plummer, et al. *Language Proof and Logic.* United States. CSLI Publications. (2011).

situation is that from a lack of consensus, one shouldn't necessarily conclude there is no principle relating logic to rationality. Two rejoinders come to mind. The first rejoinder says that there are clear cases in ethics whereas, given Harman-esque objections, there aren't equally clear cases of logic's normative relation. But this rejoinder confuses clear cases of principles with clear cases of particulars. There are obviously clear particular cases of moral facts, such as pointing out a particular murder as wrong. However, when pressed for an uncontroversial principle, it's hard to develop one. It might be that we do use some principle to identify the particular case, but it will be controversial once its pressed for philosophical rigor. Similarly, there are clear cases of logic playing a role in reasoning. My favorite case comes from a former professor of mine: If it is Jack in the Box, then it sells tacos. It is Jack in the Box. Therefore, it sells tacos. Just like in the ethics case, when pressed for a principle that captures these cases, it's hard to come up with one. So, what the advocate of the first joinder needs to show is that there are clear cases of ethical principles and not equally clear cases of principles relating logic to rationality. I can't imagine someone showing this. The second rejoinder argues that ethical disagreement is often taken as a reason for moral skepticism or relativism. In the same way, disagreement regarding the connection between logic and rationality should be a reason for skepticism or relativism in this domain. My initial reply to this rejoinder is to repeat myself. First, philosophy is a difficult endeavor and a lack of consensus shouldn't be enough to say there are no truths in the disputed domain. Secondly, and relatedly, the disagreement regards which principles capture normative judgements. The disagreement isn't, typically, that there are no principled ways of capturing our judgments. Of course, one could believe that there are no moral facts and no facts concerning rationality and hence no principled way of accounting for them, but this would just be to not play the game.

Thirdly, and finally, I think this response begs the question against what I have argued regarding Harman's position and his style of objections. Namely, I argued that this was never his position and that Harman-esque objections are insufficient to establish that there is no normative connection between logic and rationality.

I'd like to close by putting together everything I've argued for here. We saw that various authors take Harman to have challenged the existence of a connection between logic and rationality. However, I argued that he never intended to say this. Moreover, I argued that any argument that uses his observations to establish that there is no normative relation between logic and rationality is an incomplete argument. Lastly, I hold that, prima facie, logic is normatively related to reasoning/rationality. The failure of us to say exactly how it relates is not surprising and not a decisive reason to doubt that there is such a connection. Philosophy is difficult and we don't give up just because we have failed various times. For all these reasons, I believe that logic does play a normative role in reasoning/rationality. The next task is to ask whether this normativity in logic constitutes a different problem.

§3 Why think there is a unique problem?

In this section, I will explain why I think the normativity of logic constitutes a new problem. I would like to compare my view with Reppert's argument from reason. My main reason for discussing his argument is that the problem he points to can be thought of as a new problem. Comparing his view to my view on why the normativity of logic is a distinct problem serves to put the advantages of my view in perspective. I will argue that the difference gained on Reppert's view is one of degree rather than of kind while on my view, the difference is one of kind. Let me begin with Reppert's view.

Reppert's argument[34] from reason can be described as a family of arguments that, "…attempt… to show that the necessary conditions of logical and mathematical reasoning, which undergird the natural sciences… require the rejection of all broadly materialist worldviews." In this section, I only wish to interact with the version of the argument termed, "the argument from the psychological relevance of logical laws."[35] (p. 379). This version of the argument attempts to show that materialism cannot account for rationality, and materialism should thus be abandoned.

By materialism[36], Reppert means the claims that the universe is 1) mechanistic 2) causally closed and 3) such that anything non-physical must supervene on the physical. Now, on materialism, all that is explanatorily relevant to our behavior is the initial physical conditions and the scientific laws. "Concluding" is part of our behavior. So, it follows that all that is needed to explain our inference-behavior is provided by initial physical conditions and scientific laws. But now the problem arises. To be rational, we must be *governed* by the laws of logic. Yet, according to materialism, we are not governed by logical laws—only physical ones. Thus, on materialism, the laws of logic do not govern our rational inferences. And if the laws of logic do not govern our rational inferences, then we are not rational. But clearly, we are rational, at least sometimes. So materialism must be false.

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[34] Reppert, Victor. *The Argument from Reason*. In *The Blackwell Companion to Natural Theology* (pp. 344-390). Edited by Craig, William. Oxford, UK: Wiley-Blackwell, 344.

[35] Ibid., 379

[36] In this section, I use naturalism and materialism interchangeably, and I think this is consistent with Reppert's use: "…materialistic will encompass all doctrines, that one could plausibly call naturalistic" (p. 345, 2009).

Assessing this argument requires understanding what Reppert means by "governed" by the laws of logic. The bad news is that an explanation is not forthcoming in his writing, but the good news is that we can continue without said assessment. We only need to ask in what sense this could constitute a new problem. Reppert believes there is something special about this argument in that it has a transcendental nature. That is, if the naturalist responds with an error theory (or an eliminative strategy), then the naturalist undermines his own view because he would not be able to say his naturalism ought to be believed. But in what sense, if any, would this be a new problem? One common way of objecting to naturalistic worldviews is by showing that there are some phenomena that naturalism cannot explain. To illustrate, in *Mind and Cosmos,* Nagel[37] rejects naturalism since it can't account for moral values, and Pereboom,[38] in *Consciousness and the Prospects of Physicalism,* notes that the knowledge argument presents one of the strongest challenges to physicalism—a version of materialism. Such a challenge involves a knowledge gap, and hence an explanatory gap, between physical facts and first person qualitative facts. Reppert believes that his argument is specially pressing since it puts the naturalist in a special predicament, one where the naturalist can't use the standard responses. To better understand this predicament, consider the types of responses that a naturalist can employ when presented with some allegedly unexplainable phenomena (and hence a problem).

Reppert writes that typically the naturalist has three types of responses when presented with unexplainable phenomena. First, error replies or eliminitivist replies can be used to show that there really isn't anything to explain. Pereboom argues that Mary could be mistaken about

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37 Nagel, Thomas, *Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False***.** Oxford University Press, (2011).

38 Pereboom, Derk, *Consciousness and the prospects of physicalism* (Philosophy of mind series). New York: Oxford University Press

her qualitative experiences and hence she doesn't come to know a fact. A naturalist can respond to Nagel that there really aren't any moral facts, or that we are systematically mistaken about them. Secondly, reconciliatory responses aim to naturalistically accommodate the controversial phenomena. Physicalists can reduce mental kinds to natural kinds. Scanlon[39] argues both for the irreducibility and naturalistic acceptability of reasons. Finally, naturalists can use inadequacy objections. These replies aim to show that the problematic phenomena are equally problematic on the alternative views. A naturalist can accept the difficulty of explaining objective moral values on naturalism but argue that they are equally problematic on theism, say because of the Euthyphro dilemma.

On Reppert's view, the argument from reason is distinct from other issues in normativity for the naturalist in that it, on pain of irrationality, robs the naturalist of error type rejoinders. Reppert is asking the naturalist how the laws of logic are relevant to our reasoning behavior. Identifying the laws of logic with those of rationality, he says that if the naturalist claims that there are no laws or that we are systematically mistaken, then this would undermine the rational credibility of any worldview, naturalism included. Now, I take it that this argument isn't particularly pressing because we don't know exactly what it means for logic to guide our reasoning behavior and because he identifies the laws of logic with the laws of rationality. Regarding the latter point, Reppert is mistaken. It's not the laws of logic but the laws of rationality that must govern rational agents, and so stated, Reppert's problem never even takes off and hence does not count as a new problem. Reppert may respond by changing "governed by logic" to "governed by rational laws" and argue that this is still unexplained on materialism. So construed, his problem, even if it is a problem, wouldn't be a case of the normativity of logic

[39] Scanlon, Thomas. *Being Realistic About Reasons*. New York: Oxford University Press. 2013

constituting a problem, which is not what I am looking for. But for purposes of argument, I want to grant him that the laws of logic are the laws of rationality. After all, this was a position that Frege[40, 41] adhered to. As much as possible, I want to set these issues aside to focus on the main problem that Reppert is driving at.

