Rationality 101

Part 1

Jan 31st 2025

www.rationality-freiburg.de

What will you get?

- Understand what **rationality** is:
  - epistemic rationality
  - instrumental rationality
- Why this matters and why you should **care**
- Dismiss some common **myths**
- Learn a few useful **techniques** to become *more rational*

So ... what is rationality?

- Write down your answers
- No fancy definitions, just your own words
- What is *epistemic* rationality?
- What is *instrumental* rationality?
- Let's compare

Rationality: Definition 1

Judgement and **decision making** under *uncertainty*.

- **Judgement:** What should I believe? → epistemic
- **decision making**: What should I do? → instrumental
- *uncertainty*: I don't have all the information. The world is complicated.

Rationality: Definition 2

The art of thinking in ways that result in **true beliefs** and **good decisions**.

- **true beliefs:** What should I believe? → epistemic
- **good decisions**: What should I do? → instrumental

True Belief

- Correlates with reality
- High(er) explanatory power (past)
  - Germ theory vs. miasma theory.
- High(er) predictive power (future)
  - Judging traffic to cross safely.
- ... relative to some other belief
- *True(er) belief*

Good decision

- Gets you closer to YOUR goals

Myth: Rationality is Cold and Emotionless

- **Reality:** Emotions inform goals.
- Rationality helps align actions with what you **care about**.
- Your emotions drive your desires. Rationality ensures your actions match those desires.
- Even the pursuit of knowledge for its own sake is driven by your desire for knowledge!

Accurate models also include people and yourself

- What makes other people tick?
- What makes YOU tick?
- Does your boss reward the wrong colleagues?
- Would you like to go to the gym early in the morning?

Embrace errors

- It's not about being right but ...
- ... becoming less wrong
- Please do NOT change your answers

Q1

- Lake with a patch of water lilies.
- Every week the patch doubles in size.
- After 10 weeks the lake is completely covered.
- (Approx.) after how many weeks is the lake **half covered**?

Amanda

- This is Amanda, 38 years old.
- Grew up and lives in Baltimore, USA.
- Attended all BLM marches in her city from 2020 to 2022.
- Enjoys Italian-style espresso.
- **Task:** Assign probabilities to the next statements.

Q2

How likely is Amanda to be a primary school teacher by profession?

Q3

How likely is it that Amanda grew up in a single-parent home?

Q4

How likely is Amanda to be a primary school teacher that is also active in the feminist movement?

Let's compare answers

Exponential Growth: Why We Fail

- Exponential processes don't exist naturally for long.

The Conjunction Fallacy: Why We Fall for It

- Usually when another person presents us with information it's relevant
- We judge likelihood by how easy something is to imagine.
  - In our mind: more details = more probable.
  - In reality: more details = less probable.

Why care?

- There are good reasons for the previous *mistakes*.
- Are they really mistakes?
- Why should we even care?
- Because:
  - We live in a world where exponentials exist: pandemics, economic growth, retirement savings
  - We live in a world where bad actors can exploit the conjunction fallacy
  - ... the same is true for all other cognitive biases

Defenses Against Bias

- Exponentials: Ignore intuitions, **do the math**.
- Conjunction fallacy: Beware of detailed stories.
  - Every "and" significantly lowers the probability.

Think About Things

youtu.be/VFZNvj-HfBU

Q5

What is the song about? Write down you answer.

Samantha boarded the 8:15 AM train, just like every weekday, settling into her usual window seat. She glanced at her phone — 7% battery. She put it away and looked out the window as the train rumbled forward.

At the next stop, a man in a gray coat took the seat across from her. He nodded politely, then unfolded a newspaper. Samantha barely noticed—she had seen him before, though she wasn't sure where.

The train slowed, and she absently glanced at the display above the doors: "Next Stop: Westford". The doors slid open, and Samantha stepped onto the platform.

Write down thoughts

Noticing Confusion

- Huh?
- I am surprised!
- I just heard something that is in conflict with something I believe.
- ... it's probably nothing.

Noticing Confusion - Examples

- My boss suggested a meeting next Monday, even though he shouldn't be here plus Monday is his travel day
- At the doctor's when measuring blood pressure - why are there two numbers instead of one? I notice I have a patchy understanding.
- While playing *Diplomacy* a player said we were in winter even though I "knew" we were in fall.
- Peditrician's voice mail instructing to call after 9 a.m.
- Old files in a warehouse (from rationality.org)

Table tennis

A player and trainer with decades of experience tries to encourage me to sign up my kids for table tennis lessons because he claims they improve concentration and focus, which is beneficial for school.

- Q6: Do you expect he is right about this? Why?
- Q7: Assume the opposite i.e. he is in fact wrong/right, figure out a plausible explanation why.

Table tennis 2

- He may very well be right, I simply don't know!
- BUT, the fact that he observes kids playing table tennis displaying better concentration than average is not enough evidence. Why?
- Possible explanation:
  - To play table tennis successfully you need great concentration
  - Kids who lack great concentration are more likely to give up
  - End result: population of kids that are great at table tennis and have good concentration
  - Pure selection

Swimmer's Body Illusion

Coin flipping

- Everyone needs one coin
- The side with a number is T **tails** (the other H heads)

Faulty Reasoning (Clearer Thinking)

