

**BOOTSTRAPPING, DEFEASIBLE REASONING,  
AND *A PRIORI* JUSTIFICATION**

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What is the relationship between (rationally) justified perceptual belief and (rationally) justified belief in the reliability of perception? A familiar argument has it that this relationship makes perceptual justification impossible. For on the one hand, pre-theoretically it seems reasonable to suppose:

- (1) We cannot have justified perceptual beliefs without having a prior justified belief that perception is reliable.

If we are not justified in believing perception is reliable, then how can we trust its deliverances? On the other hand, it seems reasonable to suppose:

- (2) We cannot be justified in believing perception is reliable without having prior justified perceptual beliefs.

It is a contingent matter whether perception is reliable. So how else could we be justified in believing perception is reliable other than by empirical investigation?<sup>1</sup>

Combining these two suppositions yields the disastrous result that we need justified perceptual beliefs prior to having justified perceptual beliefs. Unless we are content with a skeptical result, these two suppositions need to be reconsidered. Some theorists have elected to retain (1) and deny (2), by arguing that we have *a priori* justification for believing perception is reliable.<sup>2</sup> Others have elected to retain (2) and deny (1), allowing that we can have justified perceptual beliefs without having justification for believing perception is reliable.<sup>3</sup>

Denying (1) yields what I will call “basic justification” or “basic justified beliefs” — justified beliefs that are obtained without prior justification for believing that the processes that produces them are reliable. The bootstrapping problem arises for any theory that allows for basic justification. It arises in essentially the same form for both evidentialist and reliabilist versions of basic

justification. I will be focussing on the bootstrapping problem for evidentialist versions of basic justification, but at the end of the paper, I will discuss whether the same conclusions hold for the reliabilist version.<sup>4</sup>

### The Bootstrapping Problem for Dogmatism/Direct Realism

Evidentialist basic justification theories hold that our perceptual experience provides defeasible justification for perceptual beliefs, without requiring prior justification for believing that perception is reliable. Instead reliability considerations figure as potential defeaters. If I have reason to think my perceptual processes are unreliable, then the justification provided by my experience is defeated. Consider a simple example of basic perceptual justification: If the table looks red to me, then I am justified in believing the table is red.<sup>5</sup> This belief can be justified without my having any reason to believe my color vision is reliable. Should I acquire a defeater, i.e., a reason to believe that my color vision is unreliable, then my justification for believing the table is red is defeated. This view was first developed by John Pollock (1974, 1986) who called it “Direct Realism”. Recently, it has been revived by Jim Pryor (2000) calling it “Dogmatism”.<sup>6</sup>

The bootstrapping problem takes the form of a *reductio*. Basic justification for perceptual belief allows one to reason to the conclusion that one’s perceptual faculties are reliable in an implausibly easy way. Suppose, having no idea whether my color vision is reliable, I decide to test it. I have someone stand across the room from me and hold up colored cards one at a time. I look at the first card and reason:

- (3) Card 1 looks red.
- (4) Card 1 is red.
- (5) Card 1 looks red and is red.
- (6) So my color vision worked correctly.

(Because the theory we are considering does not require that I believe the card looks red, in order to be justified in believing the card is red, I could arrive at (3) and (4) in the reverse order. On the basis of its looking red, I come to believe that Card 1 is red. I then notice that Card 1 also looks red. Nothing hangs on the order of these premises).

I reason the same way for each of the other cards: card 2 looks green, card 2 is green, so card 2 looks green and is green, etc. I then infer

- (7) My color vision worked correctly every time, i.e., I made no errors. (NE).<sup>7</sup>

Then I infer inductively that

- (8) My color vision is reliable (R).

Surely it is absurd to suppose I can in this way acquire justification for believing that my color vision is reliable. All I did was look at some cards and make judgments about their color without any independent confirmation of those judgments.

So where does the reasoning go wrong? The basic justification proponent is of course committed to the rationality of the transition from (3) to (4). (Again (3) need not be believed in order for (4) to be justified). The inference to (5) is just conjunction introduction. The inference from (5) to (6) is trivial. And the inference to (NE) is again just conjunction introduction. Finally, the inference from (NE) to (R) is a straightforward inductive inference. One might think that the inference to (NE) (or the conjunction it is based on) is questionable because of considerations of the sort illustrated in the paradox of the preface. Even if each time I am justified in believing my color vision worked, I might fail to be justified in believing (NE) because the probability of my having been mistaken at least one of those times is high. But we can stipulate that the number of conjuncts is small enough that I remain justified in believing the entire conjunction, but long enough to justify the inductive inference. This is possible on the assumption that enumerative induction is possible.<sup>8</sup>

### **Biting the Bullet**

Can the basic justification theorist simply accept that bootstrapping reasoning does justify me in believing my color vision is reliable?<sup>9</sup> To see how implausible this is, we can note that prior to carrying out the test of my color vision, I know that each time I look at a card, I will be justified in believing that my color vision is working correctly. I'm simply inferring the actual color from the apparent color with no independent check. But if I can know, before carrying out the test, that it will justify me in believing that my color vision worked correctly, then surely carrying out the test and becoming so justified cannot confirm the reliability of my color vision.<sup>10</sup>

It is true that I do not know ahead of time that I will not encounter any defeaters, e.g. the colors of objects seem to be unstable. Insofar as this does not happen, I acquire some evidence that my color vision is reliable, but surely not enough to justify the conclusion that it is reliable. Suppose my color vision were systematically unreliable, e.g., red objects always look green to me. There's no reason to think this defect would result in my encountering a defeater in my test of my color vision. Alternatively, we could suppose I am testing the hypothesis that if I encounter no defeaters, my color vision is reliable. The bootstrapping procedure guarantees that I can't learn anything about that hypothesis. Yet I could easily bootstrap to that conclusion. So biting the bullet is not a tenable alternative.