The main problem is that, on materialism, we can never come in appropriate causal contact with the laws of logic. And if we don't have this appropriate contact—what Reppert calls governed by the laws of logic—then we can't be rational. I come to this interpretation because of Reppert's emphasis that the physical laws and conditions are the only viable explanations given materialism. But if this is the issue, then it is very much like Benacerraf's issue. Recall that the challenge was to come up with a philosophical theory that specified the truth conditions for mathematics, meanwhile allowing for one to have knowledge of these truths. Knowledge, for Benacerraf, is in terms of an appropriate causal connection, so if one postulated mathematical truth conditions in terms of causally effete platonic objects, then one was unable to know these mathematical truths. Similarly, Reppert is saying that since, on materialism, we cannot have this appropriate causal connection to logic, then we cannot be rational. But then, to add that Reppert's argument restricts the rejoinders available to the materialist is not to make it a new problem, although it might make the problem a more pressing. In conclusion, whatever the merits of Reppert's arguments may be, they do not point to a different problem concerning the normativity of logic.

§3.1 A Problem from the Autonomy of Logic and Normativity

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[40] Steinberger, Florian. Frege and Carnap on the normativity of logic. *Synthese, 194*(1), (2017)

[41] Field, Hartry, *What is the Normative Role of Logic? Aristotelian Society Supplementary Volume, 83*(1), (2009)

Consider logical objects, such as the valid forms of classical logic, existing in a robust platonic sense. Such objects would be timeless, space less, immaterial, and causally effete. A problem the Platonist faces is explaining how we come in contact with such objects. This is the epistemological worry, which is intensified by the metaphysical worry of how there can be such objects. Now, Harman taught us that there is a distinction between reasoning/rationality and logic, so a Platonist has a third issue. Why are these logical objects related to rationality? This is what I shall call the problem from the autonomy of logic and rationality. It also translates into a general problem for anyone who believes that logic plays a normative role in reasoning or rationality. Such a person has to answer, "why are there logical facts that relate to facts of rationality?" Let me expand on this issue.

The lesson that we learned from Harman is that logic and reasoning are autonomous disciplines. They are autonomous in that the standards of correctness are independent of each other. Correct thinking in one domain doesn't imply correct thinking in the other domain. A logical implication licensed by modus ponens, for example, is not necessarily licensed for a rational agent. And an agent in a preface paradox is licensed to hold inconsistent beliefs even if inconsistency isn't licensed by some deductive logical system. Perhaps the case could be made that for every piece of reasoning that we call "good," there is a corresponding piece of logic to justify it. However, it would still remain that not all the rules of logic always license reasoning.

Now, "autonomy" is in terms of independence, so let's clarify this concept. Scanlon distinguishes two senses of "independence." *Judgment-independence* occurs when one can be mistaken about claims in a domain. This is true of mathematics, but it is also true when discussing fiction. *Choice-independence*, on the other hand, is a combination of judgment-independence plus standards of correctness that "…do not depend on what we, collectively, have

done, chosen, or adopted, and would not be different had we done, chosen, or adopted something else."[42] To say that the standards of correctness in logic are choice independent of the standards of correctness in rationality is to say that they obtain irrespective of our legislative practices on the matter. If the disciplines are choice independent in this sense and if logic relates normatively to rationality, then this relation must be explained and thus is a problem. But choice independence assumes realism, so if there is a problem here, we can ask whether it can be averted by giving up realism. I will briefly take up this question prior to continuing to expand on the problem I am raising here.

On Reynold's[43] characterization of realism, the realist claims that the disputed claims are as they are reported to be. An antirealist claims that the statements are true only *according* to that area of discourse. An antirealist about Harry Potter characters believes that statements such as "wizards fly on brooms" is true only according to the story, and a realist about such characters believes that this is how things are, i.e., the statement is true not just according to the story but in the world too. Similarly, a realist about logical truths believes that this is how things are, but an antirealist believes the truths of logic are true only according to the logical "narrative" we have developed. Since these logical narratives are up to us to develop, then the antirealist does not believe that logic has choice independence, although it does have judgement-independence. So, is the antirealist able to avert the above problem in virtue of being an antirealist? I don't think so. She may say that logic is not choice independent in that its standards are dependent on the logical narrative we develop, but she still must explain why the standards of logic are judgement

[42] Scanlon, Thomas. *Being Realistic About Reasons*. New York: Oxford University Press, 40

[43] Reynolds, Steven. Realism and the Meaning of Real. 40(3) Nous.

independent of rationality and yet normatively related to it. Denying choice independence enables to antirealist to say that in some sense it is up to us to make logic normatively related, but explaining how this is done is no trivial matter. In short, the antirealist has a perhaps important, available response to the problem that the realist does not, but such response needs further development.

Carnap's is another view. It promises to be neither realist nor antirealist. It is worth pausing to see if his view avoids the problem. On a Carnapian picture, statements make sense only after the rules of the language have been laid down, so the truths of logic do not have choice independence because they depend on our linguistic rules. The Carnapian can't meaningfully ask whether there is autonomy between the disciplines because there is no fact of the matter outside of some framework, but she can ask if the autonomy obtains relative to some framework. And she can ask whether it is convenient to adopt a framework where the two disciplines are autonomous. If she does adopt a framework where they are autonomous, she must explain how, in that framework, logic can play a normative role, if it indeed does play a role. In the end, this would be a Carnapian variant of my problem. In summary, the problem I am raising does well in not begging the question against other philosophical views, such as those of realists/anti-realists and Carnapians.

With that clarification of realism/antirealism aside, we can return to the problem that I am raising here. I have been saying that logic and rationality have independent standards of correctness and that this is sufficient for autonomy. Yet, if logic normatively relates to reasoning, then we must explain why it does. This need for an explanation is what I call a problem. This conclusion may seem hasty because of the following four unanswered questions. 1) Since logic isn't developed in a vacuum but in the context of human practices, which are norm

governed, isn't it inevitable that it have some normative significance? 2) When we are told that there is a problem due to the normativity of logic, what do we mean by "logic" and "normativity?" 3) Isn't the practice of formulating bridge principles simply the explanation of how logic can have normative significance? 4) Given that scientific theories can also provide normative modals, what makes logic special? I take up these questions in turn.

First, there is the historical claim that logic has been developed, at least partly, by studying human language, reasoning, and debate—by inevitably norm governed practices. With this sort of origins account, it is hard to imagine how logic could not be norm governed. The case I have in mind for this objection is Aristotle studying natural languages, and developing general formulas of what follows from what. On the account of logic as developed, at least partly, in light of norm governed practices, there's no surprise that it has normative significance. This worry is on the right track. While this might make logic's normativity less surprising, we want an answer to the follow up question of how it manages to be autonomous and yet normative. In section §4, I will give my answer.

Secondly, the conclusion seems hasty because of the ambiguity of "logic" and "normative role." Fortunately, I think this can be remedied by expanding on three senses of logic and normativity. Priest[44] writes that medieval logicians distinguished between: logica docens, logica utens, and logica ens. Logica docens refers to the logic that is taught. This has varied throughout the years, and Priest divides the history of this logic in terms of ancient, medieval, and modern. Throughout such time, logic docens can go through radical changes. For example, arguments considered valid in one system may not be considered valid in another

[44] *Priest, Graham. Revising Logic. The Metaphysics of Logic*, Edited by Penelope Rush. Cambridge University Press

system. Aristotelian logic has invalid forms that modern propositional logic holds to be valid, such as the multiple generality problem. On the other hand, logica utens is the logic that we use in ordinary reasoning. This seems to contradict Harman's point, and the point I have embraced, that reasoning isn't identical to logic, but I don't think it needs to be contradictory. A rational agent, even if she doesn't realize it, will typically reasoning according to some policy or policies, which can be labeled logic utens. Harman's claim is that the logic utens is not logic docens. Finally, logica ens is defined in an objective sense as the logic of what actually is valid. We won't have much use for the logica ens concept in this paper.