programs.clearerthinking.org/faulty_reasoning_qu

- Do "Learn about the fallacies first"
- ... and all extra activities

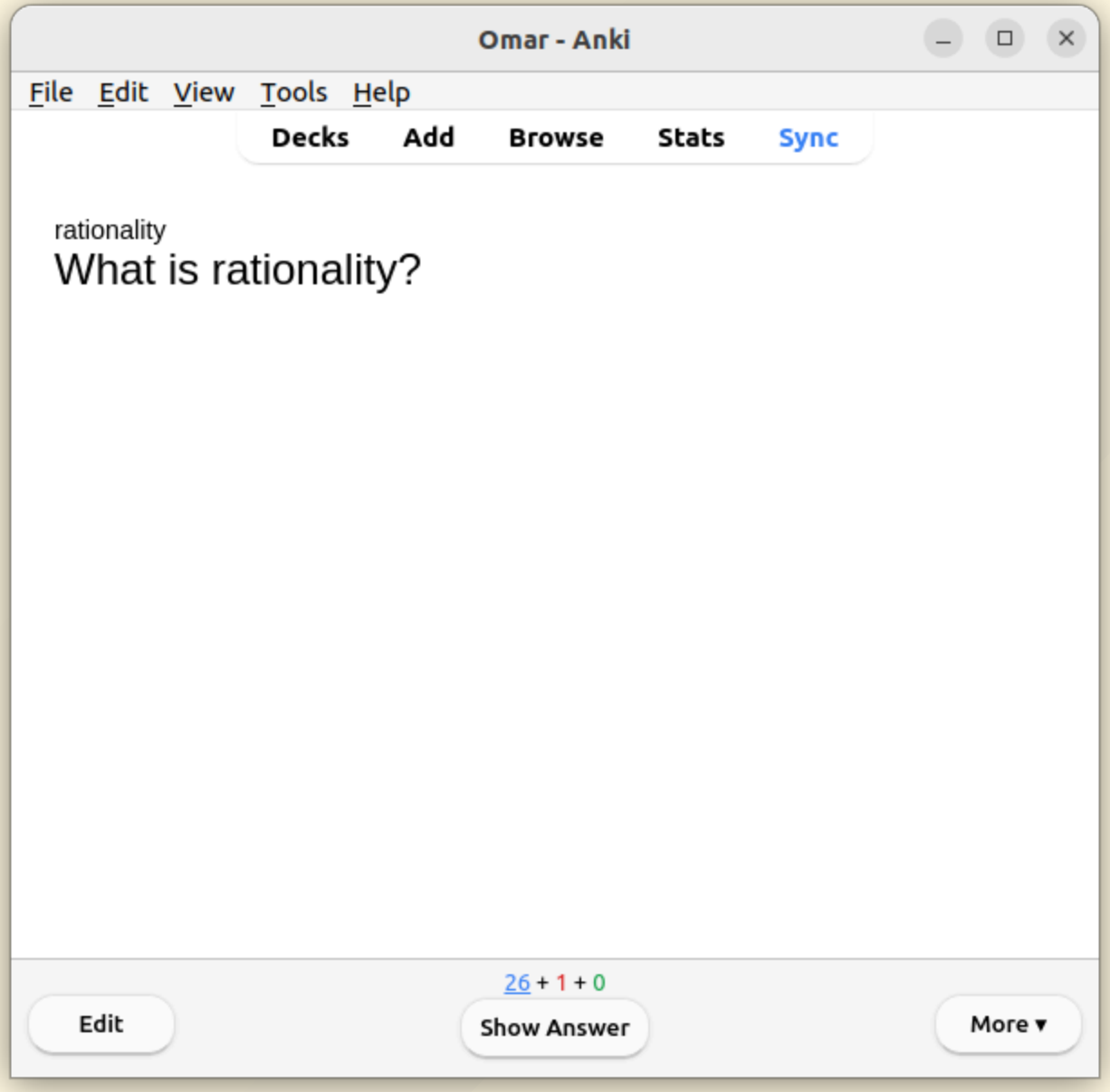
Why Facts Don’t Change Our Minds

https://www.newyorker.com/magazine/2017/02/27/why-facts-dont-change-our-minds

Group discussion

Summary

- Rationality (epistemic and instrumental).
- Some reasoning mistakes to watch out for.
- A technique: Noticing Confusion.
- It's not about perfection, it's about being incrementally *less wrong*.
- Meta-rationality: Explicit reasoning and modelling is ONE tool in your toolbelt.
  - It's very valuable but also expensive (time, energy).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rationality
What is rationality?
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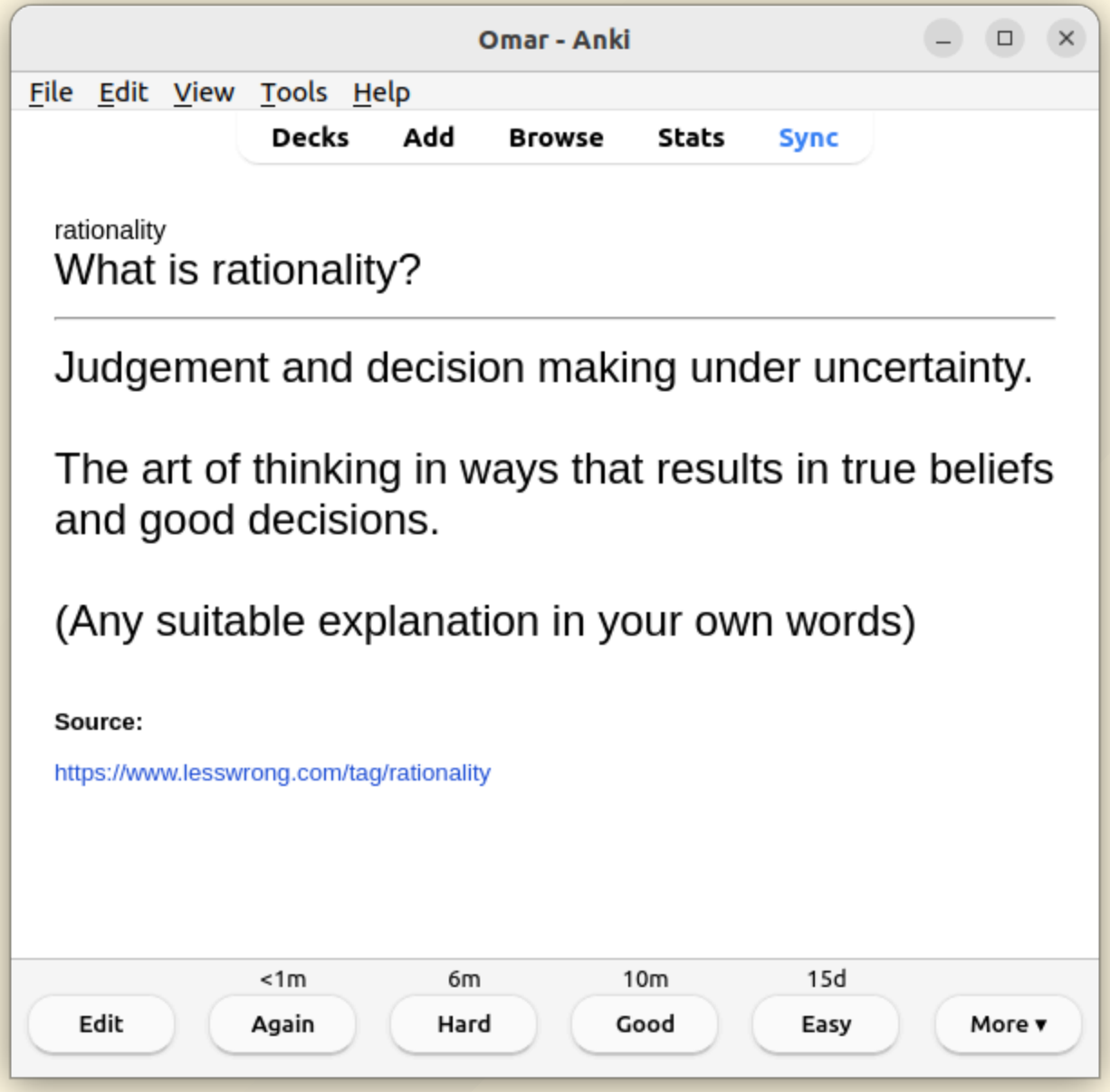
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rationality
What is rationality?
Judgement and decision making under uncertainty.
The art of thinking in ways that results in true beliefs and good decisions.
(Any suitable explanation in your own words)