## Inductive Defeaters

There may be some room for the basic justification theorist to maneuver. Inductive inferences are defeasible. This opens up the possibility that the bootstrapping reasoning gives rise to a defeater of the inductive inference from (NE) to (R). It is worth noting however, that it is very hard to see how this reasoning could get even as far as (NE), and indeed, it is hard to see how it could get even as far as (6). I cannot acquire a rational belief that my color vision is working correctly simply by making color judgments without any independent confirmation of those judgments. So basic justification proponents will still have something to explain even if they can show that the inductive inference from (NE) to (R) is defeated.

Moreover, as Roger White has argued, it is hard to make sense of how it could be rational for me to believe that my color vision made no errors without it being rational for me to believe that my color vision is reliable.<sup>11</sup> How else am I to explain my run of correct color judgments? After all, no matter how many times I test my color vision, I will be justified in believing that it has worked correctly. Surely I cannot pass this off to coincidence. So it is very puzzling how I could be justified in believing (NE) without being justified in believing (R). Indeed we will see that this kind of solution is not stable. The proposed defeaters of the inference from (NE) to (R) end up being defeaters of the reasoning to (NE).

## Rule-Circularity

Jonathan Vogel has argued that the inference from (NE) to (R) gets defeated because the bootstrapping reasoning is rule-circular.<sup>12</sup> Rule-circular reasoning uses a rule to establish the reliability of that very rule. Vogel gives an example of how rule-circular reasoning can be used to attempt to justify the reliability of induction:

- (9) Induction predicts  $p, q, \dots, n$ , and  $p, q, \dots, n$ . (where  $p, q, \dots, n$ , are verified independently).
- (10) Induction has worked  $n$  times (or  $m/n$  of the time).
- (11) So induction is reliable (or  $m/n$  reliable).

This reasoning is rule-circular because it uses induction, the inference from (10) to (11), to establish that induction is reliable. Vogel notes that the inductive justification of induction resembles bootstrapping reasoning. If we change the reasoning so,  $p, q, \dots, n$ , are not verified independently, but instead inferred by induction itself, then we have bootstrapping reasoning applied to induction. Since bootstrapping reasoning is a form of rule-circularity, Vogel argues that

a prohibition on rule-circularity will block the bootstrapping reasoning. He proposes:

(NRC): A belief that an epistemic rule (R) is reliable cannot be justified by the application of (R). That is, neither the conclusion itself nor any belief which supports the conclusion may be justified in virtue of the application of R.<sup>13</sup>

Let's consider (NRC) as it applies to my bootstrapping reasoning to the reliability of my color vision. We can think of perception as governed by rules that permit transitions from perceptual states to beliefs about the world. According to the basic justification theory we are considering, there is a rule that permits the transition from something's looking red, to believing it is red. Vogel views (NRC) as an inductive defeater, a defeater of the inference from the track-record of the rule, to the reliability of the rule. So Vogel's strategy is to allow all the inferences up to (NE), but to argue that (NRC) defeats the inference to (R). As we noted, the inference from (NE) to (R) seems to be the only step in the reasoning the basic justification theorist can deny. For the sake of argument, we can grant that on the basis of the bootstrapping reasoning, I can become justified in believing (NE). Then (NRC) will face a dilemma. Suppose an oracle tells me that if I my color vision ever works  $n$  times in a row, then my color vision is reliable. Then once I reach (NE), I will be in a position to *deduce* that my color vision is reliable. Since I will still be using color vision to establish the reliability of color vision, (NRC) entails that I cannot thereby acquire justification for believing that my color vision is reliable. But if (NRC) entails that I cannot rationally infer (R) in the case involving the oracle, (NRC) is committed to denying the deductive closure principle for justification. For I will be justified in believing that that my color vision worked  $n$  times and that if my color vision works  $n$  times, it is reliable, but not be justified in believing my color vision is reliable. Moreover, if the world cooperates, there will be nothing stopping me from knowing (NE), that my color vision worked  $n$  times. In such a case, (NRC) will be committed to the failure of deductive closure for knowledge. Most would agree that this kind of closure failure is a serious cost for any theory.

To avoid closure failure, we could restrict that application of (NRC) to inductive inferences. Then the problem is that (NRC) would allow that in the Oracle case, I actually am justified in believing, and even could know, that my color vision is reliable. But the bootstrapping reasoning is absurd whether the final inference is inductive or deductive. Surely the absurdity of the bootstrapping reasoning does not derive from the fact that the final inference is not truth-preserving.

