The Epistemology of Graded Beliefs

UNIT 4, PART 2: HOW DO CREDENCES RELATE TO BELIEFS?

Recap

- So far in this course we've spent a lot of time talking about *beliefs*.
- But beliefs seem to come in degrees…

Degrees of Belief

- Consider the following propositions:

- A) It snowed somewhere in the world in 2020.
- B) It snowed in Russia in 2020.
- C) It snowed in Moscow in January 2020.
- D) It snowed in Moscow on January 3rd, 2020.

- I am more confident that A) is true than that B) is true, and similarly I am more confident that C) is true than that D) is true.

A Picture of Degrees of Belief

- A widespread conception of degrees of belief (AKA credences):

- The maximal degree of belief you can have in some proposition *p* is certainty (degree 1).
- The minimal degree of belief you can have in p is complete disbelief (degree 0); this corresponds to complete certainty that *p* is false.
- Intermediate degrees of belief are represented by intermediate values between 1 and 0; the higher the value, the stronger your degree of belief.

Formal Epistemology

- **Central Question:** What is the epistemology of degrees of belief? Can we come up with rules governing which degrees of belief it is rational to have?

- **Methodology:** If we can represent degrees of belief as probabilities, then we can use probability theory to answer the Central Question.

Two Sorts of Puzzles

- 1) Puzzles about what degrees of belief it is rational to have in certain scenarios
- 2) Puzzles about how degrees of belief relate to binary beliefs

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- 2) Puzzles about how degrees of belief relate to binary beliefs

- Last week, we looked at an example of first sort of puzzle (the sleeping beauty problem)
- In this week and the next week, we'll look at the second type of puzzle

Big Question

- *What's the connection between credence and belief?*

- In everyday life, we often talk about believing something *full stop*, without referencing our specific degree of belief.

- E.g., "Fred believes that the train is running late."

Reduction

- Option 1: **Reduction**
- To believe *p* is just to have a sufficiently high credence in *p*
- *- This view is sometimes known as the "threshold" or "Lockean" view of belief*

Dualism

- Option 2: **Dualism**

- Belief and credence are separate states; neither is reducible to the other.

- *Potential Concerns:*
- Not very simple/theoretically elegant
- Arguably, there are important connections between belief and credence that we would like to explain.

Dualism (continued)

- Arguably, there are important connections between belief and credence that we would like to explain.
- For example, if someone believes that it is currently raining in Singapore, it seems to follow that they have at least a moderately high credence that it is raining in Singapore.
- ?? “I believe it’s raining in Singapore, but I’m also certain it’s not raining in Singapore”

Eliminativism

- Option 3: **Eliminativism**

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- Typically, this option is advocated by formal epistemologists who think that we can do all of the important stuff in epistemology with just degrees of belief; why mention outright belief at all?

Eliminativism

- Option 3: **Eliminativism**

- *Potential Concern:* We talk very frequently about what people believe, e.g.:

- "I believe in the value of democracy."
- "Fred believes that the train is running late."
- "Shelly goes to church because she believes in God."

If eliminativism is true, does that mean that whenever we say things like this, we are speaking falsely?

Eliminativism

- Option 3: **Eliminativism**

- *Further Concern:* If there are no beliefs, does this also mean that there is no knowledge (assuming knowledge requires belief)? If so, does this amount to skepticism, albeit a new version thereof?

Evaluating the Options

- Given the costs facing eliminativism and dualism, some have thought that reduction is the most promising view.
- However, reductionism turns out to face significant challenges…

Challenges to Reduction

- **Challenge #1:** The logic of rational belief is different from the logic of rational credence

- **Challenge #2:** The conditions under which it is rational to have a belief are different than the conditions under which it is rational to have a high credence

Challenges to Reduction

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Reduction (in More Depth)

- **Reduction:**
- To believe *p* is just to have a sufficiently high credence in *p*

- *Q:* What counts as sufficiently high?

Reduction (in More Depth)

- **Reduction:**
- To believe *p* is just to have a sufficiently high credence in *p*

- *Q:* What counts as sufficiently high?
- *A:* Some threshold between 0 and 1

- i.e., S believes *p* iff $Pr_S(p) \geq t$, where t is some threshold.

