The Bootstrapping Problem

A Pernicious Form of Reasoning?
Roxanne: Roxanne has no special reason to think her gas gauge is reliable. However, every day she goes out and takes a look at the readings on her gas gauge. Every time the gauge indicates the tank is x% full, she comes to believe both (i) *the tank reads "x% full",* and (ii) *the tank is x% full.* To illustrate, here is a sample of the beliefs she forms:

Time	Gauge Reading Belief	Tank Level Belief
10am Monday:	(i) The tank reads 'full' at 10am, Monday,	(ii) The tank is full at 10am, Monday
Noon Tuesday:	(i) The tank reads '3/4 full' at noon, Tuesday,	(ii) The tank is ¾ full at 10am, Monday
3pm Wednesday:	(i) The tank reads 'half full' at 3pm Tuesday,	(ii) The tank is half full at 3pm Tuesday
Etc.		

Assume Roxanne's vision is reliable. Then each of her gas gauge reading beliefs are reliably formed, and hence justified (according to the reliabilist). Assume also that her gas gauge is – as a matter of fact – reliable. Then it would seem that each of her tank level beliefs are reliably formed, and hence justified (according to the reliabilist).

So far, so good. Next, assume that every time Roxanne forms a gauge reading belief and a tank level belief, she also comes to believe their conjunction:

Time	Conjunctive Belief
10am Monday:	The tank reads 'full' at 10am, Monday & the tank is full at 10am, Monday
Noon Tuesday:	The tank reads '3/4 full' at noon, Tuesday & the tank is ¾ full at 10am, Monday
3pm Wednesday:	The tank reads 'half full' at 3pm Tuesday & the tank is half full at 3pm Tuesday
Etc.	

Since both the gauge reading beliefs and the tank level beliefs are justified, presumably the corresponding conjunctive beliefs are justified.

But now Roxanne notices a striking correlation between the gauge readings and the tank level: every time her gas gauge reads "x% full", her tank is x% full. Hence she infers the following conclusion:

> *C:* My gas gauge is perfectly reliable.

It would seem the reliabilist is committed to saying that her belief in C is justified. After all, it is inferred from reliably formed (hence justified) beliefs; moreover, the inference in question seems to be reliable, or at least conditionally reliable.

However, Vogel (and many others) have thought that this is counterintuitive. After all, we started by saying that she has no special reason to think that her gas gauge is reliable. And so it seems that she has engaged in some epistemically illegitimate form of "bootstrapping" – she has manufactured an argument for the reliability of her belief-forming methods out of thin.

Bootstrapping Problem:
The problem of explaining why bootstrapping reasoning is epistemically illegitimate.

A point of clarification: Worth getting clear on what exactly is supposed to bad about the reasoning here. Is the intuition supposed to be:

(i)	Roxanne cannot be justified in believing *C*, on the basis of this reasoning, or
(ii)	Roxanne cannot augment or "boost" her justification for her tank level beliefs by appeal to *C* ?

A Dilemma?
Some early statements of the bootstrapping problem argued that it is specifically a problem for reliabilism (e.g., Vogel 2000). Others have argued that it is a more general problem. For example, Cohen argues that it is a problem for any theory that allows for "basic justification":

> **Basic Justification:**
> In order for you to get justification through some method *M*, you don't have to be antecedently justified in believing that *M* is reliable.

In particular, Cohen suggests that a variety of internalist views also run into the bootstrapping problem.

For example, one simple internalist view says that whenever it perceptually appears to you that *p*, then you are justified in believing *p*. Now consider the following scenario:

> *Bert:* Bert is shopping for tables in a furniture store. He looks at what appears to be a blue table. As a result, he believes both: (i) this table appears to be blue, (ii) this table is blue. He then continues browsing and sees what appears to be a red table. As a result, he believes both (i) this table appears to be red, (ii) this table is red. He continues in this vein for awhile. At the end of his shopping experience, he reflects back on the beliefs he's formed and thinks, "Huh! Whenever something appears to me to be a particular color, it is that color. So my vision must be reliable."

If perceptual experience is a source of justification, then it would seem Bert is justified in arriving at the conclusion that his vision is reliable. But this seems to be just another form of bootstrapping.

Perhaps, then, we should just reject any theory that allows for basic justification. The worry with this is that it seems to lead to skepticism. After all, how does anyone come to learn that perception is reliable? It seems they can only do so by relying on perception: when we're born, we have no antecedent reason to think perception is reliable. And so **Basic Justification** is false, it would seem we can never be justified in forming beliefs via perception.

Thus it seems we're stuck with a dilemma: either bootstrapping or skepticism!