Source:
https://www.lesswrong.com/tag/rationality
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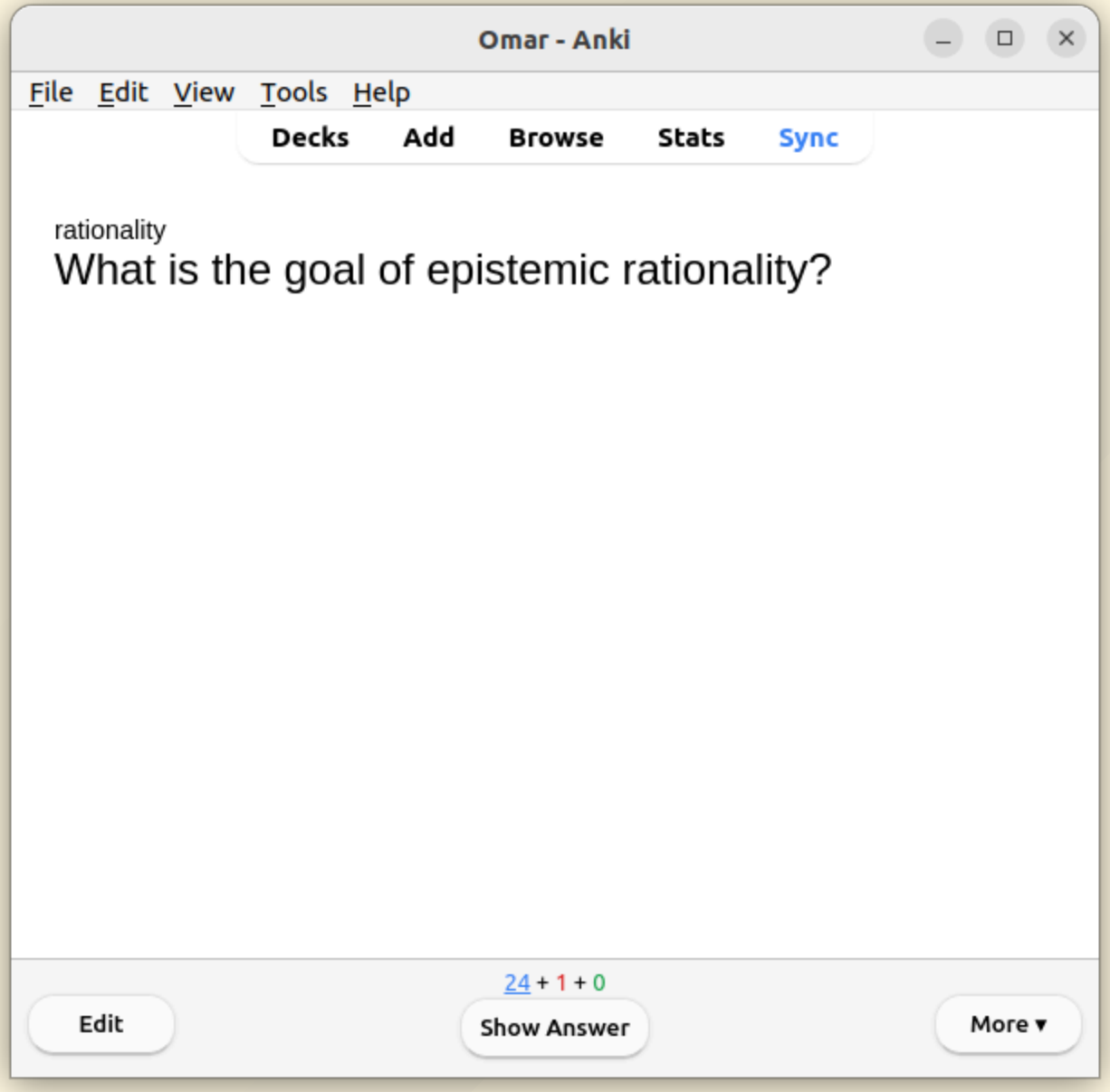
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rationality
What is the goal of epistemic rationality?
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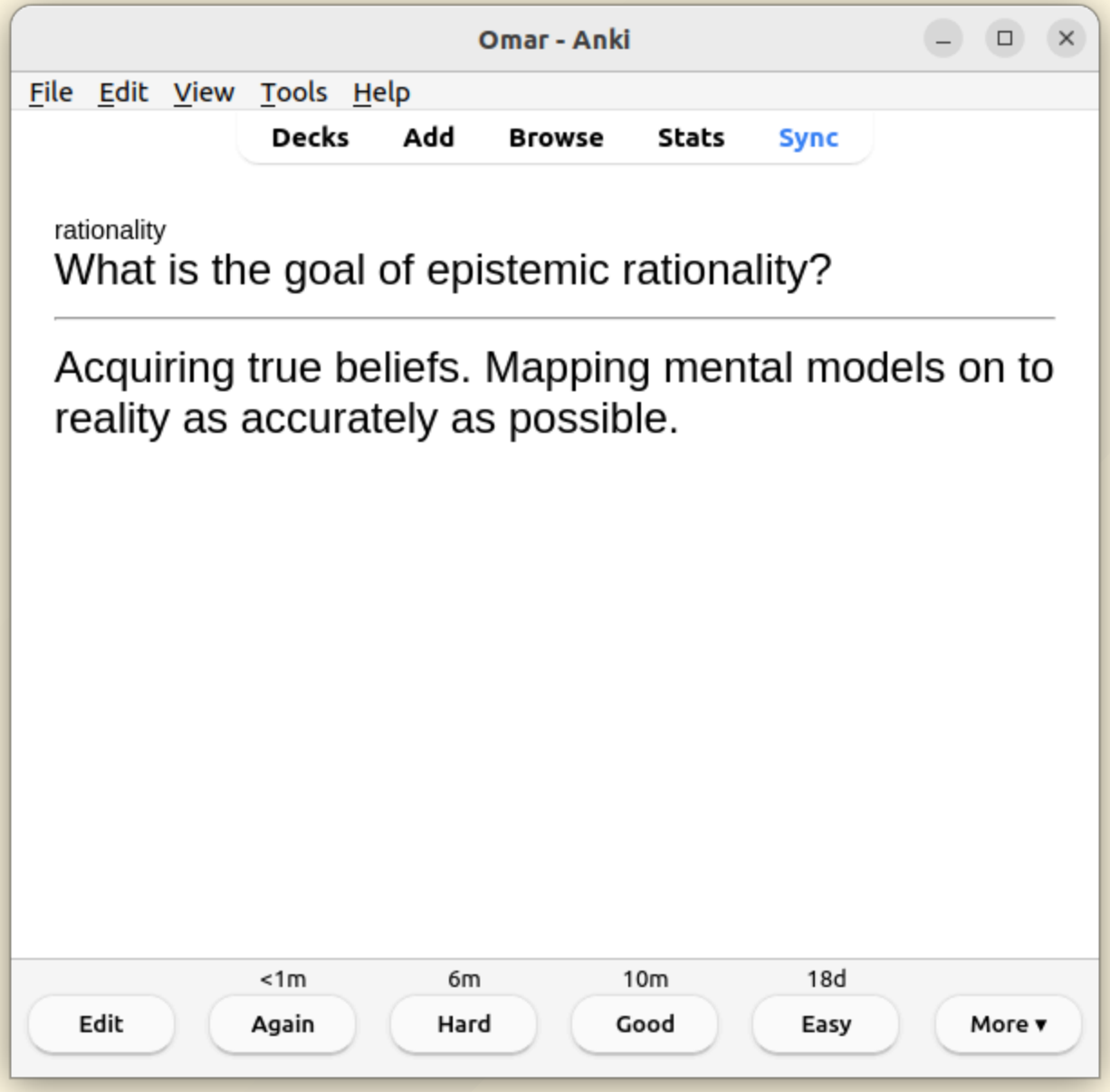
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rationality
What is the goal of epistemic rationality?
Acquiring true beliefs. Mapping mental models on to reality as accurately as possible.
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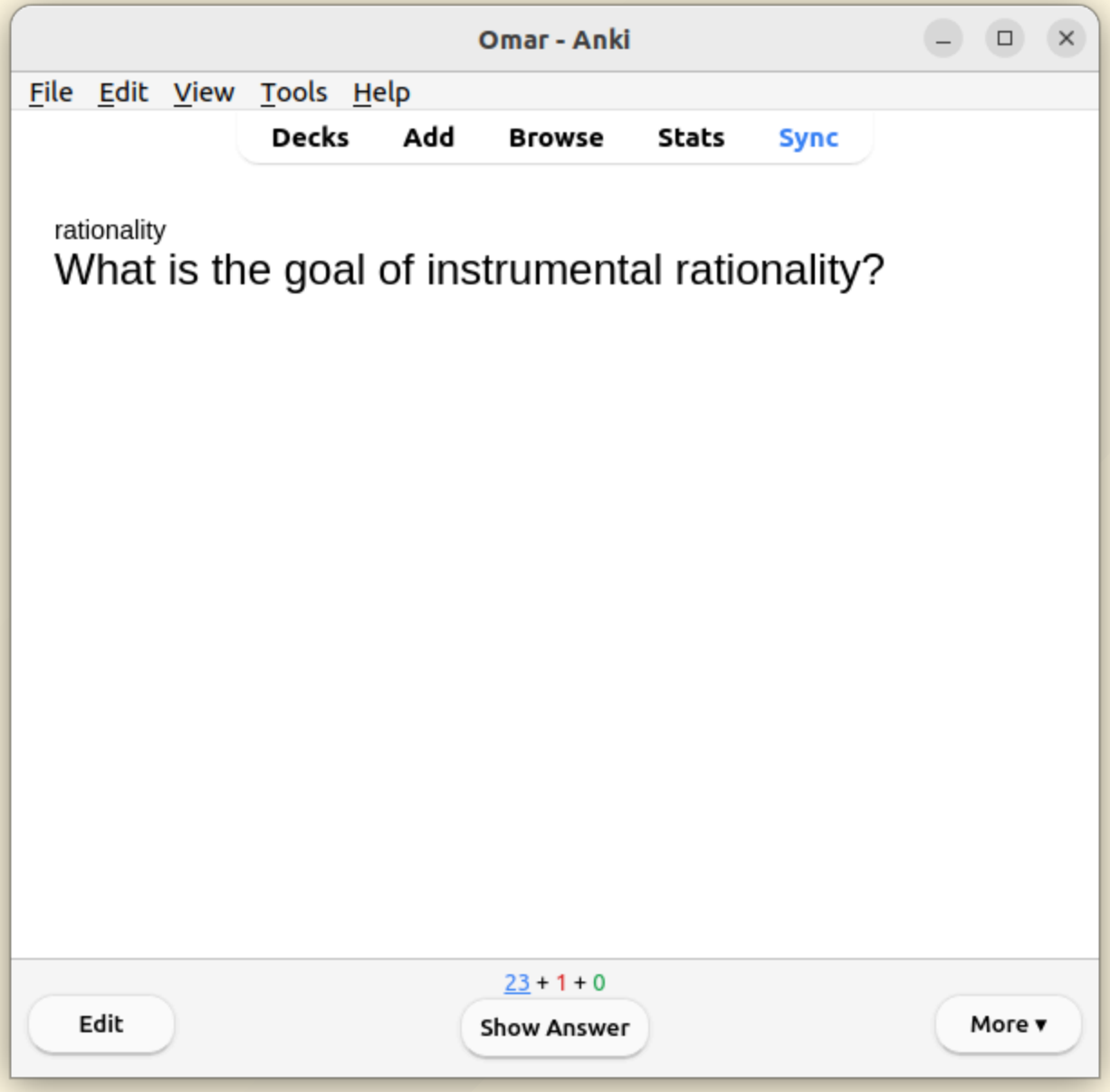
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rationality
What is the goal of instrumental rationality?
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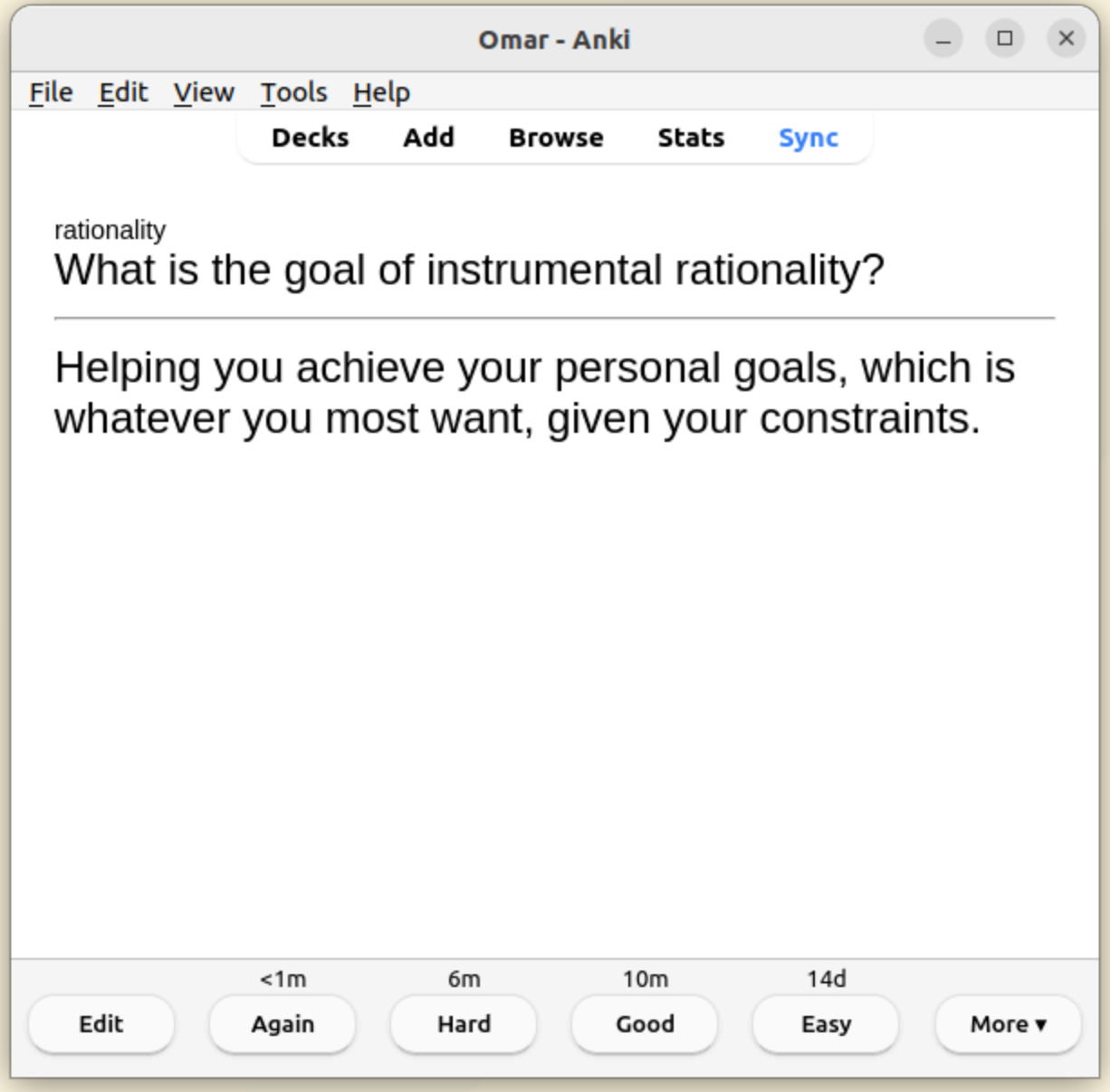
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rationality
What is the goal of instrumental rationality?
Helping you achieve your personal goals, which is whatever you most want, given your constraints.