Closure for Knowledge

- **Closure for Knowledge:** If S knows *p*, and *p* logically entails *q*, then S knows *q*.

Closure for Rational Belief

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Closure for Rational Belief

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- **Multi-Premise Closure for Rational Belief:** If it is rational for S to believe p_1 and it's also rational for S to believe p_2, and p_1 and p_2 logically entail *q*, then it is also rational for S to believe *q*.

Closure for Rational Belief

- On the face of it, Multi-Premise Closure seems plausible.

- p_1 = It's sunny outside
- p_2 = It's hot outside.
- q = It's sunny outside & it's hot outside.

- If it's rational for you to believe both p_1 and p_2, then it seems like it's also rational to believe q.

The Problem

- *The Problem:* Multi-Premise Closure seems to be inconsistent with Reduction.

The Problem

Lottery. Marcus has a ticket in a lottery. Marcus knows for sure that one – and only one - ticket will be randomly selected as the winner; he also knows for sure that there a million other tickets in the lottery.

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The Problem

Lottery. Marcus has a ticket in a lottery. Marcus knows for sure that one – and only one - ticket will be randomly selected as the winner; he also knows for sure that there a million other tickets in the lottery. Each ticket is numbered, from 1 to 1,000,000. Marcus' ticket # is 304,523.

Q: Marcus has not yet seen which ticket was selected as the winner. Is it rational for Marcus to believe that his ticket will lose?

The Problem

Q: Marcus has not yet seen which ticket was selected as the winner. Is it rational for Marcus to believe that his ticket will lose?

According to reduction, the answer seems to be "Yes". After all, the probability that his ticket will win is only 1/1,000,000. So Marcus' credence that his ticket will lose should be very high: .999999. Presumably, this exceeds the threshold required for belief.

The Problem

- *Reminder:* Reduction says that S believes p iff $\Pr_S(p) \geq t$, where t is some threshold.

- Assume that t is less than .999999. Then since it's rational for Marcus to have a .999999 credence that his ticket will lose, then according to Reduction, he counts as believing his ticket will lose.

The Problem

- *But note that Marcus' grounds for believing his ticket will lose apply equally well to each of the other tickets.*

The Problem

- *Q:* What should Marcus' credence be that ticket #1 will lose?
- *A:* 999999 (each ticket has a 1/1,000,000 chance of winning)

The Problem

- *Q:* What should Marcus' credence be that ticket #1 will lose?
- *A:* .999999 (each ticket has a 1/1,000,000 chance of winning)

- *Q:* What should Marcus' credence be that ticket #2 will lose?
- *A:* .999999

…

The Problem

Pr(ticket #1 loses) = .999999

Pr(ticket #2 loses) = .999999

Pr(ticket #3 loses) = .999999

…

Pr(ticket #100000 loses) = .999999

The Problem

So if Reduction is true, then:

Marcus believes ticket #1 will lose.
Marcus believes ticket #2 will lose.
Marcus believes ticket #3 will lose.
…
Marcus believes ticket #1,000,000 will lose.

The Problem

So if Reduction is true, then:

Marcus rationally believes ticket #1 will lose.
Marcus rationally believes ticket #2 will lose.
Marcus rationally believes ticket #3 will lose.
…
Marcus rationally believes ticket #1,000,000 will lose.

But note that these beliefs logically entail that all the tickets (tickets #1 – 1,000,000) will lose.

The Problem

But note that these beliefs logically entail that all the tickets (tickets #1 – 1,000,000) will lose.

So if Multi-Premise Closure is true, then it is rational for Marcus to believe that all the tickets (tickets #1 – 1,000,000) will lose!

The Problem

So if Multi-Premise Closure is true, then it is rational for Marcus to believe that all the tickets (tickets #1 – 1,000,000) will lose!

But this seems wrong – after all, Marcus knows that not every ticket will lose!

Moreover, it is inconsistent with Reduction. After all, the probability that every ticket will lose is 0, so according to Reduction it is not rational for Marcus to believe that every ticket will lose.

The Upshot

Reduction seems to be inconsistent with Multi-Premise Closure.

A Possible Escape?