Another worry for theories that reject Basic Justification is raised by Weisberg (2010):

> *Charlie:* Charlie, unlike Roxanne, is antecedently justified in believing that his gas gauge is reliable. As a matter of fact, it turns out that his gas-gauge is not just reliable, it's super-reliable (i.e., 100% reliable). Now he repeats Roxanne's reasoning: every day, he looks at the gauge and forms a belief of the form (i) the gas gauge indicates the tank is x% full, (ii) the tank is x% full. Based on this reasoning, he comes to believe that his gas gauge is not just reliable, but super-reliable.

Weisberg argues that this form of bootstrapping is just as bad, but rejecting **Basic Justification** theories won't help us explain Charlie's mistake (since it's stipulated that Charlie is antecedently justified in believing his gas gauge is reliable).

Proposed Solutions
1) *Rule-Circularity*.
One natural thought is that bootstrapping is bad because it is *circular* reasoning. Here is one way of spelling this out:

> **No Rule Circularity:** A belief about the reliability of belief-forming method M cannot itself be justified by the application of M.

Some worries:
Skepticism: Does this lead to skepticism with regards to perceptual beliefs?

Good Bootstrapping: Weisberg suggests that there are good cases of bootstrapping reasoning. For example:

> *Eliza:* Eliza knows antecedently that the NY Times is reliable. She reads an article on the front page reporting three independent studies of the NY Times' reliability, all of which found that the NY Times is significantly more reliable than most readers think. She concludes that the NY Times is more reliable than she had previously thought.

Weisberg argues that in this case, Eliza's conclusion is justified.

> *Q:* Do you agree with Weisberg's verdict on this case? If so, what distinguishes Eliza from the pernicious examples of bootstrapping (e.g., Roxanne)?

Eliza (arguably) shows that a ban on circular reasoning is too strong. Other cases suggest that it is too weak – that it fails to diagnose the badness in certain other defective forms of reasoning:

> *Matt.* Matt antecedently that the *NY Times* is reliable every day of the week, though less reliable on Sundays. Not know the day of the week, he reads the times front to back. For every sentence S that he reads in it, he concludes both (i) the NY Times says S, (ii) S is true. He concludes that today is not Sunday.

Weisberg argues that Matt's reasoning is defective for much the same reason as Roxanne's, even though in this case his conclusion is not about the reliability of the paper, but rather about the day of the week.

2) *No Lose Investigations*
Here's another tempting diagnosis of what's gone wrong with bootstrapping reasoning: even if Roxanne's gas gauge were highly unreliable, she could still go through the same reasoning and come out with a belief that her gas gauge is reliable. Of course, in this case her resulting belief wouldn't be justified (according to the reliabilist), but she would still hold it nonetheless. Perhaps, then, there is something illegitimate about investigating the epistemic credentials of a belief-forming method M by means of a process that could not possibly discredit M – i.e., could not possibly issue a verdict that M is unreliable. One way of fleshing this out:

> **No "No Lose" Investigations:** Suppose that at time t you are not (yet) justified in believing p, and you begin an investigation into whether p is true using some method M. If you can know at t that M into whether p is justified could not possibly lead you to believe that p is false, then you are not justified in forming a belief in p via M.
> (Cf. Titelbaum, Douven, and Kelp for ideas along these lines.)

Questions: Does a ban on "No Lose" investigations avoid general skepticism about our perceptual abilities? Does it have any counterintuitive consequences of its own?

3) *No Feedback*
Another solution is suggested by Weisberg, who notes that cases of bootstrapping have a certain underlying structure: someone starts believing various premises (e.g., Roxanne's gauge reading beliefs); they then infers certain intermediate conclusions or lemmas from these premises (e.g., Roxanne's tank level beliefs); they then infer a final conclusion from these intermediate conclusions. Perhaps what's going wrong in bootstrapping reasoning is that the reasoner is using the intermediate conclusions to illegitimately boost the probability of the conclusion to a degree not supported by the initial premises. Weisberg fleshes this out as follows:

> **No Feedback:** Suppose some intermediate conclusions/lemmas $L_1...L_n$ are inferred from $P_1...P_n$, and C is inferred from $L_1...L_n$ (and possibly some of $P_1...P_n$) by an argument whose justificatory power depends on making C at least x% probable. Then if $P_1...P_n$ do not make C at least x% probable on their own, without help from $L_1...L_n$, then the argument for C is defeated.

Questions: Does this satisfactorily solve the bootstrapping problem? Does it avoid skepticism about perceptual abilities? Is it compatible with reliabilism?