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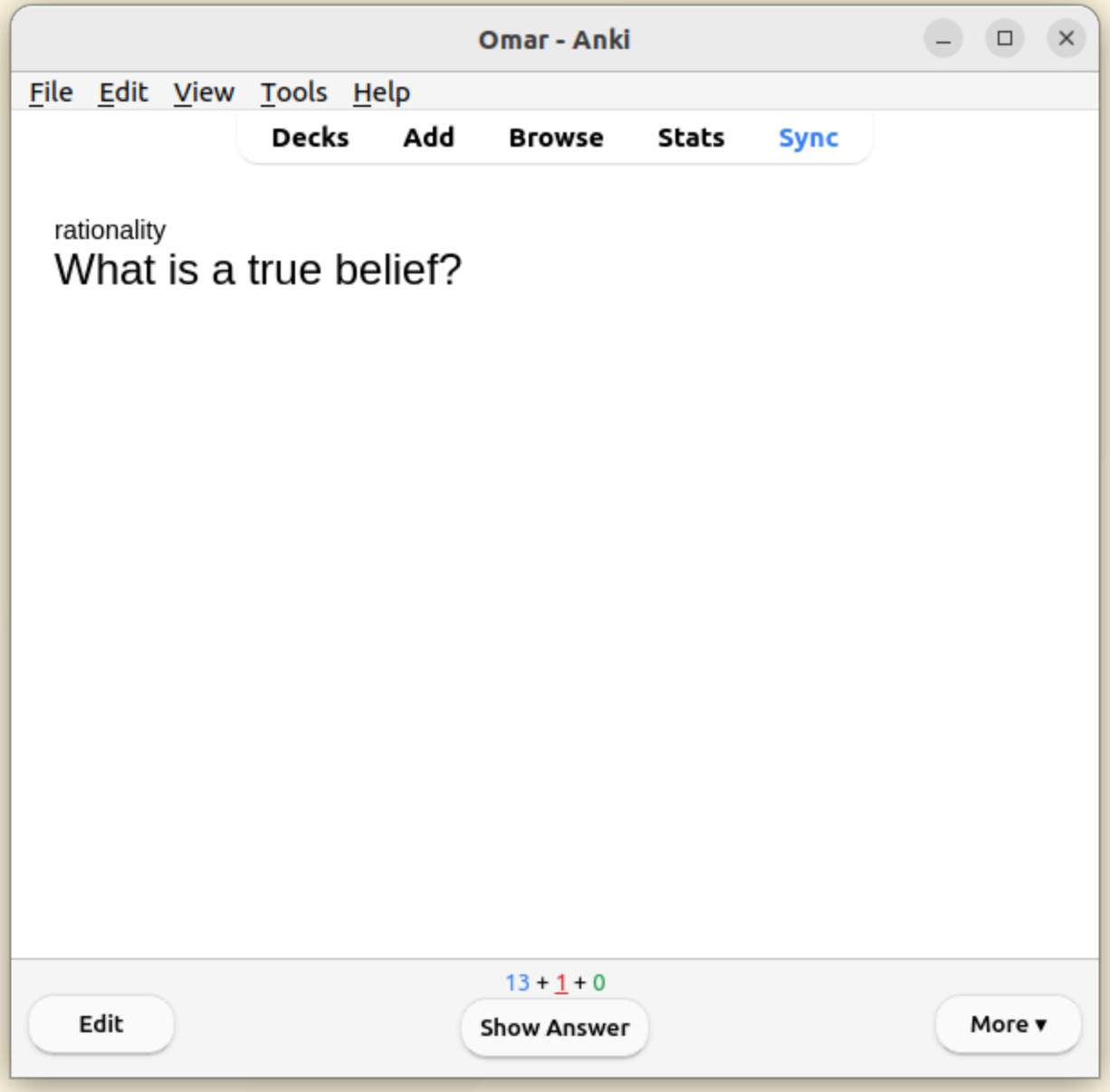
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rationality
What is a true belief?
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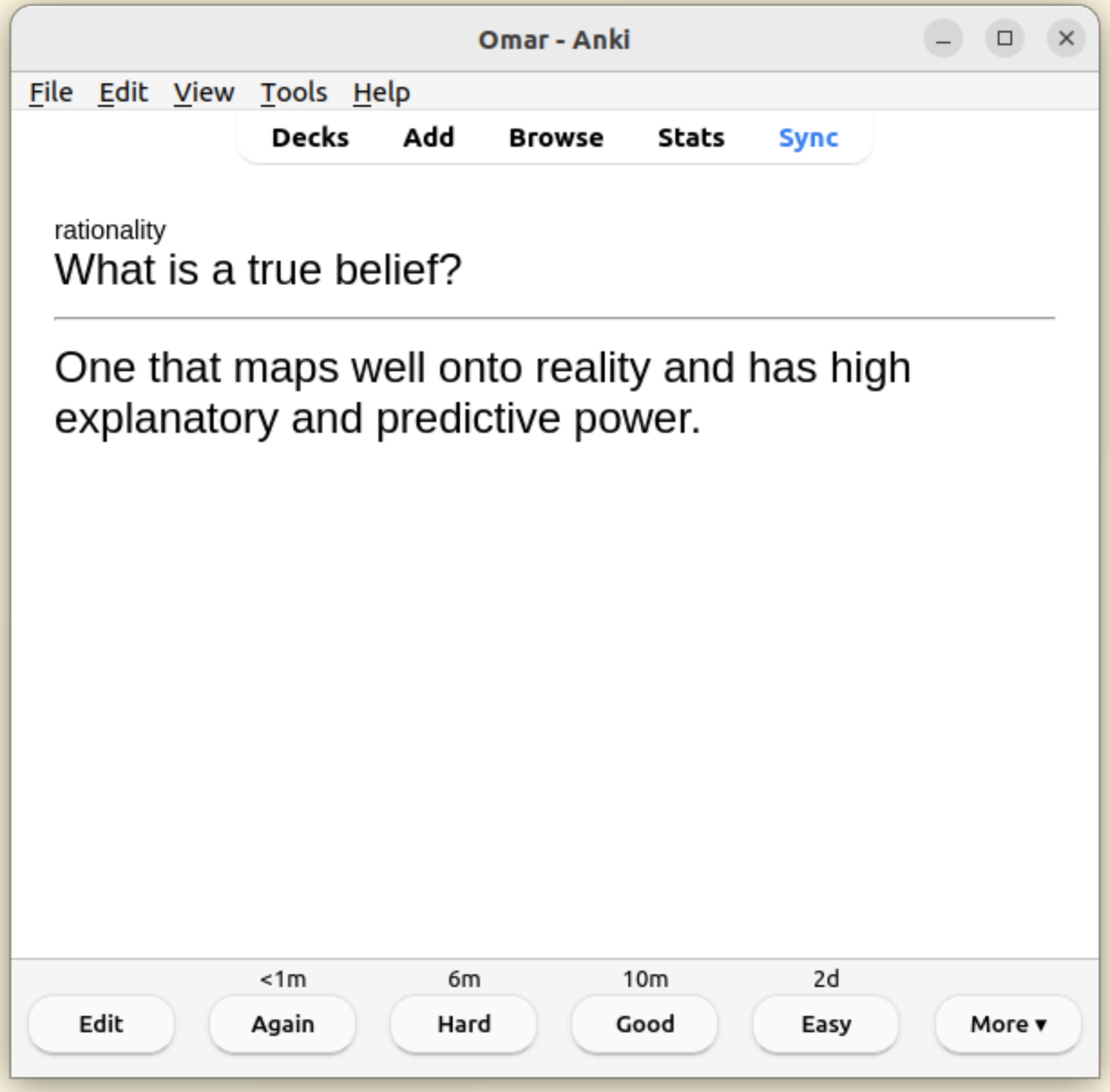
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rationality
What is a true belief?
One that maps well onto reality and has high explanatory and predictive power.
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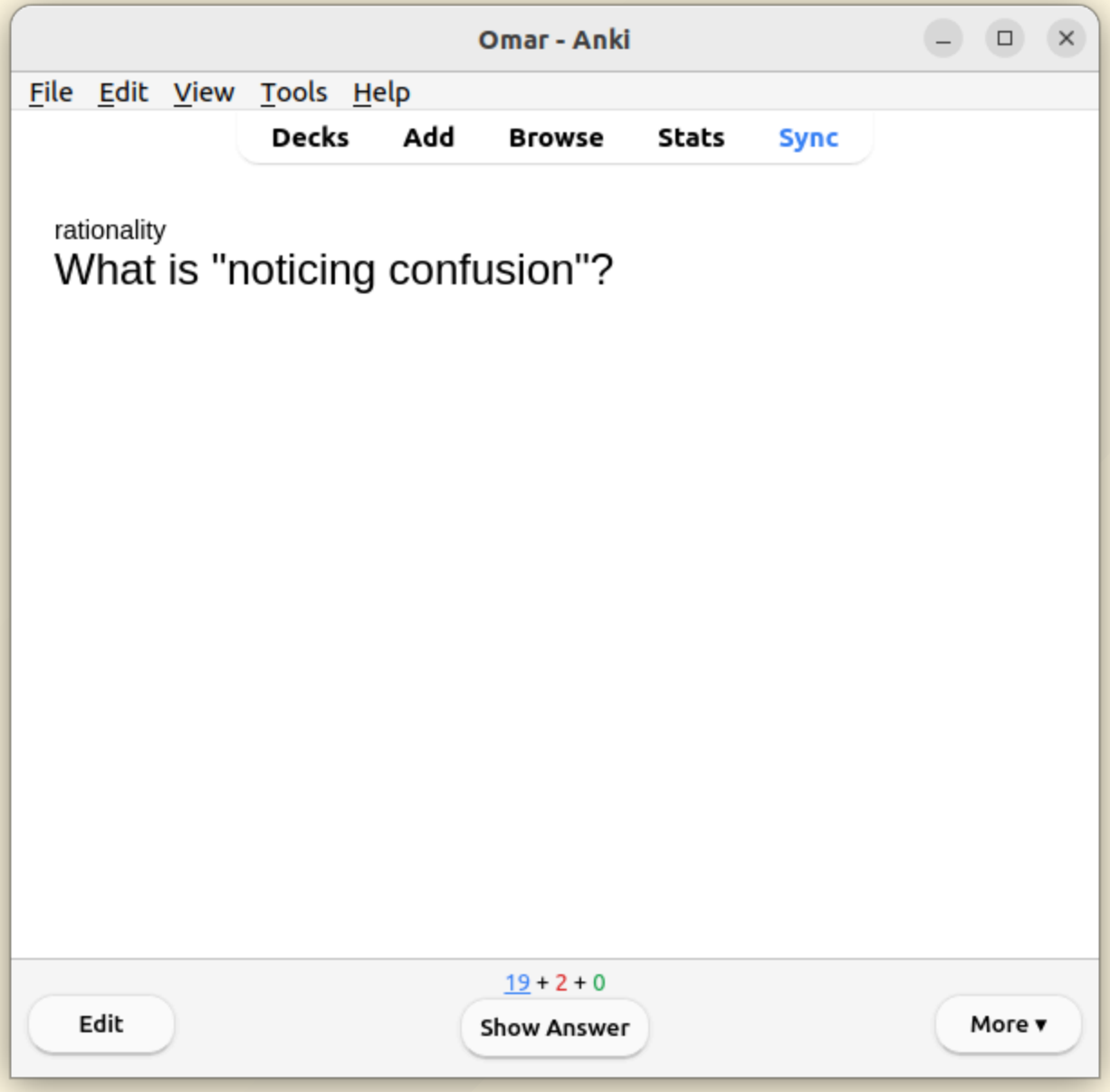
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rationality
What is "noticing confusion"?
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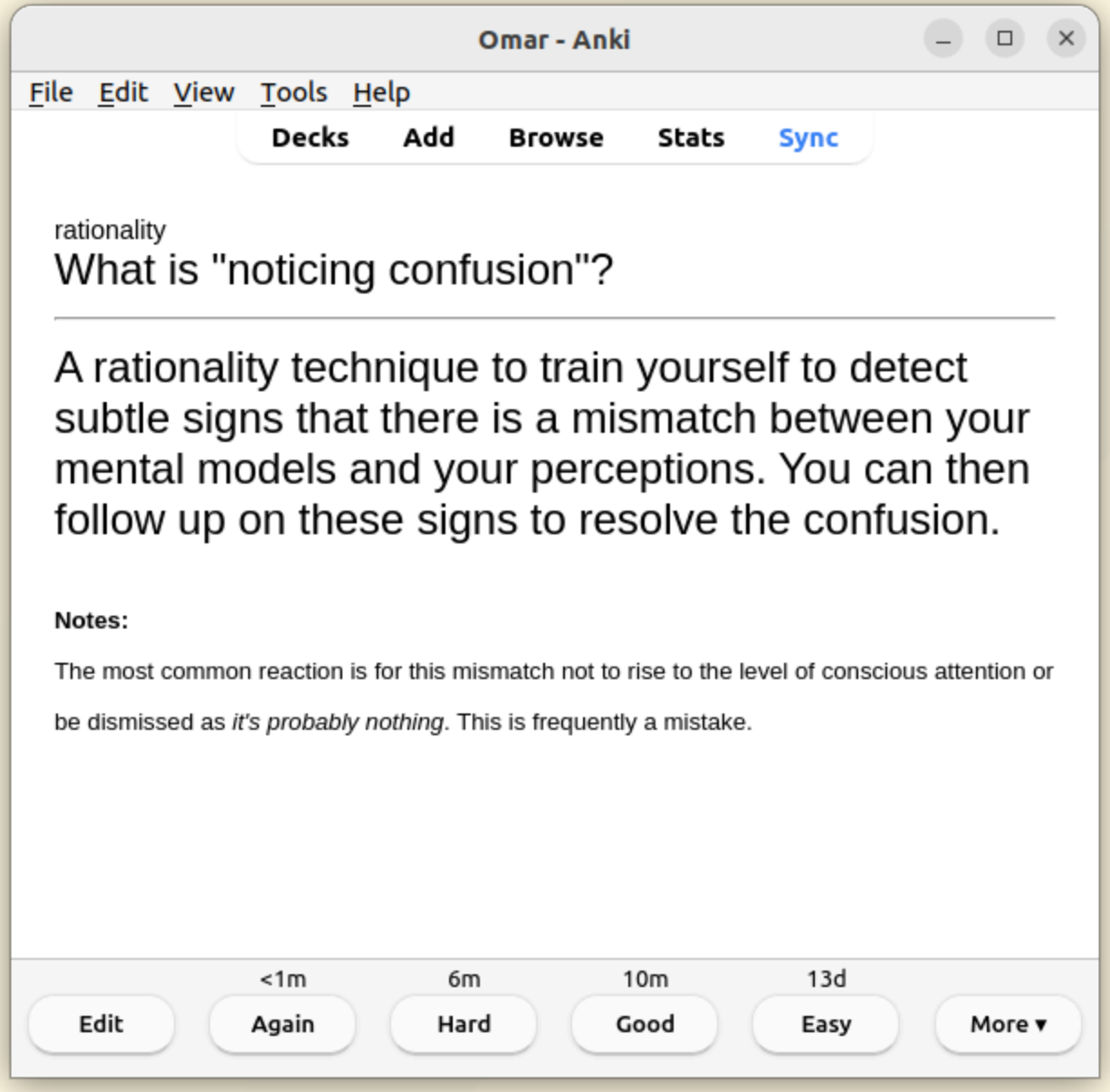
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rationality
What is "noticing confusion"?
A rationality technique to train yourself to detect subtle signs that there is a mismatch between your mental models and your perceptions. You can then follow up on these signs to resolve the confusion.
Notes:
The most common reaction is for this mismatch not to rise to the level of conscious attention or be dismissed as it's probably nothing. This is frequently a mistake.
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rationality
Appeal to ignorance: [...]
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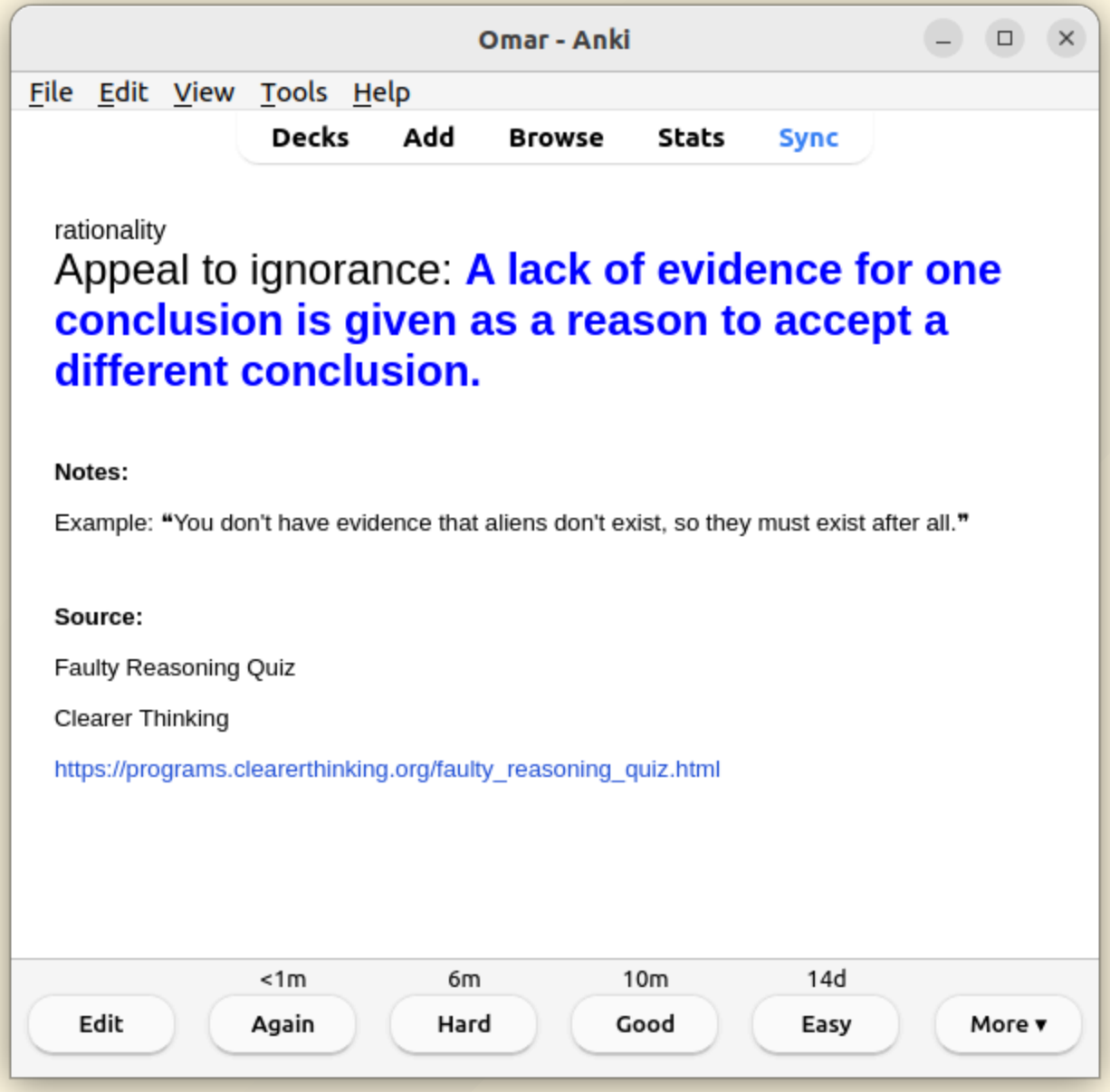
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rationality
Appeal to ignorance: A lack of evidence for one conclusion is given as a reason to accept a different conclusion.
Notes:
Example: "You don't have evidence that aliens don't exist, so they must exist after all."
Source:
Faulty Reasoning Quiz
Clearer Thinking
https://programs.clearerthinking.org/faulty_reasoning_quiz.html
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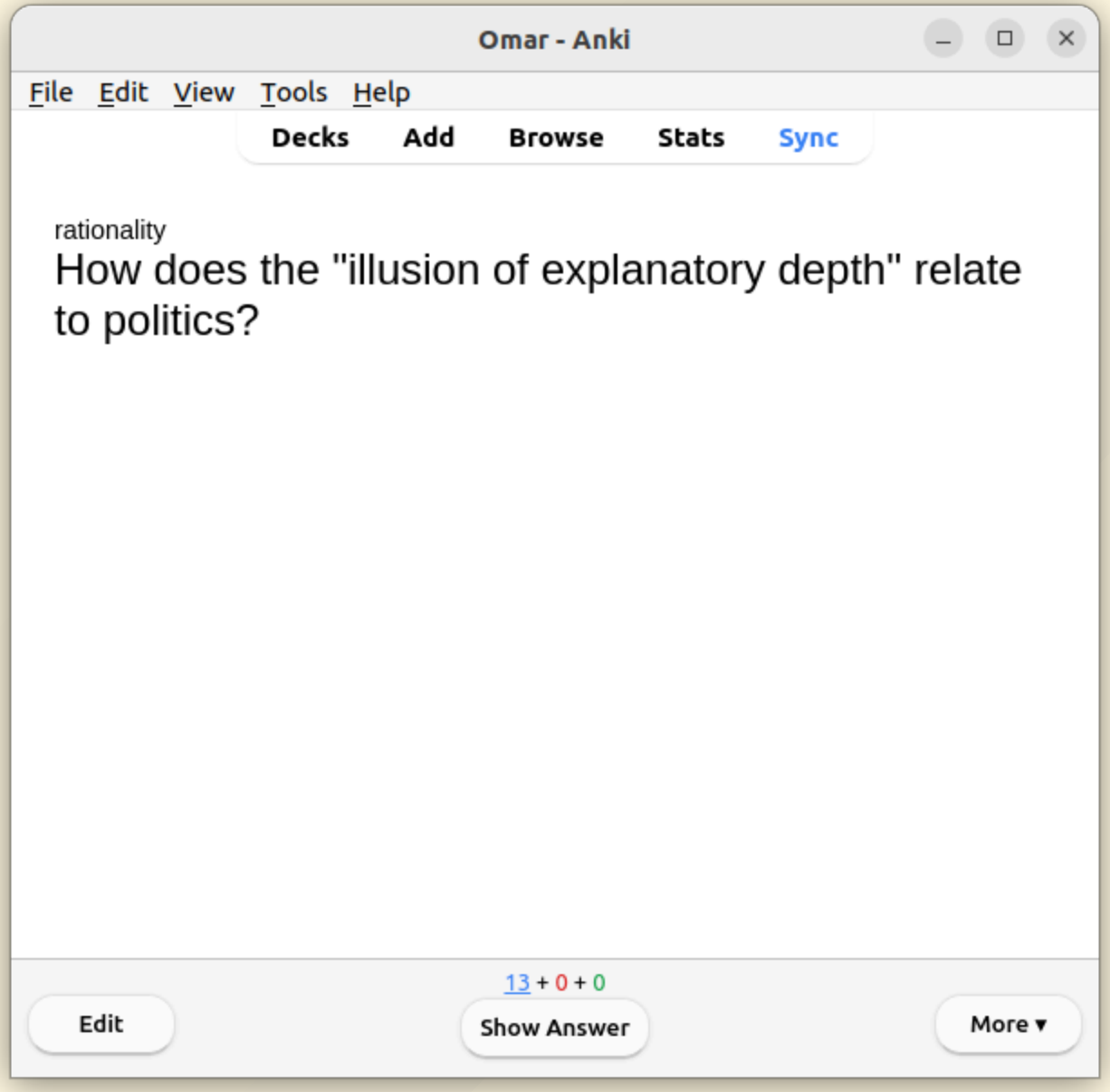
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rationality
How does the "illusion of explanatory depth" relate to politics?
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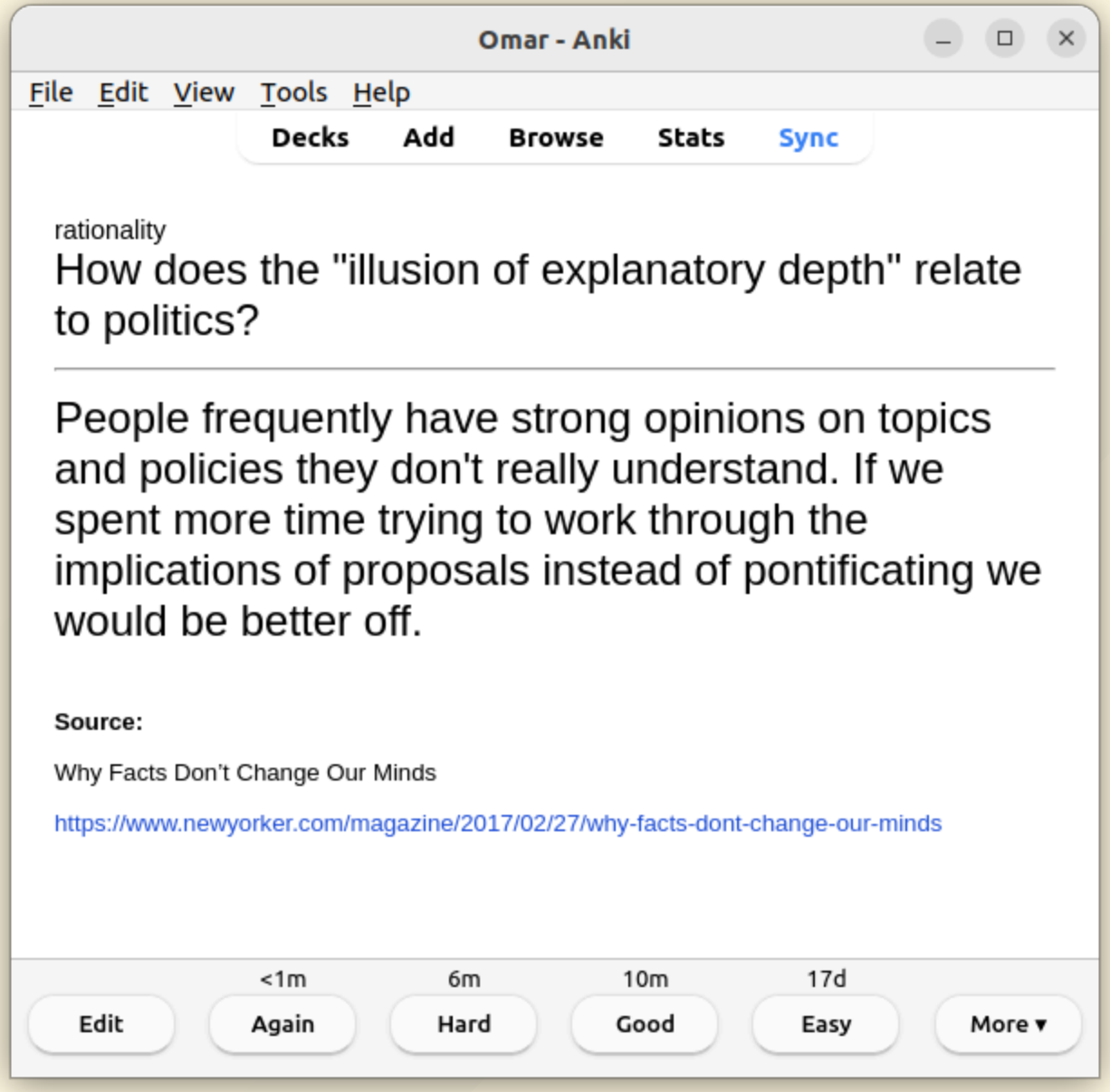
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rationality