According to Vogel's diagnosis, the bootstrapping reasoning is unobjectionable up to (NE). The problem is with the inference to (R). But it is hard to see why a rule cannot be used to establish its own reliability, but *can* be used to establish its own track record. The inference from (NE) to (R) is inductive,

not perceptual. Moreover, according to Vogel's diagnosis, none of the perceptual inferences is problematic. But if the problem is the circular use of a perceptual inference rule, then presumably some of the perceptual inferences have to be problematic. After all, that is where it seems that something like rule-circularity is occurring, viz. in the use of the perceptual rule to establish (NE), the perfect track record of that rule.<sup>14</sup>

It turns out that (NRC) does block the inference to (NE). The second sentence of (NRC) says "neither the conclusion itself *nor any belief which supports the conclusion* may be justified in virtue of the application of R [my emphasis]". But of course premise (4) is justified by the application of the perceptual rule we are considering, and (4) supports the conclusion (R). So (NRC) entails that the bootstrapping reasoning fails at (4). This means that rather than explaining what is wrong with the bootstrapping reasoning after the application of the perceptual rule to derive (4), (NRC) instead supports denying the correctness of the rule. Rather than rescuing the basic justification view from the bootstrapping problem, the prohibition on rule-circularity constitutes a basis for denying the basic justification view.

Note that (NRC) cannot be acting merely as a defeater of the justification for (4) on the basis of (3). If it were, we would get the absurd result that I can justifiably believe the card is red, until I go on to reason in a rule-circular manner, which would then undermine my justification for (4). (NRC) entails that when (3) is true, one is not even defeasibly justified in believing (4).

Could we avoid this result by simply dropping the second sentence of (NRC)? As I see it, this would be entirely *ad hoc*. Why should it be impermissible to use a rule to establish its own reliability, but not to establish its own perfect track-record?

### **Does the Bootstrapping Problem derive from Basic Justification?**

Jonathan Weisberg has argued that the bootstrapping problem generalizes to non-basic knowledge theories, theories that accept (1).<sup>15</sup> These theories seem not to be subject to the bootstrapping *reductio*. If I am justified in believing my color vision is reliable, prior to the bootstrapping reasoning, then that reasoning will yield only what I already know, viz., that my perception is reliable. So by engaging in the bootstrapping reasoning, I learn nothing new.

Weisberg argues that even if I have prior justification for believing that my color vision is reliable, I can still bootstrap my way to justification for believing that my color vision is *super-reliable*. Suppose, I am already justified in believing that my color vision is reliable. I reason as follows

- (8) My color vision is reliable
- (3) The card looks red
- (4) The card is red

- (5) The card looks red and is red
- (6) My color vision worked correctly.

As in the original bootstrapping case, I can repeat this reasoning indefinitely many times and arrive at the conclusion that my color vision performed flawlessly over many occasions. According to Weisberg, this allows me to infer that my color vision is super-reliable. So the bootstrapping reasoning takes me from justification for believing my color vision is reliable, to justification for believing my color vision is super-reliable. If this is correct, then accepting (1), thereby blocking basic justification, does not avoid objectionable bootstrapping reasoning. Weisberg concludes that basic justification is orthogonal to the bootstrapping problem.

Let's take a closer look at the bootstrapping reasoning to super-reliability. While I can perform the above reasoning indefinitely many times, in order to infer that my color vision is super-reliable, I need to be able to perform conjunction introduction on these instances. But conjunction introduction is constrained by probabilistic considerations. Even if I am justified in believing each conjunct, I cannot infer the conjunction, if the probability of the conjunction is too low. And the point at which the probability of the conjunction becomes too low will be determined by what I am justified in believing in advance about the reliability of my color vision. This will block the bootstrapping reasoning from supporting an inference to super-reliability. Suppose I have prior justification for believing that my color vision is  $.n$  reliable. The bootstrapping reasoning cannot enable me to infer a conjunction with a probability that exceeds  $.n$ .

But bootstrapping reasoning is objectionable even prior to inferring the long conjunction. As I noted for the original bootstrapping case, even the inference to (6) is problematic. Given my prior knowledge of (8) however, the reasoning to (6) looks unproblematic. Weisberg argues that this shows that the bootstrapping problem occurs despite my prior justification for believing my color vision is reliable. Consider the case of Starla and slight bootstrapping:

*Slight Bootstrapping:* Starla knows that the Times is reliable. She opens today's paper, reads the first sentence, P, and comes to believe that the Times says P and P is true. She then ever so slightly increases her estimate of her epistemic probability that the next sentence, Q, is true. The preface-style diagnosis will not apply to Starla, since she uses only two premises in her reasoning: that the Times says P and that P is true. Her premises are weaker than before, so the gain in her epistemic position is weaker too: only a slight increase in her estimate of an epistemic probability. Nevertheless, she is not entitled to even this slight gain. (Weisberg, forthcoming)

Weisberg is surely correct that Starla is not entitled to even this slight gain. But, unlike the original bootstrapping case involving basic justification, there is in this case a straightforward explanation for why she is not so entitled. Because

Starla knows in advance that the Times is reliable, she is justified in believing that the first sentence is true, before she looks at the Times. When she does look at the Times, she learns that the first sentence is P. She justifiably infers P. Has she, by looking at the Times, learned anything that permits her to increase her epistemic probability that the next sentence is true? Certainly, seeing that the first sentence is P, does not make her any more justified in believing the first sentence is true, then she was before she looked (on the assumption she has no independent evidence for P). Both before and after she sees the first sentence, her degree of justification for believing the first sentence is true is determined by her prior knowledge that the Times is reliable. The only thing new she learns by looking at the Times is that the first sentence is P. But that fact does not entitle her to increase her epistemic probability that the next sentence is true.