There is a possible escape hatch: insist that the threshold for belief is credence 1!

i.e., S believes p iff $\Pr_S(p) = 1$.

This is sometimes known as the "Certainty View" of Belief.

A Possible Escape?

There is a possible escape hatch: insist that the threshold for belief is credence 1!

i.e., S believes p iff $\Pr_S(p) = 1$.

On the version of Reduction, it is not rational for Marcus to believe his ticket will lose.

More generally, it is not rational for Marcus to believe, of any particular ticket, that that ticket will lose.

Further Worries

- However, setting the threshold at 1 faces an obvious worry: it makes rational belief *too* demanding.

- After all, setting the threshold at 1 means you cannot believe something unless you are absolutely certain of it. But how many things are we absolutely certain of?

Further Worries

- For example, I believe that the theory of evolution is true. But should I be absolutely certain of it? That is, should I assign no credence – however slight – to the possibility that evolutionary theory is incorrect?

Further Worries

- Similarly, I believe that the external world exists. But should I assign no credence whatsoever to the hypothesis that it doesn't exist, and I am being deceived by an evil demon?

Further Worries

- The worry, then, is that there are very few things that we are rationally certain of.
- So if rational belief requires rational certainty, then it follows that there are very few things that we can rationally believe.
- But this seems to lead us back to a form of skepticism!

Summing Up

- The Lottery Paradox arises from the tension between two ideas:

- i) Reduction
- ii) Multi-Premise Closure

- One way out of the tension is to accept a specific form of Reduction – the Certainty View – on which rational belief requires credence 1. But this seems to lead us back to skepticism.

The Preface Paradox

- A similar problem arises from the *preface paradox*.

The Preface Paradox

- **Preface Paradox.** You are a historian, and you have just completed your first history book. It's a doorstopper of a book: over a thousand pages, and it contains 1,000,000 historical assertions. You've researched your book carefully. However, you acknowledge that you are fallible, and it's extremely unlikely that every single assertion you made was correct. You declare as much in your preface, where you write the customary words: "Despite my best efforts, I am sure this book contains some mistakes."

The Preface Paradox

- P_1: Sentence 1 is true.
- P_2: Sentence 2 is true.
- P_3: Sentence 3 is true.

  …
- $P_{1000000}$: Sentence 1,000,000 is true.
- Ccl: Sentences 1 – 1,000,000 are all true.

The Preface Paradox

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You (the author) have a high credence in all of the premises, and rationally so. So if reduction is true, then you rationally believe each of the premises.

The Preface Paradox

- P_1: Sentence 1 is true.
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- $P_{1000000}$: Sentence 1,000,000 is true.
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But the premises entail the conclusion. So if multi-premise closure is correct, then you also rationally believe the conclusion. But presumably it would be irrationally hubristic to be convinced that your book is error-free!

Giving up Multi-Premise Closure?

- So both the Lottery Paradox and the Preface Paradox reveal a tension between reduction and multi premise closure.

- Perhaps, some might suggest, we should keep reduction and reject multi premise closure.

A Further Question to Consider

- Do rational beliefs need to be logically consistent? That is, should we accept the following principle:

- **Consistency:** It is irrational to hold logically inconsistent beliefs.

A Further Question to Consider

- **Consistency:** It is irrational to hold logically inconsistent beliefs.

- Many have thought that Consistency is plausible. But the Lottery and Preface Paradoxes also pose a challenge for the idea that rational beliefs need to be logically consistent.

Giving Up Consistency?

- B_1: Ticket #1 will lose.
- B_2: Ticket #2 will lose.
- …
- $B_{1000000}$: Ticket #1,000,000 will.
- $B_{1000001}$: At least one ticket (between #1 and #1,000,000) will win.

Giving up Consistency?

- B_1: Sentence 1 is true.
- B_2: Sentence 2 is true.
- B_3: Sentence 3 is true.

  …
- $B_{1000000}$: Sentence 1,000,000 is true.
- $B_{1000001}$: At least one of sentences 1 – 1,000,000 is false.

Discussion Question

- What do you think is the best solution to either the Lottery Paradox or the Preface Paradox? Should we reject reduction? Should we reject multi-premise closure?