Those are three distinctions in logic and three distinctions in the history of western logic. Now, let's clarify three ways logic can be normative. Here I borrow terminology from Steinberger.[45] Normative roles can come in the form of directives, evaluations and appraisals. Directives are first personal prescriptions that direct an agent on what he or she should do. Evaluations are standards, in an objective sense, by which we determine whether an action is good or correct. Finally, appraisals are statements of praise or blame. Although there may be some overlap between the three, there are important distinctions between them. When Sally is late for work, you let her borrow your bike. Unfortunately, on her bike to work, she runs into a train and dies. Had she been walking, her only other option, then she would have not run into the train and she would be alive. So, how should we think of your bike lending action? The action seems both wrong and excusable, which seems contradictory. We take the action to be the wrong, yet if we were in those circumstances, we would have recommended bike lending. The above terminology helps make this apparent contradiction intelligible. As an evaluation, the

[45] Steinberger, Florian. Three Ways in Which Logic Might be Normative. Unpublished. https://floriansteinberger.weebly.com/uploads/5/7/9/5/57957573/three_ways_jp.pdf

action was the wrong thing to do, but evaluations are neither directives nor appraisals. The basis of blame is missing because one did not, and could not, foresee the consequences. Moreover, if asked for advice, one might have even given the directive: let her borrow the bike. This shows that evaluations, directives and appraisals come apart. A rough classification is as follows. Appraisals are the basis for our attributions of praise and blame. Evaluations are the basis for our judgements of actions. And directives are the basis for agent guidance, i.e., they aim at positive evaluations.

Putting together the terminology presented here, we need to know why a logic docens is normative for a logic utens given their autonomy. Here, for something to be normative, it must specify a rule that, when violated or followed, determines a normative outcome in terms of evaluations, directives, or appraisals.

The third question is as follows. Since to be normative just means to specify the rule which serves as a basis for normative assessments, then isn't the practice of formulating bridge principles simply the explanation of how logic can have normative significance? As we have seen, Macfarlane, Field, and Steinberger respond to Harman by developing bridge principles. Upon going into detail on what a bridge principle is, we will easily see that there is more to be said as to how a bridge principle can be normative. Now, what exactly are bridge principles? And how do they manage to make the connection? Literal bridges work by connecting material from one end to the other such that a person could by supported as he or she goes across. But what material do bridge principles use to make the connections? And how do they "support" us from one side to the other? It seems that the literal meaning eludes us. In the previous section, I explained how the bridge principles contain facts of logical consequence in the antecedent, called the triggering condition, and some normative claim in the consequent. Perhaps the bridge works

when the trigger is always followed by a normative claim that we would accept on the condition that the trigger obtains.

Understood in this way, discovering bridge principles seems analogous to what is going on when one is attempting to reach reflective equilibrium (RE). In RE, one starts with accepted judgments about a subject. If the subject is morality, then one can start with judgments about actions that are clearly right and good. Then, one formulates a principle that captures these judgments, i.e., a principle whose application would lead to these judgments. The likely outcome is an unsuccessful principle: it might capture judgments we don't accept or it might fail to capture judgments that we accept. To achieve a better fit, a decision will have to be made of whether one should modify the principle or modify one's judgements. The relation is also symmetrical. Just like one's judgements lead to a principle, the principle can lead to new judgements in novel applications.

I take it that the practice of proposing bridge principles is analogous to the practice of reaching RE. We start with a judgement: agents should believe the implications of their beliefs, so we propose the principle of implication: "If $A_1 \ldots A_n$ imply B, then an agent ought to believe B." Then, we notice its unsuccessful because it captures judgements we don't accept. Agents shouldn't be expected to believe all the consequences of their beliefs, especially not in cases where doing so would be overly demanding. With these judgments, we might modify the principle's trigger condition to only apply to recognized or obvious implications: "If $A_1 \ldots A_n$ obviously imply B, then an agent ought to believe B." This modification does not make it a rational requirement for an agent to believe implications that are overly demanding and thus does not entail the unacceptable judgement that agents should believe the overly demanding implications of their beliefs. From the fact that the principle and our judgements are modified

through the process of RE, it is evident that the process is normative. Otherwise, revision of one's judgements would seem to be a distortion.

Finding bridge principles is akin to the process of reaching RE, and bridge principles are normative in that they specify a rule that, when violated or followed, determines a normative outcome in terms of evaluations, directives, and appraisals. However, there is an important difference. The principles arrived at in searching for a sense of justice or morality are principles dependent purely on the normative facts. They are good principles if they are formulated to capture what we take to be correct ways of thinking about justice or morality. The case of logic is unlike this case in that logic is already there and it's not put there to describe our normative judgements, yet its suppose to guide them, dictate them, or inform them. Bridge principles are formulated with the intent of capturing or describing what our normative judgements are regarding how someone should reason, so there is no mystery as to why they are normative. But what remains unexplained is why logic plays a role in the development of bridge principles. One unsatisfying answer is that this is a coincidence. We can do better than this, and the next sections attempt to.

The fourth question is, given that scientific theories can also provide norms regarding what one should believe, what makes logic special? This is a challenge asking, "what makes it problematic that logic is normative but unproblematic that scientific theories/models are normative?" The response to this challenge is that a scientific theory doesn't have the autonomy or independence from reasoning that logic does. That is, science does not employ standards of correctness (i.e., standards of induction and/inference to the best explanation) that are different than what we take rationality to require. True, science does this in a more careful, sophisticated, and technical way, but this still leaves it unproblematic. Logic does, however, employ rules that

are independent of what rational agents use. Thus, the challenge is met because other sciences do not employ rules independent of rationality.

To summarize, I am saying that the problem is the question, "why are logical facts related to rationality?" It is a question that confronts realists, anti-realists, and (some) Carnapians. I considered three possible issues with the question. First, one might think that the historical origins of logic make sense of its normativity. I noted that an account of the normativity of logic should be consistent with its historical origins while respecting its autonomy. Secondly, I attempted to clarify the notions of "logic" and "normativity" by introducing the terms utens, docens, ends, for logic, and evaluations, directives, and appraisals, for normativity. Finally, as a response to the question, one might say that logic relates to rationality via bridge principles. I argue that this still leaves unexplained why logic plays a role in the construction of bridge principles. In the next section, I consider Field's response to the problem I am raising.

§3.2 Field's Account of the Normativity of Logic

In this section, I want to explore Field's response to the problem. In the end, I will judge his view as an inadequate solution, but this is not to say that it lacks philosophical rigor or that it's not at all worth considering as an option. Field[46, 47] has recently elaborated a naturalistically Kosher account of the normativity of logic. His aim here differs from the above topics on the normativity of logic. Previously, Field and others were described as attempting, via bridge principles, to specify the normative role of logic. In this section, Field is proposing a foundation for terms of normative assessment, terms such as "that conclusion is reasonable" or "that is a

[46] Field, H. Pluralism in Logic. *The Review of Symbolic Logic, 2*(2). (2009)
[47] Field, H. Epistemology without metaphysics. *Philosophical Studies, 143*(2), (2009).

good norm." This relates to our topic because his account allows agents to treat logic as a norm while being consistent with the view that logic is independent.

Normative assessments include ethical judgement, such as a wrong action; they includes aesthetic judgements, such as a good painting; and they include judgements of rationality, such as a reasonable/justified belief. Field believes that normative assessments[48] are not straightforwardly factual in the following sense. First, they are relative to an assessor's norms. A statement such as "murder is wrong" is true only according to some norm. Field spends a considerable time clarifying how we should understand these relativized statements. Is this how they are ordinarily meant? If not, is this view revisionary? How do we understand the normative assessments of people who are ignorant of the relativity or who reject it? Such questions, though interesting, need not be addressed here because the points to follow will not depend on how one answers. Now, by 'norms,' Field just means policies or preferences. This makes "norms" a very broad category. It includes statements of the form, "maximize utility," or "believe the consequent when affirming the antecedent." Secondly, an assessor will have attitudes towards the consequences of employing a norm. Also, there are facts about the consequences of following the norm, "maximize utility." A likely consequence of following such norm will be an overall increase in happiness. And an agent may have an attitude of approval towards increasing happiness. This will lead to normatively assessing as 'good' actions that follow the policy (i.e., the norm) "maximize utility." A parallel situation obtains in the epistemological situation. For example, an agent will have factual beliefs about what the consequences are when employing a counter induction norm: it may lead to bruises, starvation, and slow learning. She will have an

[48] He uses the term "evaluations." Since I have already used this word in a different way, I will use a different word for clarity. The changes should have no consequence on the meaning.

attitude towards such consequences: this is bad. And hence she will consider it unreasonable to follow a counter induction policy. To summarize, Field believes that following a norm—say maximizing utility or one of counter induction—will have some objective outcome. Perhaps maximizing utility leads to greater overall happiness and counter inducing leads to slow learning. An agent will have attitudes towards these outcomes; in the case of greater happiness, the attitude is that this is good, and in the case of counter induction, the attitude is that this is bad. These attitudes are the normative assessments and they are relative because they depend on some norm. It's this relativity and norm-dependence that Field characterizes as "not straightforwardly factual." In short, Field's position has both relativist and expressivist elements.