Suppose I also know the Times is reliable. Without looking at the Times, I name the first sentence “Bill”. I infer (again without looking) that Bill is true, and thus that the Times asserts the content of Bill and Bill is true. Surely this reasoning does not entitle me to boost my confidence that the sentence after Bill is true. So what does Starla learn that I do not know? She learns that Bill = P. Surely this knowledge puts her in no better position than me to infer that the next sentence is true. I conclude that Weisberg has provided no reason to think the bootstrapping problem extends to non-basic justification theories.

### No Feedback

Weisberg proposes a constraint on reasoning that he argues can handle the bootstrapping problem, whether it occurs with basic or non-basic justification. Even though there is no bootstrapping problem for non-basic justification, we can examine whether this constraint rescues basic justification views from the bootstrapping problem. Weisberg proposes what he calls the “no-feedback” defeater (NF). Simplifying somewhat, (NF) says that if one reasons from premises P to a conclusion C via lemma L, if P does not by itself support C, the inference from L to C is defeated.<sup>16</sup> Applied to the bootstrapping case, (NF) says that the reasoning supports the reliability of my color vision, only if my initial premise (3) — the card looks red, supports that reasoning. Since that premise does not support the reliability of my color vision, neither does the bootstrapping reasoning.

Weisberg characterizes (NF) as blocking the inference from the lemmas concerning the individual instances to the reliability conclusion.<sup>17</sup> But as we noted in the case of (NRC), this kind of response to bootstrapping ends up blocking the reasoning at an earlier point. Consider the bootstrapping reasoning up until (6)

- (3) The card looks red
- (4) The Card is red



- (5) The card looks red and is red
- (6) My color vision worked

If (NF) is correct, I cannot reason even as far as (6) — My color vision worked. (3) does not support (6) either. The card's looking red is not by itself evidence for my color vision working. This presents a problem for the (NF) explanation of what is defective about the bootstrapping reasoning. (NF) does not block the reasoning to (5). This means that I am permitted to believe that the card both looks red and is red, but I am prohibited from believing my color vision worked. Of course the fact that the apparent color of the card matches the actual color does not entail that my color vision worked, though one would think it makes it extremely likely. But we can sidestep this issue by replacing (6) with

- (6') The card's apparent color matches its actual color.

(6') is entailed by (5). So if (NF) is correct, we have a particularly jarring instance of the failure of deductive closure for justification, and presumably for knowledge as well: I can know that the card both appears red and is red, without knowing the card's apparent color matches its actual color.<sup>18</sup>

Weisberg considers the possibility of restricting (NF) to cases that involve only inductive reasoning, claiming that without this restriction, (NF) will lead to closure failure:

A second obstacle to a No Feedback-like treatment of inductive-deductive cases is the *prima facie* tension with closure principles. If you cannot deduce that your car has not been stolen and moved from the fact that it is on Avenue A, then it seems you either do not know that it is on Avenue A, or else popular knowledge-closure principles are false. (Weisberg, forthcoming)

I should note that closure failure does not follow from your knowing your car is on Avenue A and your inability to thereby deduce that your car has not been stolen. (NF) leads to closure failure only for basic knowledge theories, i.e. theories that allow you to know that your car is on Avenue A, without knowing that it is very probable that your car is on Avenue A, given that this is where you left it. A non-basic knowledge theory can preclude you from coming to know your car has not been stolen by deducing it from your car's being on avenue A, but still allow that you know it hasn't been stolen on the basis of your knowledge concerning the likelihood of car theft.

All the same, restricting (NF) to purely inductive reasoning will not save (NF). When applied to bootstrapping, (NF) faces the same dilemma that (NRC) faces. If not restricted to inductive inferences, (NF) is committed to violations of deductive closure. If restricted to inductive inferences, then in the Oracle case, (NF) will not preclude my bootstrapping to the conclusion that my color vision is reliable.

## Perceptual Reasons

Vogel and Weisberg attempt to explain what's wrong with bootstrapping by arguing that a certain step in the reasoning is defeated. I have argued that each of these attempts fails. In previous work, I argued that the source of the bootstrapping problem is the denial of (1). Denying (1) permits basic justification, and so the step from (3) to (4). But I now think that bootstrapping does not result from allowing basic justification. In fact, I will argue that the very idea of basic justification is incoherent, at least for evidentialist theories. And if there can be no basic justification, then (1) cannot be denied. This means that we must deny (2), the principle that justification for believing perception is reliable requires prior justified perceptual beliefs. Once we see why we must deny (2), we can see what goes wrong with the bootstrapping reasoning. This will take some explaining.

To begin, I will make what I take to be two defensible assumptions:

- (12) Perceptual justification proceeds in terms of propositional, i.e., propositionally representable, reasons concerning how things appear.<sup>19</sup>
- (13) A proposition *P* can be one's reason, even if one does not believe *P*.