How does the "illusion of explanatory depth" relate to politics?
People frequently have strong opinions on topics and policies they don't really understand. If we spent more time trying to work through the implications of proposals instead of pontificating we would be better off.
Source:
Why Facts Don't Change Our Minds
https://www.newyorker.com/magazine/2017/02/27/why-facts-dont-change-our-minds
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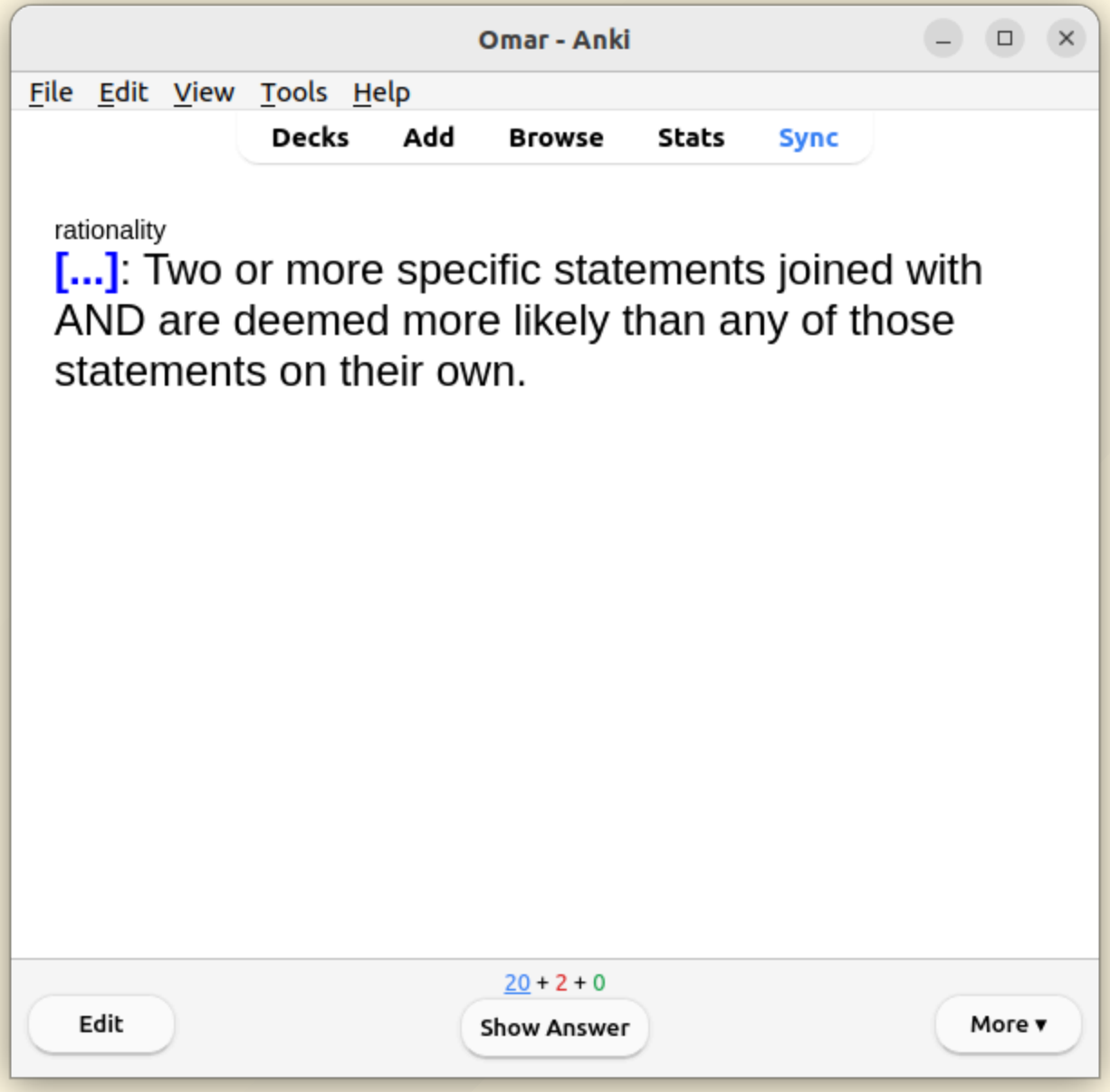
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rationality
[...]: Two or more specific statements joined with AND are deemed more likely than any of those statements on their own.
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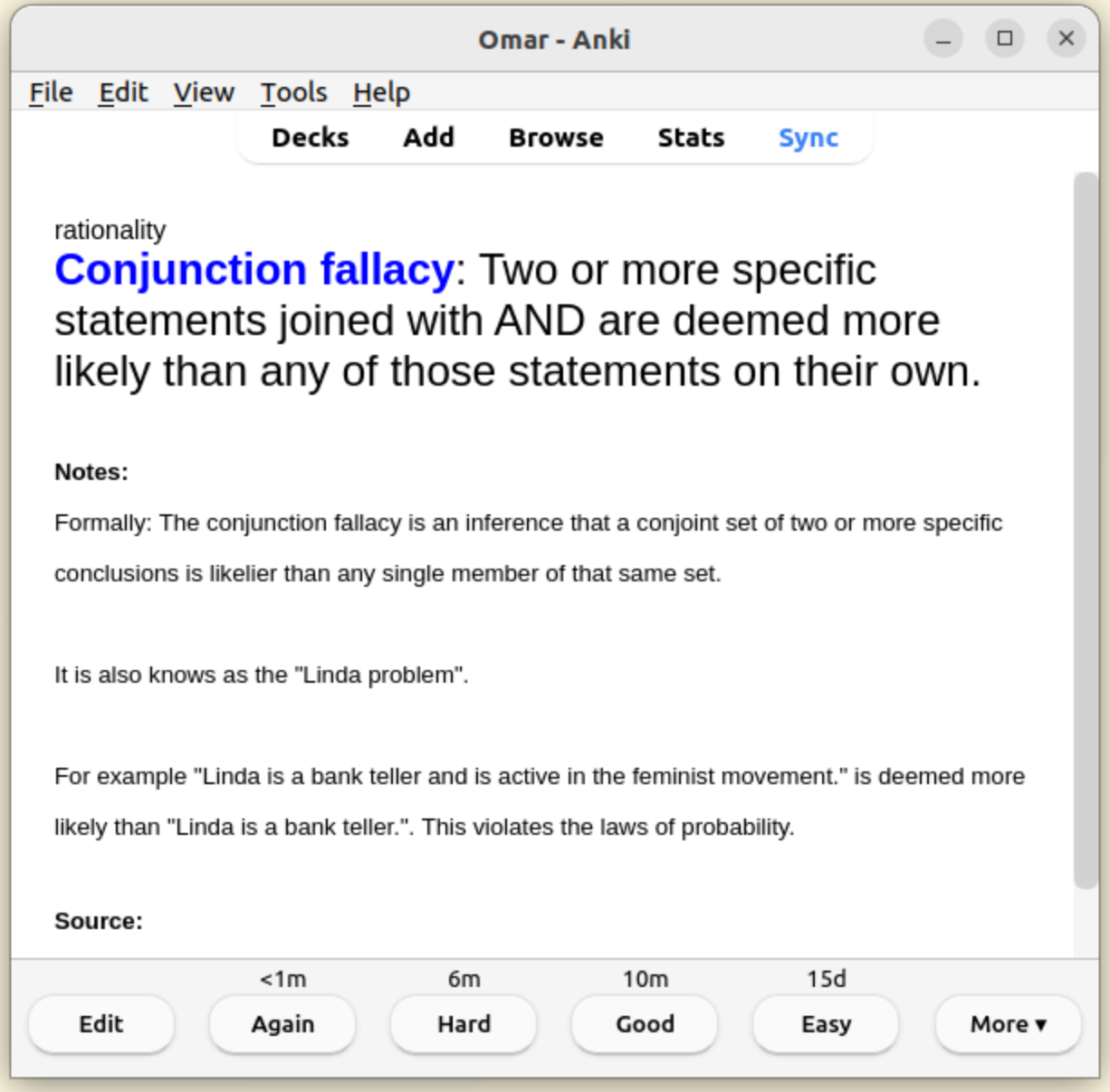
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rationality
Conjunction fallacy: Two or more specific statements joined with AND are deemed more likely than any of those statements on their own.
Notes:
Formally: The conjunction fallacy is an inference that a conjoint set of two or more specific conclusions is likelier than any single member of that same set.