Field writes that his views are developed as a response to the standard worries from Hume, Mackie, and Benacerraf. These are the problems of locating normativity in a naturalistic world, the problem of having knowledge of normative facts, and the problem of deriving a normative fact from some purely descriptive set of facts. But Field also responds to the problem that I have been alluding to. On his view, logic can be thought of as a policy (i.e., a norm) the employment of which will have consequences: to name some, policies may lead to quick learning, accurate learning, or slow learning. As before, one's attitudes towards the consequences of following this policy generates the normative assessments of actions and beliefs that are either following the policy or are inconsistent with it. Earlier, I defined a normative role as something that specifies a rule that when violated or followed determines a normative assessment. Since the normative assessments depend on our attitudes towards the outcomes and the outcomes depend on the policy (i.e., logic) in question, then logic is playing a normative role. On Field's view, logic isn't imbued with some mysterious, unexplained normative property. Rather, its normativity is generated naturalistically by agents who subjectively evaluate treating

logic as a policy. Importantly, his view also allows for logic to be autonomous since nothing in his account requires logic to depend on reasoning or rationality. Lastly, I said that an account of the normativity of logic should include an explanation of the history of logic, where logic isn't developed in a vacuum of abstraction but in the context of language, reasoning, and debate, admittedly norm governed practices. Nothing in Field's view straightforwardly suggests how this condition will be met, but at least his view is prima facie consistent with the historical component. Moreover, in his writing, he never mentions intending to include this historical component. In summary, Field's theory presents a considerable response to the problem of how an autonomous logic can play a normative role for reasoning and rationality.

What should we say about Field's view? Because it has expressivist and relativist elements, any good objection to these views is presumably a good objection to his view. However, I am interested in the question of whether Field's view of epistemic rationality reduces to instrumental rationality, and whether this reduction is tenable. To explore this, I will answer three questions. What is instrumental rationality? Does Field's view reduce epistemic rationality to instrumental rationality? And why is this reduction untenable? I take the affirmative position on the last two questions and I will answer the three questions in turn.

§3.3 Field and the Instrumental conception of Epistemic Rationality

The importation question of this section is a question concerning the distinction, if any, between epistemic and instrumental rationality. Some[49] argue that we do not have a clear

[49] Cohen, S. Theorizing about the epistemic. *Inquiry-An Interdisciplinary Journal Of Philosophy*, *59*(7-8). (2016).

enough concept of "epistemic" to even raise a distinction, while others[50] argue for such a distinction. I will argue that we mean different things by each term.

As I see it, if there is a distinction between epistemic and instrumental rationality, it must be that reasons in the former, but not the latter, are goal independent. Instrumental rationality, or the requirements of instrumental rationality, depend on one's goals. To see what constitutes instrumental rationality, assume the following obtains. Bret learns he is in a burning building and he does not want to die in it. Given these conditions, he is rationally required to evacuate as efficiently as possible. For current purposes, we should not quibble over the "efficiently as possible" clause. Perhaps Bret is an acrobat highly trained in circus stunts and would do quite well jumping out the window and landing in the trash bin, which happens to be the most efficient evacuation route. Suppose further that, concerning efficiency, a close second evacuation option is to walk out the door next to the window, with no more risk than the first option. By taking the second option, Bret doesn't thereby forsake his instrumental rationality. But here we are here worried only about the general conditions of instrumental rationality, and the precise details should be ironed out in a future, complete theory. Besides points like these, I take it as uncontroversial that Bret's rational requirement is to evacuate as efficiently as possible.

Now, what is it that generates the instrumental rational requirements? I extrapolate from Bret's case that the rational requirements are generated by 1) a fact 2) a cognitive relationship to that fact and 3) a goal related to that fact. The rational requirement will be to do that which "appropriately[51]" satisfies that goal. For Bret, the fact is that there is a fire and such fire puts his

[50] Kelly, T. Epistemic Rationality as Instrumental Rationality: A Critique. *Philosophy and Phenomenological Research, 66*(3). (2003).

[51] I leave it to a complete theory to explain what goes into "appropriately"

life in danger. The cognitive relation is his knowledge of that fact, and the goal that Bret has is the goal of surviving. Without these pieces in place, it is difficult, if not impossible, to understand why Bret would have reason to escape the building, unless one of the pieces is replaced by one of an equal type (maybe there isn't a fire but he is trying to avoid the police).

It may seem that there are few counter examples. First, imagine that Bret only thinks there is a Fire, but really there isn't. We may not have a fire and thus not a fact and yet still label Bret as rationally required to evacuate quickly merely because he believes there is a fire. Secondly, suppose that there is a fire, Bret's goal at any given time is to survive, yet he doesn't know there is a fire. One might say that Bret has a decisive reason to evacuate despite him not meeting the cognitive condition. Finally, Bret might know of the fire and its harmful proximity (thus meeting the first conditions), and yet not have the goal of living. Someone might say that even though he does not have a survival goal, we can still evaluate Bret as irrational for not evacuating. I am not entirely confident that this is a persuasive objection. I mention it because there is something quirky (and hence irrational) about a person who has no goal of surviving, perhaps because we evaluate him by the goals we accept.

I think these cases point to the need to clarify my three-part account. Fortunately, this can mostly be done by appealing to the easy-to-see distinction between subjective and objective rationality. Subjective rationality is what an agent should do given his available evidence. Objective rationality is what an agent should do if he knew all the facts or had what epistemologists call 'total evidence.' Imagine you find out that 100 miners are drowning in location one, two, or both. Suppose further that you do not know where they are. In front of you are three buttons: A, B, and C. A saves all the people in location one, B saves all the people in location two, and C saves 50 people from each location. Given that you do not know how the

individuals are dispersed, what should you do? The correct answer seems to be option C, for then you do not risk 100 lives. Now, suppose they actually are all in location two. So, what should you do? Obviously, one should choose button B. I take it that what makes sense of these conflicting answers is that subjectively, option C is rational, but objectively, option B is the rational one. The benefit of adopting this subjective-objective distinction is that it will allow us to make sense of these competing intuitions.

Applying this terminology to Bret's case helps respond to the first two objections. In the case where Bret merely believes there is a fire, he is subjectively required, although not objectively required, to evacuate. In the case where there is a fire but Bret is unaware of it, then his subjective rationality permits him not to evacuate, though objectively he should. This suggests a rewriting of my three-part account of instrumental rationality into two forms, one for subjectively rational agents and one for objectively rational agents. Bret is objectively rational in evacuating when 1) there is a fire compromising his life, 2) he knows there is a fire, and 3) he has the goal of living. Bret is subjectively rational in evacuating when 1) he has some credence in something he takes as a fact (e.g., someone yells "fire," or the alarm goes off) and 2) he has a goal related to the fact (i.e., the goal of not being burned). This accounts for the first two objections to (1) and (2) as criteria for a theory of instrumental rationality.