Consider (12). One might argue that one's justification for believing the table is red is simply the experience itself. But I think there are good reasons for supposing that in perception, we have propositional reasons. Suppose I am in Smith's office looking at a red table and talking to a friend. My friend does not know I am in Smith's office. When I tell him there is a red table in Smith's office, he asks me what my reason is for thinking that. If experience were not a source of propositional reasons, I would have to say something like "I am presently in Smith's office, but you'd have to be here to know my reason". Or perhaps I could say, "Well you know what it's like to see a red table? That's what it's like for me right now". Surely this is ludicrous. When asked what my reason is, I'd have no hesitation to respond with either (14) or (15).

- (14) I see that the table is red.
- (15) The table looks red.

I see no reason not to take either of these response at face value. Typically I do not believe either (14) or (15) when I see that there is a red table. So how could either be my reason? Pryor, in his defense of Dogmatism, observes that the phenomenology of perception plays a central role in perceptual justification.<sup>20</sup> We can plausibly accommodate Pryor's observation by supposing that my being in the phenomenal state is what makes the proposition my reason. This would explain how (15) can be my reason. It is my reason because in fact the table does look red to me. So it is the truth of (15) that makes it my reason.

As it stands, this kind of account cannot explain how (14) is my reason. (14) does not describe a (purely) phenomenal state. If one is an externalist about reasons, one could say that although (14) does not describe a purely phenomenal state, all the same, when it is true, it is my reason for believing the table is red. This account can only go so far. I can have a perceptual reason to believe the table is red, when I do not in fact see that it is red. In such a case, (14) cannot be my reason. One could be an epistemological disjunctivist holding that when I do see the table is red, that is my reason, but when I do not see the table is red, my reason is that the table looks red.<sup>21</sup> Even if this view were correct, I see no reason to deny that when I do see the table, (15), in addition to (14), is a reason for me. When I see the table is red, the table looks red to me as well. It is hard to see how (15) could be a reason in the case when I do not see the table is red, but fail to be a reason when I do see the table is red (even if in the latter case, (14) is also a reason).

One might counter this argument for propositional perceptual reasons by claiming that the phenomenon of giving reasons for one's perceptual beliefs is merely dialectical. When asked to produce a reason for believing the table is red, I respond by stating a proposition. But that proposition was not my reason prior to my being challenged.

I see no reason to suppose this is true. Speaking for myself, I would insist that my reason all along has been that the table looks red. It did not just become my reason when I was challenged to produce one. Imagine my friend saying, "Okay, I understand what your reason is now. But I want to know what justified you when you first saw the table".

In the course of defending (12), I have already defended (13). My reason is (14), not because I *believe* the table looks red, but rather because the table does look red. These considerations about perceptual justification show that *the table looks red (to me)* is a defeasible reason to believe *the table is red*. (More generally, the proposition that something looks a certain way, is a defeasible reason to believe that it is that way). This means there is a defeasible inference rule

*a* looks red

*a* is red

I do not mean to lean too heavily on the claim that this is an *inference* rule. As I noted, perception does not typically involve beliefs about appearances, and perhaps inference is a relation that holds only between beliefs. My claim is only that however we characterize the psychology of perception, appearances, i.e. perceptual representations, license perceptual beliefs by giving rise to propositional reasons. Of course there is nothing stopping one, on a particular occasion, from taking note that an object looks red, and inferring on that basis that the object is red.<sup>22</sup>

## Defeasible Inference Rules and Suppositional Reasoning

In natural deduction systems, we have the rule of conditional proof. If I assume  $p$ , and then using the inference rules of the system, derive  $q$ , I can discharge the assumption and infer  $p \rightarrow q$ . Typically we string together several inferences in the derivation, but we could just as well do a one-step conditional proof, e.g., assume  $p \ \& \ q$ , infer  $q$  using conjunction elimination, discharge the assumption and infer  $(p \ \& \ q) \rightarrow q$ . John Pollock has argued that we can reason in a similar way with defeasible inference rules.<sup>23</sup> So if  $p/q$  is a defeasible inference rule, we can assume  $p$ , use the inference rule to derive  $q$ , discharge the assumption, and infer  $p \rightarrow q$ . Because the inference rule is defeasible, talk of proof is out of place here. Instead we can say that this kind of reasoning yields a defeasible justification for believing the conditional.

The rule of conditional proof holds in certain systems of deductive logic in which inference rules express implication relations. It is not obvious that, as Pollock suggests, we can extend this kind of reasoning to defeasible inference rules. But we do not need to rely on the analogy with deductive logic to make the case for the permissibility of this kind of reasoning with defeasible inference rules. We can call this kind of reasoning, whether it occurs with deductive or defeasible inference rules, “suppositional reasoning”. The important point is that suppositional reasoning with both deductive and inductive inference rules figures in our everyday natural language reasoning (although of course not always explicitly).<sup>24</sup> Suppose I know that if it rains the picnic will be cancelled, and that we will either go to the picnic or to the movies. My son asks me what we will do if it rains. Given what I know, I can reply that if it rains, we will go to the movies. How do I arrive at this conclusion? Perhaps I can just see that it follows from what I know. But I might instead reason suppositionally: I suppose that it rains, and then using my background knowledge, apply *modus ponens* to infer that the picnic will be cancelled. Then I use disjunctive syllogism to conclude we will go to the movies. Then discharging my initial assumption, I infer that if it rains, we will go to the movies. This is perfectly respectable reasoning.