It is also knows as the "Linda problem".
For example "Linda is a bank teller and is active in the feminist movement." is deemed more likely than "Linda is a bank teller.". This violates the laws of probability.
Source:
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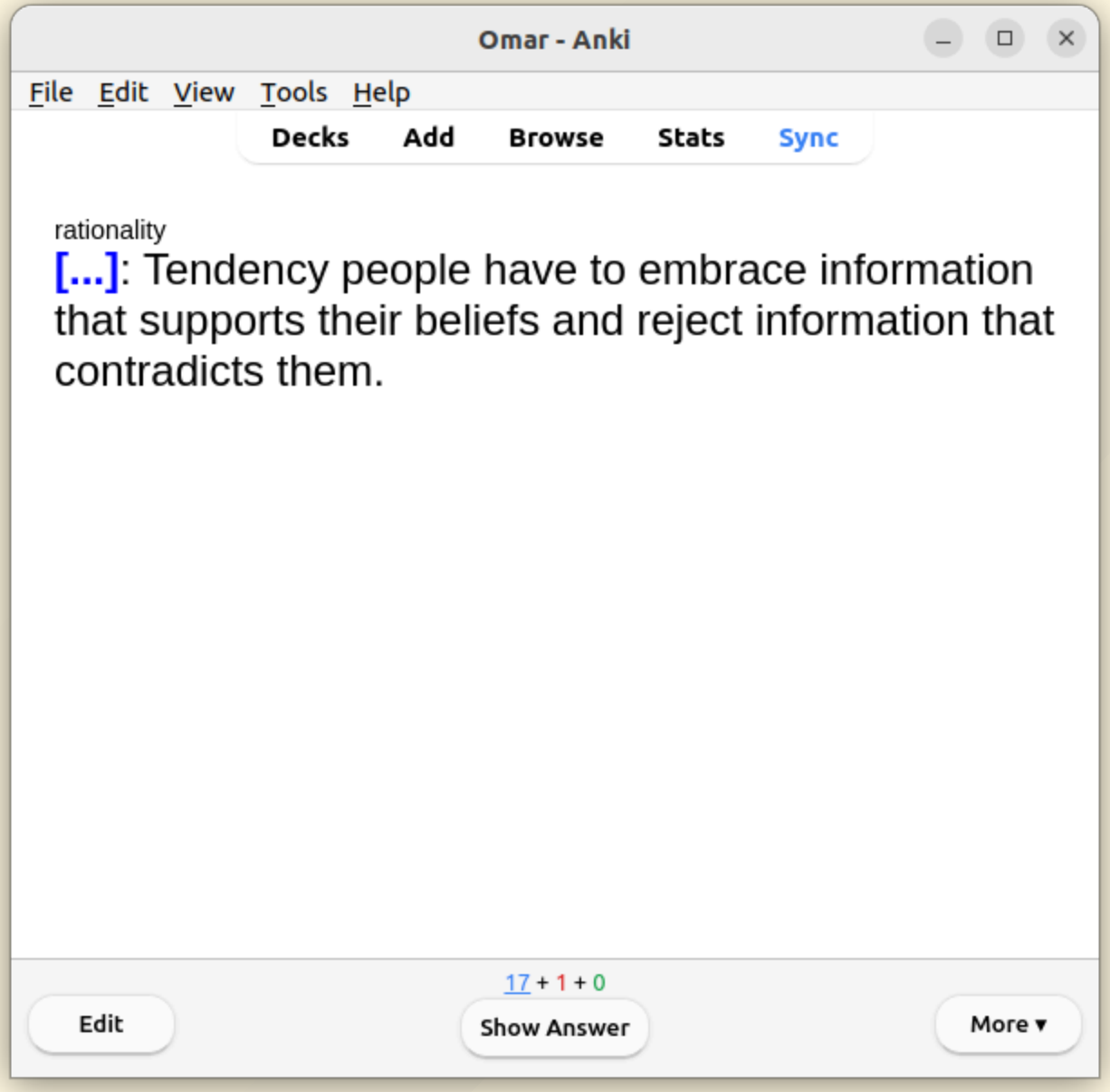
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rationality
[...]: Tendency people have to embrace information that supports their beliefs and reject information that contradicts them.
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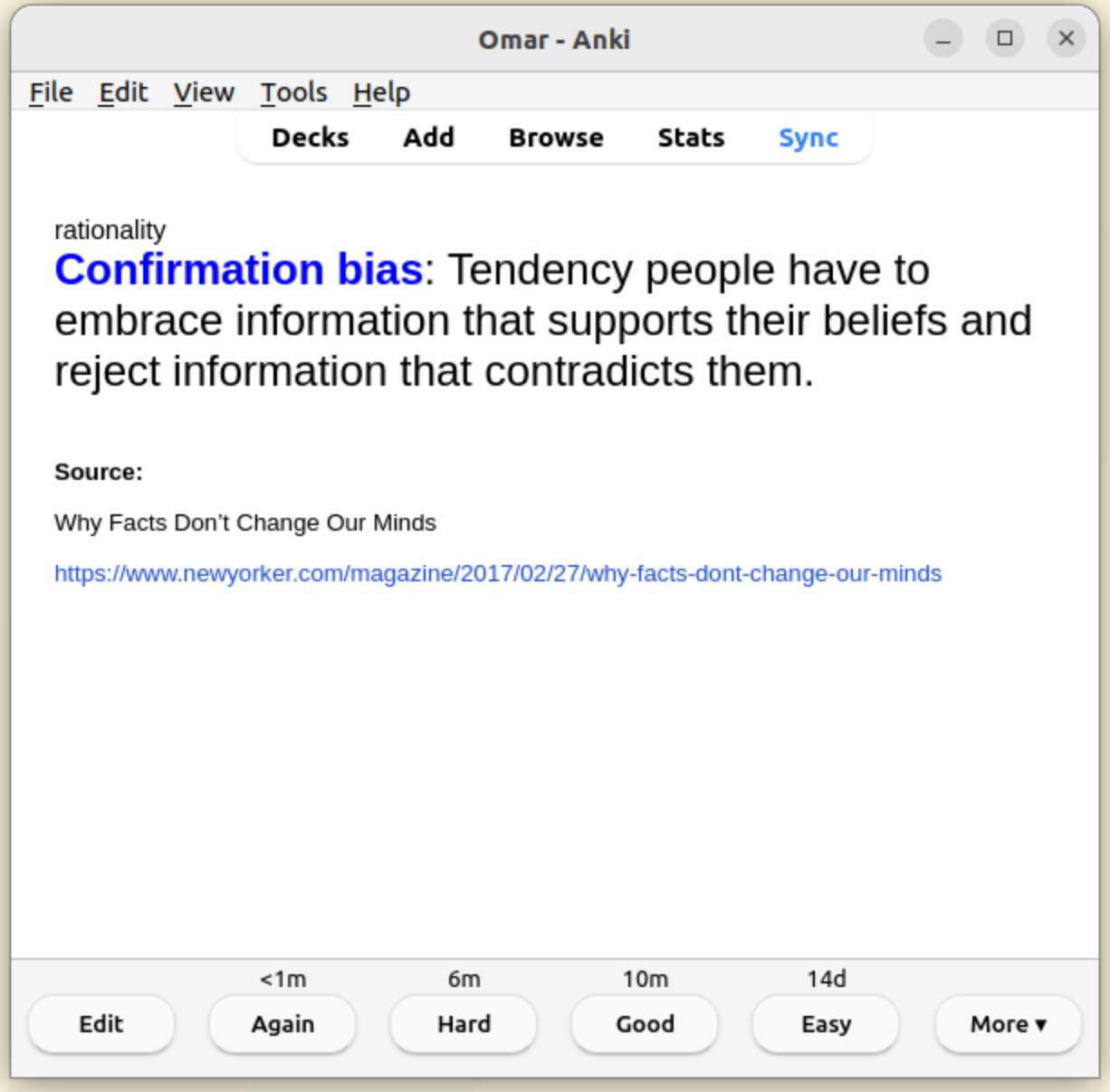
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rationality
Confirmation bias: Tendency people have to embrace information that supports their beliefs and reject information that contradicts them.
Source:
Why Facts Don't Change Our Minds
https://www.newyorker.com/magazine/2017/02/27/why-facts-dont-change-our-minds
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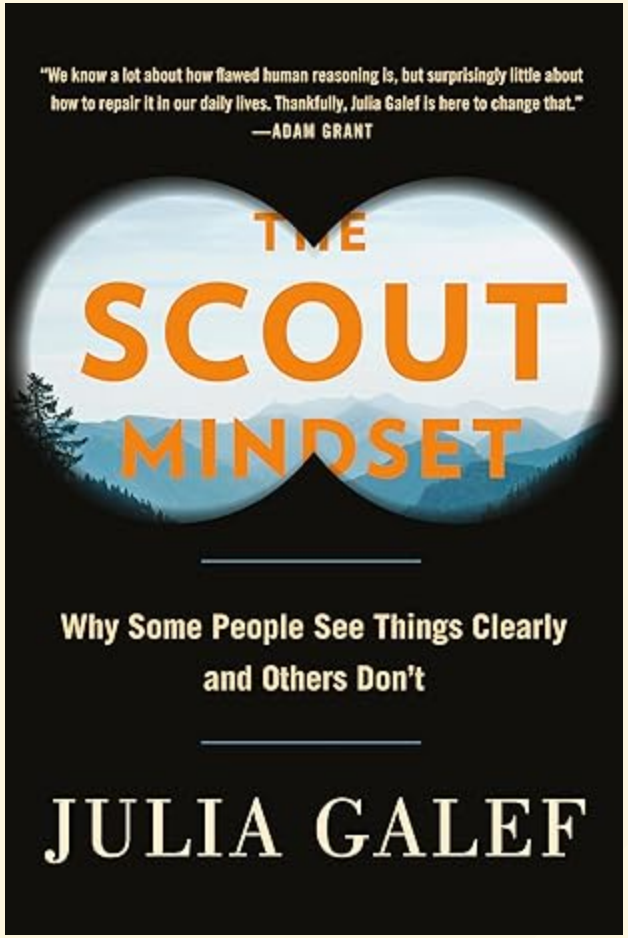
Anki Deck