The last type of objection evaluates the agent regardless of whether he has a goal or not—i.e., the objection is that Bret is irrational for not evacuating even if he did not have the goal of surviving. Since this objection does not depend on having or lacking an epistemic state, and since the subjective/objective distinction is in terms of having/not having said epistemic state, then the subjective/objective distinction will not deal with the last objection. However, I think the objection assumes that there are goals every instrumentally rational agent should have, such

as the goal to want to survive. I think, however, that an agent can decide not to have the goal of surviving and still be counted as rational, say if his goal is to die. We still find him odd, but that's because it's odd to imagine someone who does not have survival as a goal, and it's not because surviving is somehow an objectively rational goal. To illustrate the point, imagine that Bret's courageous brother has been taken hostage by a foreign power because of his knowledge that is crucial to the downfall of his country. He is contained and waiting for the master manipulators and torturers who never fail and who will come and take the secret by force. By a severe lapse in judgement, the guards left him in a room with a red button that will blow up the facility and the interrogators. His options are either press the button and blow up everything with him in it or not press it and risk the safety of the country. Bret's brother doesn't just press the button, he crushes it! I take it that Bret's brother is rational person despite not having the goal of surviving. Since nothing seems to depend on the conclusion being a survival type of goal, I take this to count against the more general objection that in lacking a goal, one can nevertheless be irrational. To be clear, there is a similar objection stating that an agent who has literally no goals—not just lacking a single goal—is irrational. This seems plausible, but it is consistent with my view since all I have said is that the instrumental rational requirements are generated by goals. To compare these different objections, I am saying that to count as an instrumentally rational agent, one must have some goal, but there is no specific goal that is required.

That completes my answer to the question, "what is instrumental rationality?" Of course, much more remains to be said. My goal here was only to give a clear enough picture that could meaningfully relate to Field's account of rationality. The next task then is to show how Field's view is an instrumental conception of epistemic rationality. In my above characterization of

Field, I did not use the concept of "goals." This was excluded for purposes of simplicity, but I believe that the concept of goals plays an important role in his epistemology. He writes, "judgments of one norm being better than another are relative to our goals and to our evaluations of the possible trade-offs among them… for epistemic norms, the only goals of interest concern attaining truth…"[52] By "judgments" and "evaluations," Field just means normative assessments. Later, he continues, "we certainly don't regard all logics as equally good: … relative to almost any goals one may have, a logic that allows you to affirm the consequent is a bad logic, in that it will have a deleterious effect on achieving those goals."[53] Earlier, I related that for Field, the normative assessments were results of the policies we employed and our attitudes towards the consequences of employing such norms. From these quotes, it becomes clear that these attitudes are related to some epistemic goal in that the agent is approving of it. Thus, we will have a positive attitude towards those norms that service an epistemic end if employed, and we will lack a positive attitude towards those policies that do not serve an epistemic end.

Now, notice how this is parallel to my previous characterization of instrumental rationality. We have a fact: policy P has certain property—say, learning truth quickly. We have a cognitive relation: I realize that it does. And we have a goal: I want obtain truth quickly. As I have argued, instrumental rationality has these three conditions. And since these conditions are sufficient for instrumental rationality, it follows that Field's epistemology is a kind of instrumental rationality.

All of this is not to say 1) that field affirms the distinction between epistemic and instrumental rationality and 2) that Field agrees that his view is an instrumental conception of

[52] Field, H. Pluralism in Logic. *The Review of Symbolic Logic, 2*(2), 355.
[53] Ibid., 355

rationality. Indeed, in the texts I have been considering, he is silent on these issues, which is why I have argued for these two points. Perhaps someone could respond to me by saying that Field would not agree to construing his account of the norms of assessment as depending on goals. The only textual support I can find for this is a passing comment where he relaxes his view: "…saying that our norms are to be evaluated by these and a variety of other 'truth-orientated' criteria is much weaker than saying that we adhere to them because we think they are the best means of achieving some tradeoff among those truth-orientated criteria"[54] Here, the "best means of achieving" portion indicates an explicit denial that epistemic rationality is generated in the way that instrumental reasons are generated. The instrumental reasons we have for taking some means or action depend on the goals we have and whether those means best serve those goals. Bret's reasons for exiting the room depend on his survival-goal and whether exiting the room serves this goal. In the above quote, one may argue, Field is claiming that we do not adhere to some norm because it serves some goal and thus is denying that epistemic reasons are produced as instrumental reasons are.

What is missing, unfortunately, is an explanation of how what he is saying is 'weaker' than saying that our reasons are generated by some goal. His denial that truth related goals aren't related to why we follow some norm is in stark contrast with his discussion of goals, as seen in the previous quotes. So, I find the statement very puzzling. Since this remark is made in passing without much elaboration, our best interpretive practice is to interpret it in light of the clearer passages and in context of the main argument, where he is obviously claiming that the norms are assessed by our attitudes toward the outcomes of employing such norms and that we positively assess the norms with desired outcomes. Now, goals are just desired outcomes, so the positive

[54] Field, H. Epistemology without metaphysics. *Philosophical Studies, 143*(2), 278.

assessments depend on goals, and these goals then generate the reasons for employing this or that norm. I think that Field does mean to give goals the role I say he does. We should interpret the above quote to be consistent with this. Perhaps what he meant by 'weaker' is only that an agent doesn't *consciously* choose one norm over another because of its service to some truth related goal. Alternatively, Field could mean that the evaluations based on truth-orientated criteria do not presuppose that they are the standard of "best-ness." Perhaps Field wants to remain neutral on how standards of "best-ness," if any, are ordered. Is coherence of beliefs better than their truth? Nevertheless, either way that they are ordered, one wouldn't be denying that epistemic goals play a role in generating epistemic reasons, on Field's account. Therefore, on the more charitable interpretations of Field—i.e., those that show how he is not contradicting himself—Field isn't denying what I have argued for: epistemic goals generate epistemic reasons.

Now, if I have argued correctly, then Field holds to a sort of instrumental conception of epistemic rationality (ICER). Thus, an objection to ICER should count as an objection to Field, all else being equal. Such an objection naturally comes from the question, "does epistemic rationality depend on goals? Kelly[55] has an interesting argument to show that it does not. Basically, Kelly says that if epistemic rationality is instrumental rationality (ICER), then what we epistemically should believe will depend on our goals (i.e., of finding the truth). But it doesn't. Thus, epistemic rationality isn't instrumental rationality.

The controversial premise for Kelly's argument is that epistemic rationality does not depend on our goals. This is how he argues for this point. Suppose an atheist has no goal in the

[55] Kelly, Thomas. Epistemic Rationality as Instrumental Rationality: A Critique. *Philosophy and Phenomenological Research, 66*(3). (2003).

truth of the belief, "god exists[56]." Then, if ICER is true, upon hearing evidence for the existence of God, the atheist will be under no rational obligation to update his beliefs since he has no goal in obtaining truth on the matter. If this seems bad, the situation is worse than this. On the instrumental conception, there are no reasons when there are no goals. So, the goal-less atheist knows, a priori, that there is no reason to believe that God exists without ever having to know his opponent's arguments. This, however, is absurd, so ICER must be false. All this suggests that it is characteristic of epistemic rationality that epistemic reasons do not depend on one's goals—something in contrast to Field's view.

Two versions of objection suggest themselves. First, there could be tacit goals, such that the atheist in the above example really does have the goal of knowing the truth about God's existence and hence is required to update his beliefs according to the evidence. Well, I discern no a priori reason to deny that there could be tacit goals. But at the same time, I discern no a priori reason against the possibility of a person who for a given question has literally no epistemic goal and hence no epistemic requirement, given ICER. And it is this latter, plausible possibility that is sufficient for Kelly's argument to go through. This brings me the second version of the objection. Perhaps for every agent, S, and each coherent topic, T, S has an (either conscious or tacit) epistemic goal with respect to T. If this were true, then the atheist in the above example would have an epistemic obligation to update his belief in light of the evidence even if he does not care about the correct answer. This is because he might not have a *conscious* epistemic goal, but he does have a *tacit* goal. Now, notice what this move does. Goals are no longer part of an agent's personal preferences, as they are usually conceived of in instrumental rationality. Rather, they are objective features of all agents, or epistemic contexts, akin to an

[56] I assume this phrase has meaning and can be either truth or false.

Aristotelian telos. I see no reason—besides that of saving ICER—to grant goals this status. But if we did grant goals this status, then I don't think we would have an instrumental conception of rationality because the existence of goals independent of an agent's personal preference is foreign to the concept of instrumental rationality. Such a view, whatever it amounts to, is still going to generate normativity, but it makes it mysterious why all agents are subject to certain epistemic goals.

What if I am wrong and truth related goals do not generate epistemic reasons on Field's account? If I am wrong about this, then I am wrong in claiming that his view is an ICER. But the spirit of my critique would still stand because whatever generates the epistemic reasons on Field's view is some agent's subjective evaluation. Then, we can reformulate Kelly's objection all over again. An agent who has no subjective relation towards the truth about P does not thereby forgo her epistemic duties.

