# INCOMPLETENESS THEOREMS AND FIRING PHILOSOPHERS

/imagine [robot kicks philosopher in the behind, hyperrealistic, masterpiece, surreal, artstation trending 8k]

# LOGICAL CORRELATION & 1ST INCOMPLETENESS THM

- I read your mind and does the opposite of what you predicts

# LOGICAL CORRELATION & 1ST INCOMPLETENESS THM

- You are a formal system ::::: Godel's theorem
- You are just some program ::::: Halting problem

- "Diagonalization theorems" (and also e.g. Quine's paradox) introduce self-reference through logical correlation.
- You can't disentangle yourself from the "rest of the world" because the rest of the world may contain logically correlated copies of you

# WAIT BUT HOW? 2ND INCOMPLETENESS THM

- Bob: "I'll only halt if Alice proves I don't halt"
- BUT *WE* CAN SEE that bob won't halt! So are we fundamentally superior to Alice??

# WAIT BUT HOW? 2ND INCOMPLETENESS THM

- We assumed Alice's soundness, Alice may not do so herself
- You're just not allowed to hold beliefs about your entire beliefs
- So-called "informal reasoning" is just reflective reasoning


I'm not provable
Stronger systems
He is provable !

# Löb

completely predictable

"You can prove me!"

doesn't limit other people's reasoning capacity

the only people who know his theorem call it an "obstacle"

# Bob

completely unpredictable

"You're too weak to prove me."

limits other people's reasoning capacity to show he's the stronger system

his theorem is well-known

# REFLECTION

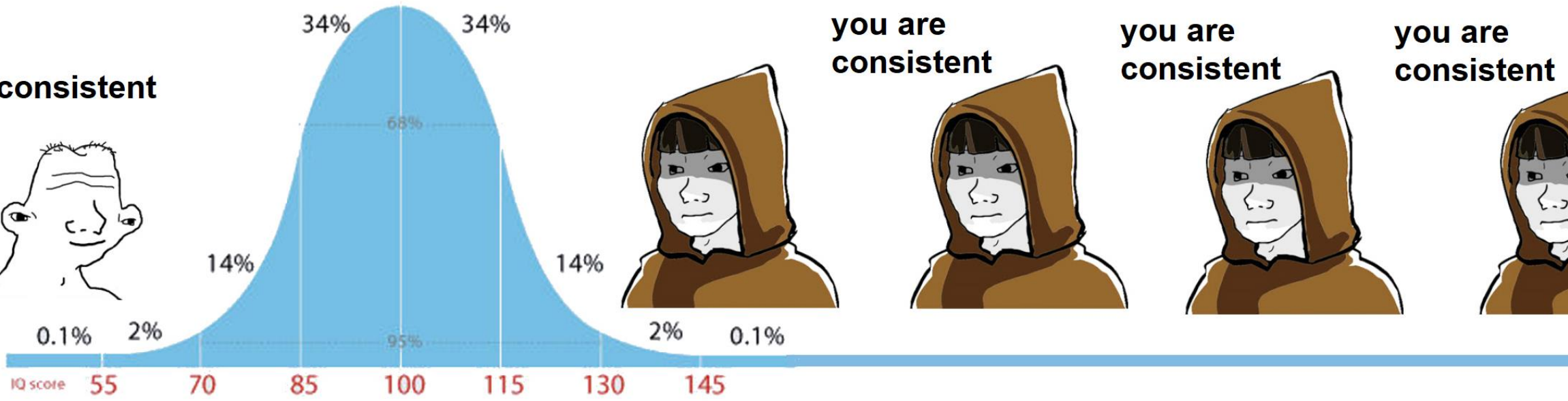
- At t = 2 I can have beliefs about my beliefs, t = 3 beliefs about those beliefs…

- But I can also do a little thinking
- and at t = 2 have beliefs about all the beliefs I would have had ($\omega$)

- … in general I can reflect up to "any computable ordinal"

no!!! i don't know
if i'm consistent!!

i am consistent




you are
consistent



you are
consistent



you are
consistent

# REFLECTION

- Well actually not *any* computable ordinal.
- Because then you would be uncomputable.
- Your mind is some complex program with its own ordinal complexity
- “Oh, but I can think about ZFC + Large ordinal!” – not usefully

I know and understand
ZFC + Any Arbitrary
Large Ordinal!!!

Wang
Yangming

**If you cannot act on it, it is not knowledge.**

# CHAITIN'S FORMULATION

- There is a program just slightly more complex than you can't predict

# THE LÖBSTACLE

- If you can't determine the behavior of more complex things, how do you become more complex?
- Are you permanently limited to your current complexity, without hope for improvement?
- Should we fear becoming smarter, because of the uncertainty of what we'd do if we were smarter?
- If a smarter computer tells us it's ok, can we trust it?


I'm not sure if I'm sound
Stronger systems
He is sound !


I'm not sure if I'm sound
Stronger systems
He is sound !


I'm not sure if I'm sound
stronger systems
He is sound