Anki installation (Windows, macOS, Linux, Android, iOS).

There is an Anki deck with the previous questions and more for you to download on the event page:

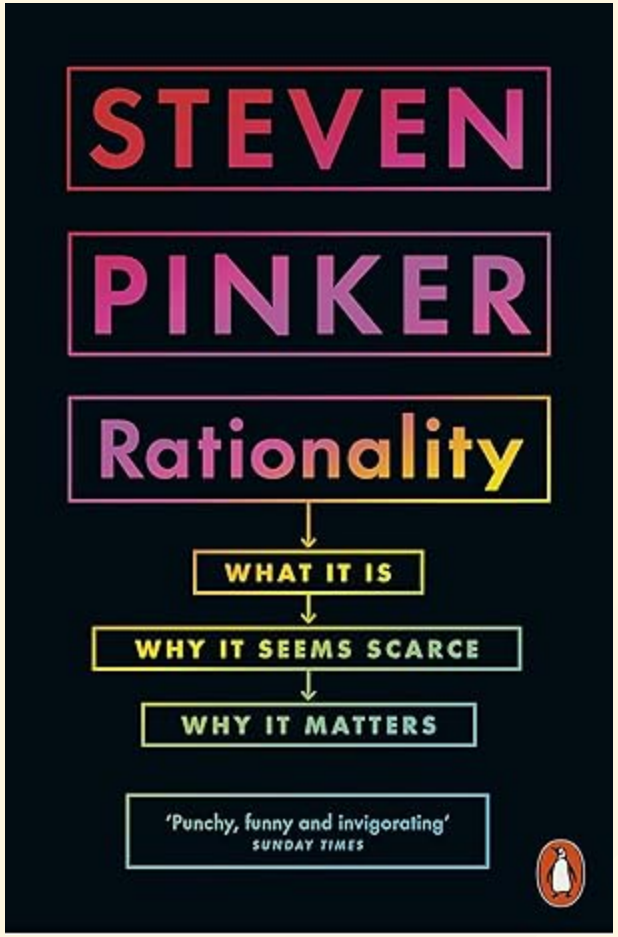
rationality-freiburg.de/events/2025-01-31-rationality-101-part1/

The Scout Mindset



Available as printed book, audio book and ebook in all the usual places.

Rationality



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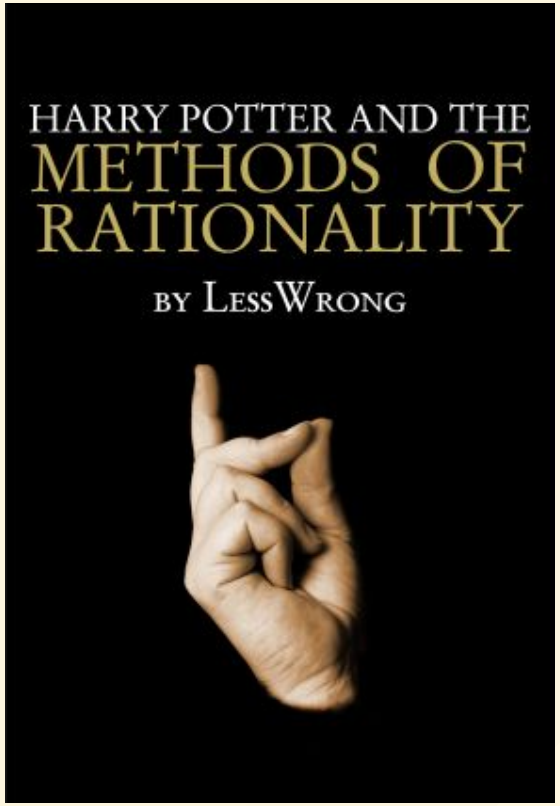
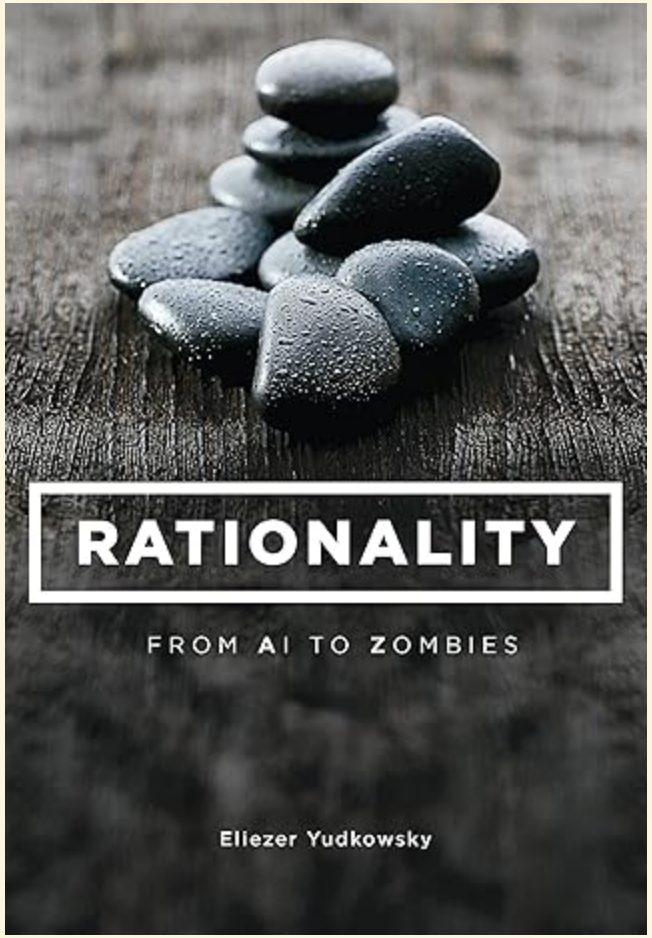
Harry Potter and the Methods of Rationality



- Audio book (Audible)
- hpmor.com

The Sequences



- Rationality: From AI to Zombies on Amazon
  - Printed book
  - Audio book (Audible)
  - Kindle ebook
- readthesequences.com

Clearer Thinking - Podcast & Tools

clearerthinking.org

See you in 2 weeks!

Rationality 101 - Part 2

Friday, February 14th

rationality-freiburg.de/events/2025-02-14-rationality-101-part2/

Newcomer Form

First time at our meetups?

rationality-freiburg.de/nf

Also available in paper form!

Feedback Form

Everyone!

(also newcomers)

rationality-freiburg.de/ff

Also available in paper form!

Sources

- Lily pad: https://pixabay.com/photos/leaves-plants-lily-pads-water-lily-238452/
- Woman smiling: https://pixabay.com/photos/woman-smiling-portrait-outdoors-7175038/
- Swimmer: https://pixabay.com/illustrations/swimming-swimmer-pool-race-athlete-7004451/