

# 'What's the Matter With Epistemic Circularity?'

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## 1. Two Kinds of Circularity

Roxanne's **bootstrapping**: Roxanne lacks reason to believe that her fuel gauge is reliable. She sees that the gauge reads 'full' on Day One, and infers that the tank is full. She then infers from this that the gauge's reading was correct. After nine more days of similar inferences, she infers that the gauge is reliable.

Raymond's **self-verification**: On the Isle of Knights, Knaves, and Fools, Raymond asks the source before him "Are you a knight?" The source says yes, and Raymond infers that the source is a knight.

Both procedures are **epistemically circular**, in the (rough) sense that they attempt to verify the reliability of a given source by trusting the source's own testimony. These epistemically circular procedures fail to confer knowledge and justification, even if the sources are objectively reliable. So, *what's the matter with epistemic circularity?*

## 2. Reductionism and Anti-Reductionism

**Incredulists** accept, and **credulists** deny:

CREDIBILITY REQUIRES APPARENT RELIABILITY: An agent is justified in trusting a source's testimony only if the agent has prior justification to believe that the source is reliable.

A **reductionist** about epistemic circularity is an incredulist who takes the principle that CREDIBILITY REQUIRES APPARENT RELIABILITY to explain the illegitimacy of Roxanne's and Raymond's bootstrapping and self-verification procedures.

An **anti-reductionist** denies that this principle explains what's the matter with epistemic circularity, typically (but not necessarily) by denying the principle. I'll mostly focus on anti-reductionism that denies the principle, and thus accepts credulism.

## 3. Bootstrapping and Closure

The paradigmatic (credulist) anti-reductionist accepts that

(1) Roxanne's belief that the tank is full on Day One is justified.

If (1) is accepted, then it is hard to avoid licensing bootstrapping. Consider:

(2) If Roxanne's belief that the tank is full on Day One is justified, then her belief that the gauge was correct on Day One is justified.

(3) If Roxanne's belief that the gauge was correct on Day One is justified, then her belief that the gauge made no errors on Days One through Ten is justified.

(4) If Roxanne's belief that the gauge made no errors on Days One through Ten is justified, then her belief that the gauge is reliable is justified.

From (1)-(4), it follows that

(5) Roxanne's belief that the gauge is reliable is justified.

But (5) is implausible. How can the credulist accept (1) but avoid (5)?

3.1 First option: deny (2)

Denying (2) requires denying

DEDUCTIVE TRANSMISSION: If one justifiably believes that  $p$ , and if one can tell that  $p$  entails  $q$ , then one is justified in inferring from  $p$  that  $q$ .

Denying DEDUCTIVE TRANSMISSION is reasonable. Other plausible counterexample: inferring from the (visually perceived) fact that a wall is red to the conclusion that it is not white with red light shining on it.

But credulists must go further, and deny

DEDUCTIVE CLOSURE: If one is justified in believing that  $p$ , and one can tell that  $p$  entails  $q$ , then one has justification to believe that  $q$ .

If you believe  $p$  and know that  $p$  entails  $q$ , then you cannot justifiably withhold belief from  $q$ . So DEDUCTIVE CLOSURE plausibly follows from:

EXISTENCE: Given one's total evidence, there is at least one justified doxastic attitude that one can take to any proposition.

Bottom line: We should accept EXISTENCE, and thus accept (2).

Second option (Jonathan Vogel): deny (4)

Denying (4) requires denying

INDUCTIVE TRANSMISSION: If one justifiably believes that  $p$ , and if one can tell that  $p$  is the premise of an inductively strong argument for  $q$ , then one is justified in inferring from  $p$  that  $q$ .

But credulists must also deny:

INDUCTIVE CLOSURE: If one justifiably believes that  $p$ , and if one can tell that  $p$  is the premise of an inductively strong argument for  $q$ , then one has justification to believe that  $q$ .

But INDUCTIVE CLOSURE again plausibly follows from Existence. Example: Say a **stunningly anti-reliable** gauge gives incorrect readings 99.99999% of the time. If you believe that a gauge has given a correct reading on an arbitrary trial, you cannot justifiably withhold belief that it is not stunningly anti-reliable (absent very strong evidence).

Again, since we should accept Existence, we should deny (4).

Third option (Jonathan Weisberg): deny (3)

Best version: Roxanne is justified in believing, for each day, that the gauge was correct on that day, but still not justified in believing that it made no errors (as in lottery and preface paradox cases)

But it takes many individual premises for small risks of error to accumulate, and not many premises to get a strong inductive argument that the gauge is reliable.

#### 4. Incremental Bootstrapping and Expected Reliability

General problem for reductionists (like me): CREDIBILITY REQUIRES APPARENT RELIABILITY is too weak to explain the illegitimacy of some variant cases of bootstrapping.