Now consider the defeasible inference rule of Statistical Syllogism

Most  $F$ s are  $G$ s  
 $a$  is  $F$   
 $a$  is  $G$

Our use of this rule explains why we believe many of the things we do — that one’s car will start when one turns the key, that the aspirin one just took will relieve one’s pain, that it will be hot on any given June day in Tucson, etc. Moreover, we can reason suppositionally with this rule. Suppose you and I are standing across the street from a dog (call him “Fido”) whom I know to be a Pit Bull. You ask me whether Pit Bulls tend to be dangerous. I am not sure. At that moment Fido starts running toward us and I say, “But if Pit Bulls do tend

to be dangerous, we had better run”. How do I arrive at this conditional? We can view it as suppositional reasoning using the rule of statistical syllogism. I suppose that most pit bulls are dangerous. Relying on my background knowledge that Fido is a Pit Bull, I infer by statistical syllogism, that Fido is dangerous. Discharging my assumption, I infer that if most Pit Bulls are dangerous, then Fido is dangerous. (Then using a bit of practical reasoning, I infer that we should run.) Since statistical syllogism is a defeasible inference rule, I thereby acquire a defeasible reason to believe the conditional.

Let’s consider another example using the defeasible inference rule — Enumerative Induction.

Every observed  $F$  is  $G$

The next  $F$  will be  $G$ .

Suppose Bob wants to know if it will be hot when he goes to Tucson in June. I respond, “Ask Mary — she’s been to Tucson many times in June. If it has been hot every time Mary was there, then you can count on its being hot when you are there”. Here, I arrive at this conditional by suppositional reasoning with rule of enumerative induction. I suppose that every observed (by Mary) June day has been hot, and infer that the next June, viz., the June of Bob’s visit, will be hot. Discharging the assumption, I infer that if every observed June day has been hot, then the June of Bob’s visit will be hot.

One might object that all I can infer is that if every observed June has been hot, then *probably* the next June will be hot. If that is the case, then the rule of enumerative induction should be formulated with a weaker conclusion:

Every observed  $F$  is  $G$

Probably, the next  $F$  will be  $G$

Even if this is so, I can still use the rule in suppositional reasoning. But we often use enumerative induction to infer non-probabilistically qualified conclusions. And that is reflected in the rule as originally stated. Either way the rule is formulated, we can reason suppositionally with it.<sup>25</sup>

### **Suppositional Reasoning and Bootstrapping**

Now let us turn our attention to the inference rule endorsed by the basic perceptual justification theorist:

$a$  looks red

$a$  is red

If this is a correct inference rule, then, like the other defeasible inference rules we have considered, we should be able use it in suppositional reasoning. Suppose I have yet to look at the colored card. I suppose the card looks red. Then using the rule, I infer that it is red. Discharging the assumption, I infer that if the card looks red, then it is red. This reasoning gives me a defeasible reason to believe that if the card looks red, then it is red. Of course there are analogous rules for the other colors, each of which is an instance of the more general rule:

$$\frac{a \text{ looks } C}{a \text{ is } C}$$

where  $C$  can be any color. So whatever color the card is, before I look, I have an *a priori* defeasible justification for believing that if the card appears to have that color, then it actually has that color. That is to say, I have a defeasible justification for believing that the actual color of the card will match the apparent color. So when I get to step (5) of the bootstrapping reasoning, all I've learned is what that color is. I have learned nothing about the reliability of my color vision. This explains our sense that when engaging in bootstrapping reasoning, one is merely "spinning one's wheels".<sup>26</sup>

I need not (and typically would not) engage in this suppositional reasoning. Still, there is an important sense in which I am justified in believing the conditional, whether or not I carry out the reasoning. Using standard technical vocabulary, we can say that I am *propositionally* justified in believing  $P$  just in case I can arrive at  $P$  via trivial reasoning. For example, before I considered this very sentence, I was justified in believing that I cannot see the Southern Cross constellation from in front of my house. Though I had not actually reasoned to this conclusion, I was justified in believing it in the sense that I could arrive at it via trivial reasoning (from my justified beliefs that I live in the northern hemisphere and that the Southern Cross is visible only in the southern hemisphere). In the case of the suppositional reasoning, I can arrive at the relevant conditional via trivial reasoning simply in virtue of my competence in using the rule.

It is important to see that the conditional is not a premise in the reasoning. If we view the conditionals corresponding to inference rules as premises in our reasoning, then as Lewis Carroll observed, we are committed to a vicious regress of premises.<sup>27</sup> But crucially, the bootstrapping reasoning is not independent of my justification for believing the conditional. I can engage in the bootstrapping reason only if I can competently use the inference rule. And if I am so competent, I am (propositionally) justified in believing the conditional. So I cannot do the bootstrapping reasoning unless I am already justified in believing the conditional.