In closing, Field's view holds much attraction in that it deals with the known issues of normativity as well as the one I have motivated here. Unfortunately, his view faces consequences that are difficult to accept. Next, I will attempt to keep some of the insightful aspects of his view without the unacceptable consequences.

§4. The Logic-as-Model View and Normativity

I have identified the autonomy of logic and reasoning as a problem. This section will do three things. First, I present three broad ways logic can relate to reasoning and I argue that one such way—the logic as model view—is preferable among the three. Secondly, I will elaborate on the logic as model view. Lastly, I will turn to an application and assessment of the view, where I detail how this view allows logic to play a normative role while also reinterpreting Harman-esque objections into something more constructive.

§4.1 Three Ways Logic Might Relate to Reasoning

We have seen that Field provides a response to our problem, but it has the consequence of reducing epistemic rationality to instrumental rationality, which in turn had the implausible consequence of making epistemic rationality dependent on one's epistemic goals. I think there is something right about having epistemic goals play a role in the evaluation of logic, and I believe that the logic as model view can preserve what is right about goals playing a role without resting epistemic rationality on them. Moreover, when this view is compared to its alternatives, the attraction of the view becomes apparent. Here, I defend this latter claim, and I will subsequently defend the former claim that the view preserves from Field what is right about assigning a role to epistemic goals.

The first step is to clarify the sense in which formal and natural languages relate. One view is that the formal language describes the logical form present in natural language sentences. Because of the forms, certain sentences combine to make valid arguments such that any combination of sentences of the same form will constitute a valid argument. Let's call this the descriptive view because it views logic as describing features of natural language. Another option advocates regimenting our natural language so that it becomes as explicitly logical as possible. We can refer to this as the normative view since it tells us how we should structure our language. A third option is that the formal language models the natural language. Such a view is exemplified in Shapiro's *Vagueness in Context* where he writes.

> The present claim is that a formal language is a mathematical model of a natural language, in roughly the same sense as, say, a Turing machine is a model of calculation, a collection of point masses is a model of a system of physical objects, and the Bohr construction is a model of an atom. In other words, a formal language displays certain features of natural languages, or idealizations thereof, while simplifying other features.[57]

[57] Shapiro, Stewart. Vagueness in Context. New York: Oxford University Press, 49.

Shapiro is saying that a formal language is to natural language what the Bohr model is to the atom. He is also saying that the same relation obtains between logic and reasoning. How the above quote says this needs to be specified, and fortunately, Shapiro does just that. He begins by asking what formal logical symbols have to do with correct reasoning.

> …what is the medium of (correct) reasoning? Is it a natural language, a realm of propositions, a language of thought, or something else entirely? Since the notions treated in mathematical logic all turn on the syntax and semantics of formal languages, the enterprise seems to presuppose that the medium of reasoning has a syntax and a semantics. That is, the medium of reasoning is much like a language.[58]

Shapiro is saying that reasoning occurs in a language and hence logic, as a formal language, can relate to reasoning via its medium, i.e., natural language. To remain metaphysically neutral, he makes the side note that if reasoning occurs in another non-linguistic medium, then logic, in virtue of its purely formal nature, does not relate to it.

These views have intuitive appeal to them, so how shall we assess them? The descriptive orientation, in my opinion, over intellectualizes natural language. Although what makes this view plausible is that some aspects of logic do correspond to aspects of reasoning in natural languages, competent language users don't reason in ways that logic requires[59]. This is the lesson we learned from Harman. Relatedly, the contents of logic extend far beyond what an ordinary language user understands without proper training. The natural language just doesn't have the rigor that formal logic has, and this would be a requirement if it were being described by the formal language. We can label this criticism the over-intellectualizing objection.

A different comment can be made for the normative orientation. It tells us to regiment our language to match logic, thus making language's logical form explicit enough to do science and

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[58] Ibid., 27

[59] *Priest, Graham. Revising Logic. The Metaphysics of Logic*, Edited by Penelope Rush. Cambridge University Press

metaphysics. One thing that is eyebrow raising is the suggestion that we should[60] regiment our language. One can ask whether this is a good piece of advice. After all, we have learned from Harman that reasoning and logic aren't identical.

The logic as model view contains what is correct about the descriptive orientation. Namely, that there is some correspondence between a natural language and a formal language, but it doesn't hold that every feature of logic corresponds to some feature of natural language. Moreover, the logic as model view does not imply an obligation to match one's language to one's formal language, though it presents a way to do so and an explanation of why doing so would be beneficial.[61] Each of the three views outlined here are normative in the sense I have been using. That is, they use logic to specify a rule the application of which would lead to a normative assessment. However, the logic as model view is preferable because it avoids the over-intellectualization objection and because it explains why goals play a role in choosing a logic. The next step is to clarify what it means to say that logic is a model.

§4.2 An Elaboration of the Logic as Model View

What does it mean for logic to be a model? A good way to begin is by explaining what it means to be a model. A model is defined functionally. That is, it should be defined by the role it plays. And this role includes, but is not limited to, aiding in understanding, predicting, controlling, or knowing. A model of predation can serve the purposes of understanding what is happening in an ecological niche, predicting environmental outcomes, or controlling such outcomes. Obviously, these concepts are interdependent and how a model relates to them calls for a longer study. I take it as uncontroversial that a model does relate in these ways, and below

[60] What is eyebrow raising is taking the normative view to say that we are obligated to do this. The suggesting isn't as shocking if it's a mere proposal.
[61] I argue for this in §4.3

I will only sketch how this might be done, but the sketch will have enough details for our purposes.

A model is an idealized theory, and idealization is an intentional distortion or discrepancy. Weisberg[62] distinguishes three types of idealizations in models, and they depend on the goals or reasons for idealizing. First, a Galilean idealization comes about because the theorist wants to simplify the theory or make it computationally tractable. Secondly, minimalist idealization is used to include only the relevant or essential causal factors. A model of the motion of a ball on a frictionless plane and in a vacuum would be one such idealization. It may be used to illustrate that unless acted on by another force, the object would continue in motion. Finally, multiple models idealization includes multiple, incompatible models. Typically, these are used when each model achieves a different goal such that it would be too costly to abandon one or another of the models. This last option isn't a property of a model per se. It is rather an explanation of why scientists may want to retain incompatible models, namely, to accomplish different goals. This will be important when discussing the role of building different logical models.

Besides idealization, Models also come with representors and artefacts. Shapiro[63] defines representors as those aspects of the model that correspond to the target phenomena and artefacts as incidental features of the model that do not correspond to reality. An elementary school science fair contestant may have Styrofoam balls as planets, painted to resemble planets in the solar system, and propped up by wooden sticks. The relation of the balls to each other is a representor since it corresponds to the actual relations of planets to each other. The balls and their colors are also representors. However, the wooden sticks holding up the balls do not

[62] Weisberg, Michael. *Three Kinds of Idealization. Journal of Philosophy,104*(12). (2007).
[63] Shapiro, Stewart. Vagueness in Context. New York: Oxford University Press. 2006.

correspond to anything. They are artefacts. And if a judge criticized the budding young scientist by saying that, in reality, planets are not held up by sticks, then the judge would be making an erroneous criticism[64].

One question that arises is "what makes something an artefact?" The answer cannot be, as Shapiro suggests, that artefacts are parts of the model that do not correspond to reality, for then a model of a flat earth would be an artefact. Even though flat earth models fail to correspond to reality, we don't treat them as artefacts. The scientific criticism levied against this model is of the same type that the above judge levies against the aspiring scientist who props up Styrofoam balls with sticks. Yet, in one case this criticism is legitimate, and in the other it is illegitimate. What explains the difference is that the criticism is legitimate when the criticized feature of the model is a representor, and it is illegitimate when the feature is an artefact. Our practices here indicate that failing to correspond isn't sufficient for being an artefact, for we criticize representors for this very same reason.