Alice's **incremental bootstrapping**: Alice knows that the source before her is either a (perfectly reliable) knight or a (perfectly anti-reliable) knave, but she has no evidence favoring one possibility over the other. When she asks the source whether it will rain and is told that it will, Alice becomes more confident than not that it will rain. She then becomes more confident than not that her source is a knight.

Charles' incremental bootstrapping: Charles knows that his barometer is either merely reliable or perfectly reliable. When Charles sees on Day One that the barometer reads 'low', he not only believes but becomes psychologically certain that the barometric pressure is low. On this basis, he is certain that that on Day One the barometer reads 'low' and the pressure is low. Charles then repeats this process for ninety-nine additional days. At the end of Day One Hundred, Charles is certain that the barometer has a perfect track record, and he infers that the barometer is not only reliable but perfectly reliable.

Both cases involve illegitimate bootstrapping procedures, but CREDIBILITY REQUIRES APPARENT RELIABILITY is too weak to rule the procedures unjustified.

Reductionists need a general answer to the question: How confident should you be in the testimony of a neutral source of unknown reliability?

My answer: Your confidence should equal the source's **expected reliability (ER)**.

$$ER =_{df} \sum n \Pr(\text{Rel} = n\%)(n\%).$$

A source is **neutral** in my stipulative sense when:

$$\text{NEUTRALITY CONDITION: } \Pr(p | S(p)) = \Pr(\neg p | S(\neg p)).$$

Proof of my answer:

When you know that a source is  $n\%$  reliable, and you have no other relevant evidence, your credence that the source will give a correct answer to whether  $p$  should be  $n\%$  (by the Principal Principle). That is,

$$(6) \Pr\left(\left(S(p) \wedge p\right) \vee \left(S(\neg p) \wedge \neg p\right) \mid \text{Rel} = n\%\right) = n\%.$$

In cases where you do not know the objective reliability of your source, the various possibilities for its reliability will form a partition, and so

$$(7) \sum_n \Pr(\text{Rel} = n\%) \Pr\left(\left(S(p) \wedge p\right) \vee \left(S(\neg p) \wedge \neg p\right) \mid \text{Rel} = n\%\right) = \Pr\left(\left(S(p) \wedge p\right) \vee \left(S(\neg p) \wedge \neg p\right)\right).$$

From (6) and (7), it follows that

$$(8) \Pr\left(\left(S(p) \wedge p\right) \vee \left(S(\neg p) \wedge \neg p\right)\right) = ER.$$

And from (8) and the NEUTRALITY CONDITION, it follows that

$$(9) \Pr(p \mid S(p)) = ER.$$

We should thus supplement CREDIBILITY REQUIRES APPARENT RELIABILITY with the stronger principle that

CREDIBILITY EQUALS EXPECTED RELIABILITY: An agent is (uniquely) justified in adopting a credence equal to the prior expected reliability of a neutral source's testimony.

CREDIBILITY EQUALS EXPECTED RELIABILITY handles Alice's case, because her source's ER is  $\frac{1}{2}$ , but she is more confident than not in its testimony.

CREDIBILITY EQUALS EXPECTED RELIABILITY handles Charles' case, because his source's ER is less than 1, but Charles is psychologically certain of his source's readings.

In general, we can see that any violation of CREDIBILITY EQUALS EXPECTED RELIABILITY will lead to either bootstrapping or incoherence, so CREDIBILITY EQUALS EXPECTED RELIABILITY offers a plausible general diagnosis of what's the matter with bootstrapping.

## 5. The Neutrality Condition: Parity and Lack of Bias

There are two ways for NEUTRALITY CONDITION to be violated: (i) You have antecedent reason to be more confident that  $p$  than that  $q$  (or vice versa). This violates:

$$\text{PARITY CONDITION: } \Pr(p) = \Pr(\neg p).$$

(ii) A source's likelihood of error is unevenly distributed between incorrectly saying  $p$  and incorrectly saying not- $p$  (e.g., **individual bias**). This violates:

$$\text{LACK OF BIAS CONDITION: } \Pr(S(p) \mid p) = \Pr(S(\neg p) \mid \neg p).$$

Note: For NEUTRALITY CONDITION to be violated, PARITY CONDITION or LACK OF BIAS CONDITION must be violated.

## 6. Self-Verification

Big picture: The (credulist) anti-reductionist allows Raymond to trust his source's testimony in general, but not about its own reliability. The reductionist says he shouldn't trust his source's testimony about *anything*.

Tempting thought: If reductionism is right, then you should trust a source's testimony about its own reliability to the same degree you trust its testimony about other stuff (minor caveat: individual bias)

Carol's predicament: Carol knows that the source before her, source A, either is a perfectly reliable knight or a merely unreliable fool, and Carol has no reason to consider one possibility more likely than the other. Carol knows of another source, source B, who also is known to be a knight or a fool, with neither possibility more likely than the other. Carol asks source A whether source B is a knight, and A claims source B is a knight. Carol then asks source A whether A himself is a knight, and A claims to be a knight.