Moreover, the bootstrapping reasoning cannot increase my degree of justification for the reliability of my color vision beyond the initial *a priori* degree of justification afforded by the suppositional reasoning. The only source of justification in the suppositional reasoning comes from the application of

the perceptual inference rule. So the degree of justification the suppositional reasoning imparts to the conditional will be equal to the degree of justification that derives from the application of the perceptual inference rule. But that is precisely the upper bound on the degree of justification the bootstrapping reasoning can impart to its conclusion. After the application of the inference rule in the transition from (3) to (4), there is no further evidence involved. The remainder of the bootstrapping reasoning consists only of inferences ultimately based on (3) and (4). So the degree of justification the reasoning can impart to its conclusion cannot exceed the amount of justification (3) imparts to (4) via the perceptual inference rule. But that's equal to the degree of justification the suppositional reasoning imparts to the conditional. So the BS reasoning cannot increase my justification for believing that my color vision is reliable, beyond that afforded by the *a priori* suppositional reasoning.<sup>28</sup>

I need not be aware of the correctness of the inference rule in order for the rule to license my inferring in accordance with it. So I need not believe *a looks red* is a reason to believe *a is red* in order for me to infer *a is red* from *a looks red*. One can have a reason to believe a proposition without believing that one does. One can even have a reason when one thinks one does not. Compare: One's (justifiably) believing that Fido is a Pit Bull and that most Pitt Bulls are dangerous gives one a reason to believe Fido is dangerous, even if one denies that it does. In both cases, it's the triviality of the reasoning that makes one (propositionally) justified. It does not matter whether the reasoning proceeds from a belief or a supposition.

If my argument is correct, then we should not be looking for a fallacious step in the bootstrapping reasoning. There is no fallacious step. The reason we think there must be is that we are sure the bootstrapping reasoning cannot yield justification for believing color vision is reliable. But even though each step in the reasoning is correct, it does not give me any reason to believe my color vision is reliable. Any reason I have to believe my color vision is reliable after I engage in the bootstrapping reasoning, I already have prior to engaging in the reasoning.<sup>29</sup>

### ***A Priori* Justification for Contingent Propositions**

At this point, one might think I have not solved the bootstrapping problem. Rather I have merely traded it for another problem. Whether the card looks red only if it is red is a contingent matter, but the suppositional reasoning that justifies that conditional is purely *a priori*. So the suppositional reasoning provides me with an *a priori* defeasible justification for a contingent proposition. This is at best surprising.<sup>30</sup> Indeed one might think that an *a priori* defeasible justification for a contingent proposition is as problematic as bootstrapping.

But if *a priori* justification for a contingent proposition is a problem, it is a problem for any theory that endorses defeasible inference rules, i.e., for any

non-skeptical theory. As we have seen, the suppositional reasoning can be run on any inference rule, defeasible or otherwise. Having said that, I must acknowledge that the *a priori* suppositional reasoning to the contingent conditional has an air of “pulling the rabbit out of the hat”. Perhaps this shows that the defeasible reasons posited by the Dogmatist/Direct Realist are not so innocent as they might initially seem. It turns out that there is more built in to the notion of a defeasible reason than we supposed.

We began with the argument from (1) and (2) that threatens the very possibility of perceptual justification. We assumed that there are two independent ways to respond to the argument — deny (1) and endorse basic perceptual justification, or deny (2) and allow we have *a priori* justification for believing perception is reliable. It turns out, at least on an evidentialist view, that (1) cannot be denied. Any inference rule linking perceptual states with justified beliefs about the world gives rise to a *a priori* justification for the reliability of perception. We could reinterpret basic justification theories as denying that justified perceptual beliefs require *empirical* justification for believing perception is reliable. This view allows us to posit (empirically) basic perceptual inference rules. And it is the existence of these perceptual inference rules that makes possible our *a priori* justification for believing perception is reliable.

Of course we can ask what makes possible basic perceptual inference rules. And here I think the only answer we can give is that the correctness of an inference rule is a necessary truth about rationality.<sup>31</sup> I doubt there is anything more fundamental to which we can appeal.

Why not simply hold it is a necessary truth that it is *a priori* rational to believe perception is reliable? As I see it, rationality is fundamentally a matter of believing in accordance with one’s reasons. This means that the correctness of inference rules is prior to the rationality of beliefs.

### **Bootstrapping and Reliabilism**

Reliabilism is a basic justification theory and as such is subject to the bootstrapping problem.<sup>32</sup> If both perception and introspection are reliable, then on standard reliabilist views, I can become justified in believing both that the table is red and looks red. This suffices for the bootstrapping reasoning to proceed. Can my suggested solution for the Direct Realist/Dogmatist help the Reliabilist? This depends on how we think of Reliabilism. On the standard construal, it is not clear that reasons play any role in perceptual justification. The justification derives simply from the reliability of the perceptual process. Thus there is no perceptual inference rule that can generate, via suppositional reasoning, the *a priori* justification for believing perception is reliable.

But there is another way to think of Reliabilism that does allow for this treatment of the reasoning. We can construe Reliabilism as an account of the correctness of inference rules.<sup>33</sup> On this view, Reliabilism would be seen as



proffering a naturalistic reduction of the reason relation. According to most evidentialist views, fundamental reason relations are viewed as necessary. So if  $r$  is a reason to believe  $p$ , then necessarily  $r$  is a reason to believe  $p$ . On the reliabilist view we are now considering, reason relations hold only contingently. All the same, the existence of the rules would allow this kind of Reliabilist view to make use of the suppositional reasoning treatment of the bootstrapping reasoning. I myself find this to be a highly implausible account of the correctness of rules of rational inference, but that is a topic for another time.<sup>34</sup>