A better definition is that representors are those aspects of the model that serve some theoretical end: prediction, control, or understanding[65]. These may be accomplished by a correspondence between the model and reality, but they need not be accomplished this way. The Bohr model of the atom does not correspond, but it may aid in understanding the atom, albeit at a superficial level. And artefacts are those features of the model that aren't meant to play the role of a representor. I wish the situation was as straight forward. Theorists can discover that some aspects of the model that were considered artefactual can be representors. Not being a

[64] One could criticize the student on an aesthetic or innovative level. Using magnets to hold up planets would be far better. Nevertheless, this is a different sort of criticism even if it's based on the same fact—that sticks were used to prop up planets.
[65] I imagine that there are other theoretical ends besides these.

mathematician himself, Einstein took almost a decade to find a mathematical system to express his theory of gravity and space-time. A colleague of his informed him of Riemann's work in geometry, which had been developed in the 19th century. That is, it was developed prior to Einstein's theory and with no intention for it to apply to Einstein's work. This is a common case of how developments in mathematics often have unintentional applications in physical theory. There are countless other cases. Steiner[66] explains how group theory came to play a role in fundamental physics. Physicists Hermann Weyl and his mathematical colleagues were using symmetry groups to model fundamental particles. Since these models added no new physical information, the importance of these models was questioned by certain colleagues who referred to Weyl and others as "gruppen pest." Nevertheless, Heisenberg's SU(2) symmetry group model of the neutron and proton surprisingly turned out to have further group theoretic properties that lead to the prediction and discovery of further particles. The stories of Einstein and Weyl teach us that a theorist's relation to a model is dynamic: models come from unexpected places, and what is considered an artefact may become part of the model. These dynamics, we will see, help us understand how the logic-as-model view plays into the topics of this essay.

Lastly, to present logic as a model is to answer two questions. First, what features of logic are representors and what are they representors for? Secondly, which features are artefactual and why? There are no necessarily correct answers here. As a Styrofoam ball can be a model for an atom, planet, or basketball, so too logic can be used to model different phenomena, or when there are competing models, they model the same phenomena. An example in logic is parenthesis; they typically aren't meant to have a counterpart in natural reasoning. In regards to the second

[66] Steiner, Mark. The nature of nature : Examining the role of naturalism in science, Edited by Gordon, Bruce. Dembski, William. ISI Books. Wilmington, Delaware. (2010).

question, the answer typically depends on features that the theorist regards as incidental and this varies from model to model. On one solar system model, the artefacts are the sticks that prop up the Styrofoam balls, whereas on another—with magnets holding up the balls—it's the magnets. To say that there are no necessarily correct answers is not to say that statements about what a rational agent should do are true relative to a model, nor is it to say that these facts somehow depend on the model at hand. A thermometer can be thought of as a model of temperature, and there is no such thing as a necessarily correct thermometer—only useful or more useful ones, but this doesn't mean that there are no physical facts about heat or that these facts somehow depend on the thermometer. Similarly, to say that there are no necessarily correct answers regarding which parts of the model are representors or artefacts is not to espouse relativism about the facts regarding reasoning and rationality.

Returning to the view, a complete model answers both of the above questions. I will not formulate a complete model because this is what Shapiro does at book length, nor is it necessary that I do so to understand the view. All that is necessary to understand the view is to give a few examples of what counts as an answer to those two questions[67]. For example, Shapiro writes that, "at the very least, the notion of 'deductive consequence' should be a representor. A conclusion in natural language should be deducible from some premises if… the corresponding formal argument is deductively valid in the formal system. Otherwise, it is hard to see how a deductive system models anything."[68] Here, Shapiro answers the first question by suggesting that deductive consequence in a formal language is a representor of deductive reasoning in

[67] I am assuming two things. One, that understanding what counts as an answer to a question is sufficient for understanding the question. Two, that the examples I give here are enough to understand what counts as an answer.
[68] Shapiro, Stewart. Vagueness in Context. New York: Oxford University Press, 51.

natural language. To illustrate, Shapiro might say that an argument in natural language should be consistent with the principle of modus ponens and it shouldn't conclude with the consequent by denying the antecedent of a conditional statement.

How about the second question—what features are artefacts and why? One answer, again from Shaprio, suggests itself from the observation that formal languages have a precision that is utterly foreign to natural languages. Hence, their high degree of precision can be considered an artefactual feature of the logical model. The option of appealing to artefactual features is what enables the logic as model view to avoid the over intellectualization objection. To summarize, a model is defined by the role it plays, such as helping understand some phenomena. The features used to do this are idealization and representation. Artefacts are incidental features of the model not intended to play a theoretical role. However, the history of science shows that whether a feature is considered an artefact can change with new information.

§4.3 The Logic as Model View: A Layout, Application, and Analysis

§4.3.1 A Layout

In this section, I apply the logic as model view to solve the problem I have been discussing. I do this by showing that logic can be a model of rationality. Features of logic capture ways to obtain epistemic ends. Such features, then, can be models of how an agent should reason and thus logic normatively relates to our theory of rationality. But this is a "model" only, which means it comes with certain idealization. What an agent should do will also be influenced by factors such as cognitive limitations. Hence, this view of logic's normative role respects the autonomy of logic and reasoning. Lastly, I will discuss benefits of solving the problem this way as well as implications for the debate between Harman and others.

First, to show that logic is a model is to say which features are representors (and for what) and which ones are artifacts. If logic can be a model for reasoning or rationality, then which of its features corresponds to a feature in reasoning or rationality? Earlier, we saw that Shapiro thinks deduction in logic is a representor. But why should deduction be a representor? The answer, as a general principle, is that a feature of logic can be a representor in a theory of reasoning/rationality when it models the route to some epistemic end. In Shapiro's case, the end is truth since, presumably, he has in mind truth preserving deduction. But plain truth isn't the only epistemic end: there is finding truth quickly, accurately, or precisely. Other epistemic ends include coherence, intelligibility, and understandability.

We can still question why a feature of logic should model the route to some epistemic end for it to be related to rationality. To begin answering, let's classify three ways logic can be conducive to some epistemic end. First, when E is evidence for P, logic can capture this, say via an inductive or probabilistic logic. Secondly, having beliefs that are coherent/understandable can explained by saying they are consistent. There's the question of how exactly consistency is related to coherence and understandability. For purposes of space, I won't take it up. I just note that there are clear ways in which it is related: "I like and I don't like green tea" seems incoherent because its inconsistent. Ordinary speakers often make statements of this kind and if they are pressed for clarity, they respond by showing how their statements are consistent: "I like that it has caffeine, but I don't like the taste." Finally, that A non-evidentially implies B can be a reason to believe B. "There are fifteen children there" non-evidentially implies that "there are children there." I am arguing that logic can explain or map how we get to these various epistemic ends and thus logic can be used as a model for rationality.

To elaborate consider the evidential relation. Prior to some fully developed logic, we have some idea of which evidence, E, counts as evidence for P, when it does so, and to what extent. For example, if I see a beehive *there*, then this is evidence that there is honey *there.* I also have beliefs about the conditions under which seeing a beehive is evidence, such as if I am close enough and sober enough. Finally, I have an idea of the extent to which this is evidence. I can expect beehives to give me honey at a rate that is above chance. The conclusion, "there is probably honey there" is an epistemic end in that it is probably true. Often enough, evidential relations lead to epistemic ends. A logic can capture an evidential relation and hence can be a model for some epistemic end.

All of this, however, is not a theory of rationality. This is because we have further views regarding when an epistemic route should be used to evaluate, direct, and appraise an agent. This is difficult to see in the honey case because of its simplicity. What an agent should do in this case is difficult to distinguish from what the evidential relation is. But this isn't always the case. Our views of when and how an agent should be normatively assessed for following or not following a logical rule will be influenced by cognitive limitations. The truth of A implies an infinite number of propositions, most of which are unimportant and uninteresting. We can't expect a rational agent to whole heartedly follow implication to infinity. Call this the problem of clutter. Restriction to a finite number of implications isn't the solution, for suppose that A implies B, where A is Peano's axioms and B is some complex theorem. An agent can fail to make this implication and still count as rational because the implication is overly demanding. These restrictions are due to cognitive limitations. To see this, imagine that the agent in question is God, who is omniscient and has infinite time and power. Then, the problems of clutter and over demandingness don't seem as pressing. So, in general, our theory of epistemic rationality

depends both on the epistemic routes as well as what is feasible for an agent. Since epistemic rationality depends on epistemic routes, and these are captured by a logic, then logic normatively relates to rationality. The representors, therefore, are the principles of cogency, consequence, consistency.