How confident should Carol be that B is a knight when A first tells her so? Where  $b$  is the proposition that B is a knight and  $A(b)$  is that A claims that b, by Bayes' Theorem

$$\Pr(b|A(b)) = \frac{\Pr(A(b)|b)\Pr(b)}{\Pr(A(b)|b)\Pr(b) + \Pr(A(b)|\neg b)\Pr(\neg b)} = \frac{75\% \left(\frac{1}{2}\right)}{75\% \left(\frac{1}{2}\right) + 25\% \left(\frac{1}{2}\right)} = \frac{3}{4}.$$

No surprises here. This equals A's prior expected reliability of  $\frac{3}{4}$ .

How confident should Carol be that A is a knight when A tells her so? Where  $p$  is the proposition that A is a knight, by Bayes' Theorem

$$\Pr(p|A(p)) = \frac{\Pr(A(p)|p)\Pr(p)}{\Pr(A(p)|p)\Pr(p) + \Pr(A(p)|\neg p)\Pr(\neg p)} = \frac{100\% \left(\frac{1}{2}\right)}{100\% \left(\frac{1}{2}\right) + 50\% \left(\frac{1}{2}\right)} = \frac{2}{3}.$$

Upshot: A's testimony that he is a knight is less credible than is A's testimony that B is a knight. This is because of **selection bias**.

Illustration: Ask 100 sources about 100 *different* sources, and you can expect roughly 25 errors, half claiming knights are fools, and half claiming fools are knights. Ask 100 sources about themselves, and there are again 25 errors, but all are fools mistakenly claiming to be knights.

Does this undermine reductionism about self-verification? No, because selection bias is not a marker of vicious circularity, and can even enhance a source's credibility about its own reliability. Where a source's reliability is known either to equal  $r$  or some lower value of  $r$  minus  $x$ , and where  $p$  is an arbitrary proposition such that  $\Pr(p) = \Pr(\text{Rel} = r)$ , the source's self-verifying testimony that its reliability is  $r$  (rather than  $r$  minus  $x$ ) will be epistemically less credible than its testimony that  $p$  only when

$$\Pr(\text{Rel} = r) < \frac{x+1-r}{x+1}.$$

For example, on the Isle of Knights and Fools, selection bias will enhance a source's self-verifying testimony when the source's prior expected reliability is above  $\frac{5}{6}$ .

## 7. Epistemic Circularity and Skepticism

The ‘Cartesian Circle’ charge against Descartes (as stated by Reid):

If a man’s honesty were called into question, it would be ridiculous to refer to the own man’s word, whether he be honest or not. The same absurdity there is in attempting to prove, by any kind of reasoning, probable or demonstrative, that our reasoning is not fallacious, since the very point in question is, whether reasoning may be trusted. ... Every kind of reasoning for the veracity of our faculties amounts to no more than taking their own testimony for their veracity.

In defense of Descartes, DeRose replies:

[W]e should remember that the use of a faculty could result in one’s coming to learn that the faculty is unreliable. ... In light of this, if Descartes were right that his faculty of clear and distinct perception is self-verifying (rather than self-undermining), this would by no means be an obviously worthless result. Such an epistemically circular verification may well be of some significant value.

But the defense of Descartes (and us) doesn’t work. Call a probability distribution over reliability hypotheses **symmetrical** just in case for all  $x$ ,

$$\Pr(\text{Rel} = 50\% + x) = \Pr(\text{Rel} = 50\% - x).$$

Call a proposition **favorable evidence** if that proposition, if verified independently of the source, would increase the source’s expected reliability. Finally, say that a source’s claim that  $p$  gives **symmetrical support** for your reliability hypotheses if for all  $x$ ,

$$\Pr(\text{Rel} = 50\% + x \mid S(p)) - \Pr(\text{Rel} = 50\% + x) = \Pr(\text{Rel} = 50\% - x \mid S(p)) - \Pr(\text{Rel} = 50\% - x).$$

When  $p$  is favorable evidence with prior probability of  $\frac{1}{2}$ , the source’s claiming that  $p$  will provide symmetrical support, and thus leave you with symmetrical posteriors, in any realistic case. The upshot is that if your priors for a source are symmetrical, then almost any favorable claim the source could make about its own reliability will not increase the its expected reliability.

## 8. Internal Faculties vs. External Sources

Anti-skeptical upshot for reductionism: If we have reasons to accept credulism about our own internal cognitive faculties but not external sources, then we will have reason to deny that it is similarly illegitimate to use our internal faculties in verifying their own reliability.