## Notes

1. One need only be justified in believing that one's perception is reliable on the particular occasion of acquiring the perceptual belief. This is consistent with one's perception being unreliable in general.
2. See Wright (2004) and White (2006)
3. See Pollock (1974, 1986), Pryor (2000), Huemer (2001), Goldman (1979). A view I will not discuss is holism. According to holism, one has justified perceptual beliefs if and only if one is justified in believing perception is reliable, though neither justification is prior to the other. Holism denies that justification relations are linear. In Cohen (2002) I attempted to defend this view, unsuccessfully, I now believe. See also Vogel (2004)
4. I will be talking mainly about the bootstrapping problem for justified belief. But the problem can be formulated in terms of knowledge as well. See Cohen (2002). The bootstrapping problem was originally raised by Jonathan Vogel (2000) and Richard Fumerton (1995) against Reliabilism. In Cohen (2002) I showed how the problem generalizes to evidentialist views. This was also noticed by Michael Bergmann (2000).
5. One need not believe that the table looks red. The mere fact that the table looks red provides the justification.
6. Pollock (1986) held that perceptual experience gives rise to explicitly propositional reasons for beliefs about the external world. Pryor (2000) remains neutral on this question, holding only that perceptual experience justifies beliefs about the external world.
7. I borrow the "no errors" terminology from Roger White (2006). (NE) is not an essential premise, and for that matter, neither is (6). Rather, from a conjunction of premises like (5), I could infer (8). But it is useful for explanatory purposes to include (6) and (NE). None of what I say will require these premises.
8. If one views red as a response-dependent property, then the bootstrapping problem could perhaps be formulated more clearly with an example about squareness rather than redness.
9. Bergman (2006), Van Cleve (2003)
10. This is noted by Roger White (2006)
11. White (2006)
12. Vogel (forthcoming)
13. This principle is very similar to Fumerton's "No Self-Support" principle (1995). For further discussion of this principle, see Cohen (2002)

14. If we are worried about rule-circularity, it is not at all clear why a rule could be used even to establish that it worked on a particular occasion, i.e., it is unclear how one could use the rule to establish (6).
15. Weisberg (forthcoming)
16. Here is the full statement of NF: If (i)  $L1 \dots Ln$  are inferred from  $P1 \dots Pn$ , and (ii)  $C$  is inferred from  $L1 \dots Ln$  (and possibly some of  $P1 \dots Pn$ ) by an argument whose justificatory power depends on making  $C$  at least  $x$  probable, and (iii)  $P1 \dots Pn$  do not make  $C$  at least  $x$  probable without the help of  $L1 \dots Ln$ , then the argument for  $C$  is defeated.
17. See first paragraph of section 3.3 in Weisberg (forthcoming)
18. One might argue that neither (6) nor (6') is required in the reasoning. Even if it is not, the deductive closure problem remains.
19. Pollock (1974, 1986) explicitly endorse this view. Pryor (2000) remains neutral.
20. Pryor (2000)
21. Williamson (2000)
22. The "inference" rule does not require that the perceptual representation is temporally prior to the perceptual belief. Rather, the inference rule expresses an asymmetric epistemic dependence relation.
23. Pollock (1995) p.100
24. Thanks to Tom Blackson for this observation (in conversation).
25. Hawthorne (2002) makes a very similar point to the one I am making about suppositional reasoning with defeasible inference rules. He argues that if there is an inference to the best explanation rule, then where  $E$  best explains  $P$ , one can *a priori* infer *If  $E$  then  $P$* .
26. How exactly does the reasoning proceed from the conjunction of conditionals concerning individual colors, to the general conclusion that the apparent color will match the actual color? Is it some sort of induction? There is no doubt something strange about induction with *a priori* premises. Although perhaps it should not be so strange in this case given that the conditionals, although derived *a priori*, are contingent. If there is a problem here, I could avoid it simply by restricting the domain of the example. Suppose the cards are either red, blue, or green, and I'm testing whether my color vision is reliable with respect to just those colors. Then the inference from the conjunction of conditionals to the general conclusion is deductive.
27. Carroll (1895)
28. What I say here does not conflict with any Lewis-style triviality result. I am concerned with the degree of justification imparted to a conditional by a particular argument, viz., the suppositional reasoning. I am not making a claim about the probability of the conditional assigned by an entire probability function.
29. This treatment of bootstrapping will also handle the "closure" version of the easy knowledge problem, viz., my inferring *the table is red* from the *table looks red* and then inferring *the table is not white but illuminated by red lights*. My *a priori* justification for believing *if the table looks red, then it is red*, is sufficient to license this latter inference. See (Cohen 2002)
30. Sosa (2009) argues that we have prior, though not *a priori* justification for believing (or perhaps presupposing) something akin to *if the table looks red, then it is red*. For Sosa this justification derives from the fact that perception is

reliable. Like many, I have trouble seeing how facts about reliability can explain facts about rationality. In particular, how could the reliability of perception make it rational for me to believe *if the table looks red, then it is red*, if I have no evidence that perception is reliable.

31. Strawson (1958)
32. Vogel (2000), Fumerton (1995)
33. Comesaña (forthcoming)
34. I am indebted for helpful comments to Brad Armendt, Selim Berker, Tom Blackson, Jessica Brown, Alex Byrne, David Chalmers, Juan Comesana, Ian Evans, Alan Hajek, John Hawthorne, John Pollock, Jonathan Schaffer, Susanna Siegel, Nico Silins, Ernest Sosa, Chris Tucker, Brian Weatherson, Jonathan Weisberg, Crispin Wright, Steve Yablo, and Elia Zardini.

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