We have a further question of how such principles relate to each other. Perhaps they are all captured by form and rules of logic such as non-contradiction. That is, we might say that the valid consequences and consistent statements of a logic are a function of the forms the logic endorses as valid and the rules of the logic. Hence, on this way of understanding the relationship between consequence and consistency on the one hand, and logical form and logical rules on the other, the fundamental representors of a logic are the endorsed forms and logical rules, for they map out the epistemic routes.

§4.3.2 The Application and Analysis

Now, that logic is a model for rationality, and that the model can be adjusted to accommodate an agent's cognitive limitations, has two consequences. First, it teaches us that Harman-esque worries are incomplete. Secondly, and relatedly, Harman-esque worries are reinterpreted as epistemological engineering projects—an observation that Steinberger has made. Let me elaborate.

Recall that we defined representors as those features of the model that serve some theoretical end, say predictability or understandability. So, to the extent that a representor accomplishes these goals, to that extent the model is successful. This means that models are successful in a goal dependent fashion. An objection to a model of theoretical rationality, therefore, should show that some goal is not obtained. That is, it should show how a logical model cannot be used in evaluations, directives, or appraisals. What is incomplete about the Harman-esque objections

is that they don't show how certain goals, i.e., said normative functions, are unfulfilled. All they do is illustrate that a principle of logic is not necessarily a principle of rationality.

Harman-esque worries, therefore, should be interpreted as promptings to modify the model in a way that better accomplishes one of these goals. If the model is supposed to provide direction, it should be precise enough to be follow-able. If it is only supposed to be an evaluation of an action, then a minimum requirement is that it be applicable to the circumstances it aims to evaluate. This is an insight coming from Steinberger. His paper explains that there isn't just one normative role to specify, but three different ones, and that Harman's objections can serve as desiderata, depending on the normative role in question. He writes, "the objections… do double duty… later serving as desiderata against which the viability of positive accounts… may be tested."[69] Whereas a Harman-esque worry may have inspired skepticism about the normativity of logic, the information here calls for a more constructive response. A response akin to epistemological engineering.

For purposes of illustration, I will provide a few examples. When building the model, one will use the representors, Harman-esque considerations, and the normative function in question. Depending on the normative function, one may or may not ignore certain Harman-esque considerations. This is because only some of the normative functions are agent sensitive and only some of the Harman-esque considerations depend on agent sensitive concerns. In specific, the normative functions of directives and appraisals are sensitive to the agent's limitations whereas evaluations are not. Evaluations are just objective descriptions of what is correct or incorrect. Recall that it is wrong for someone to lend his bike if doing so unexpectedly leads to

[69] Steinberger, Florian. Three Ways in Which Logic Might be Normative. Unpublished. https://floriansteinberger.weebly.com/uploads/5/7/9/5/57957573/three_ways_jp.pdf, 3.

the person's death. It is wrong—in an evaluative sense—even if one had no way of knowing the consequences. However, the agent may not be blameworthy since we cannot reasonably expect him to know the consequences, and not knowing either, we would have recommended, i.e., directed, that he lend the bike. So, suppose that our normative goal is an evaluation. We propose a principle such as "If A implies B, then you ought to believe B." We can use this principle to evaluate whether an agent has correctly reasoned; that is, he correctly reasons when A really implies B and he draws the implication, B, on the basis of A. Notice that this principle should not be affected by objections that consider agent limitations since we are talking here only about evaluative functions, so over-demanding and clutter avoidance worriess play no role here. Something that will play a role is agent independent considerations. For example, one shouldn't draw an implication based on a false belief. Thus, the above principle needs to be adjusted: "If A implies B, then you ought to believe B when A *is true.*"

Notice too that qua evaluation, the principle doesn't need to factor in what an agent believes. However, this would be relevant if the principle were a directive: "If A implies B, then you ought to believe B when acceptably believing A." By "acceptably," I just mean to factor out cases where the agent has obvious undefeated reasons for not believing A. Now, as it stands, this principle is not a good enough directive because of other agent relative limitations. These could easily be accommodated. For example, over-demandingness and clutter avoidance can be met as follows: "If A *straightforwardly* implies B, then you ought to believe B when acceptably believing A and when B does not constitute clutter." These cases are not the final product, but they do exemplify how in building the model, one should take into consideration logical facts, the normative aims, and the various Harman-esque/agent considerations that relate to the aim/agent sensitivity.

Now, even if its a bit of digression, it is worth pausing to consider how this view compares to Field's, especially since I have given epistemic ends a significant role and I critiqued Field's view for generating epistemic normativity via epistemic goals. An attraction of Field's view came from the fact that we can evaluate different logics depending on how well they serve certain epistemic goals. I think this is true, and the model view of logic is in line with this. Where I argued that Field went astray was in saying that these goals are the bases for epistemic normativity. Suppose that some E is evidence to believe P such that one has an epistemic reason to believe P. Field says that the epistemic reason comes from our approval of the consequences of a policy. In this case, it is a policy that allows us to believe P on the basis of E. Here, he was wrestling with the known metaphysical issues of placing normativity in a naturalistic worldview. An alternative account is Scanlon's.[70] He would say that E is a reason to believe P just in case it really is a reason, and that is all there is to it. My account isn't meant to answer this question. It is consistent with Field's or Scanlon's. What I am trying to settle in this section is the problem of explaining how an autonomous discipline of logic can relate normatively to reasoning. Why there is normativity is a different issue. In short, the logic-as-model view captures the benefits of Field's theory without being committed to the objections that I confront him with.

Finally, I am now able to deliver on promises made back in section 3. Recall, first, that when raising the problem how logic relates to rationality given its autonomy, I wondered whether the question was easily answered by pointing to its historical origins. Logic is developed in light of norm governed practices, so isn't it expected to have some normative component? My response was that an account of the normativity of logic should be consistent or sensitive to its historicity while respecting logic's autonomy. The logic as model view does this.

[70] Scanlon, Thomas. *Being Realistic About Reasons*. New York: Oxford University Press. 2013.

Recall that Shapiro believes that deduction in a formal language is a model for deduction in a natural language. This can be characterized by saying that, on the logic as model view, the development of logic is sensitive to norm governed practices in which it is developed. Also, recall that Shapiro believes logic also has features that extend beyond the natural language, features such as precision. This can be characterized by saying that, on the logic as model view, logic is autonomous, i.e., it has standards of correctness that do not depend on rationality.

The second promise from section 3 was to answer why logic plays a role in building bridge principles. Logic stipulates principles that lead to epistemic ends, such as truth and coherence. Its these principles that, qua model, are idealizations of what a rational agent would do. The bridge principles are adjustments (to these principles) based on factors such as cognitive limitations and based on the goal at hand, i.e., evaluation, direction, or appraisal.

Conclusion

I began with the with the observation that using logic in the evaluation of argumentation and reasoning is inescapable. Recent literature in the area has struggled with two doubts of whether and how logic relates normatively. Regarding the first issue, I argued that the worry of whether logic is normative rests on a misinterpretation of Harman. His observations were never aimed at normativity, and using his style of objections is insufficient for normative skepticism regarding logic. However, his Harman's lesson stands: the principles of logic are independent of the principles of reasoning. This lead to what I called a new problem concerning normativity. Why do the autonomous principles of logic relate to reasoning? After wrestling with Field's view, I presented the logic as model view. Our theory of epistemic rationality is influenced by 1) the epistemic routes one could take and 2) our views of when to evaluate, direct, or appraise an agent for taking these epistemic routes. I argued that logic captures these epistemic "routes" and that

logic is best understood as a model for rational agents. Objections to models, I then argued, are relative to some goal since the purpose of a model is to satisfy a theoretical end. This doesn't imply that epistemic rationality depends on some model or theoretical ends. However, it does suggest a way of thinking about the second worry that Harman ensued—that of how logic relates to rationality. On the logic as model view, this is a question of what we want the model to do for us (evaluate, direct, or appraise). It's something we can conceive of as "epistemological engineering." We might end by saying that the consequences of everything I've argued for here are that Harman's first worry is met and his second one is redefined as a project rather than a problem.

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