

# THE COGNITIVE BIAS CODEX

## What Should We Remember?

To avoid mistakes, we aim to preserve autonomy and group status, and avoid irreversible decisions

To get things done, we tend to complete things we've invested time and energy in

To stay focused, we favor the immediate, relatable thing in front of us

To act, we must be confident we can make an impact and feel what we do is important

## Need To Act Fast

We project our current mindset and assumptions onto the past and future

We store memories differently based on how they were experienced

We reduce events and lists to their key elements

We discard specifics to form generalities

We edit and reinforce some memories after the fact

We favor simple-looking options and complete information over complex, ambiguous options

Source confirmation bias

Confirmation bias

Less-is-better effect

Oscar factor

Conjunction fallacy

Bike shedding effect

Law of triviality

Information bias

Ambiguity bias

Status quo bias

Social comparison effect

Decommissioning

Reactive psychology

System justification

Backdoor effect

Environment effect

Pseudodiscordance effect

Dispositionality effect

Zero-risk bias

IKEA effect

Loss aversion

Generosity effect

Impatience escalation

Hyperbolic discounting

Appeal to novelty

Identifiable victim effect

Pazmanian effect

Risk compensation

Prior justification bias

That's just what I expected

Defensive attribution hypothesis

Activation of prior knowledge

Activation of prior knowledge

Outcome bias

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# **Intro**

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# Intro Poem

- I have read a cool book.
- 
- 
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- I have read a cool book.
- And you should too!
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# Intro Poem

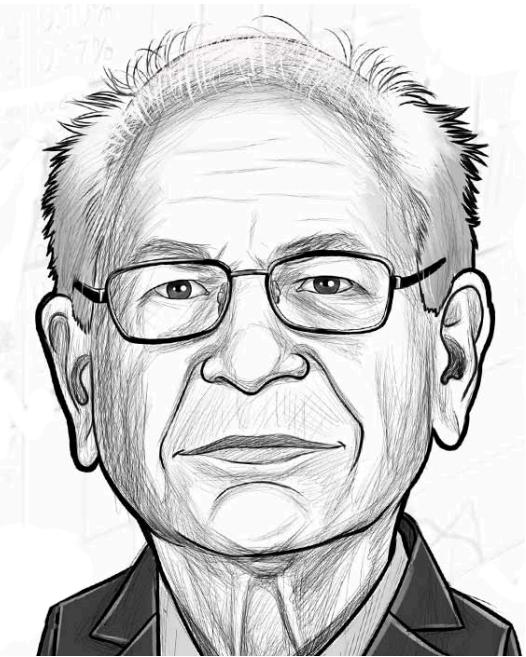
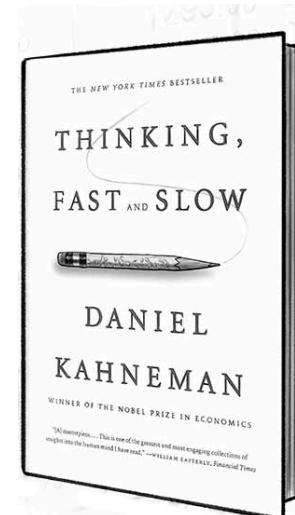
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# Cognitive bias

- Our brain was not made to write software.
- We tend to think of our brain as reliable logical processor.
- Our brain has bugs, which are called ‘Cognitive bias’.
- We focus on how our brain prohibits writing good software.
- I’m qualified for this talk because I do software and have a brain.

# Don't believe me?



# Don't believe me?



Watch your thoughts:

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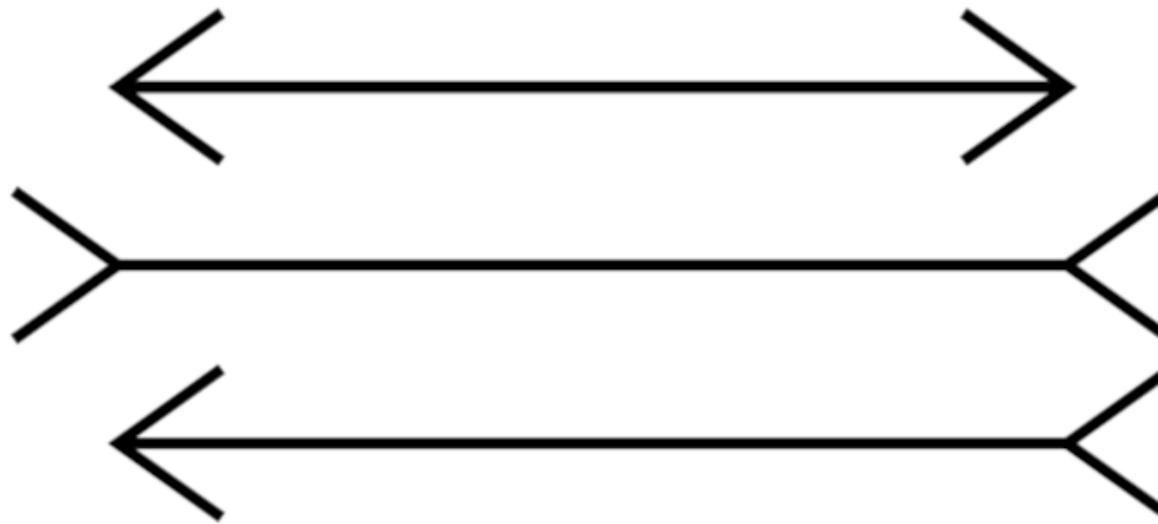
Watch your thoughts:



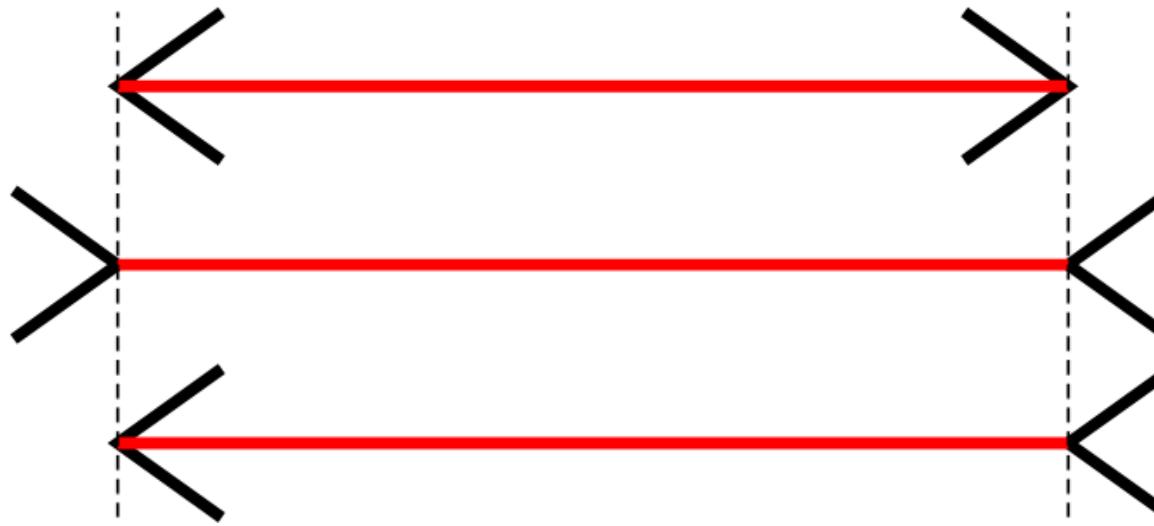
Your brain invented a little story about bananas making you sick without being asked.

Also: You are now more likely to avoid bananas for some time subconsciously.  
Congratulations!

# Which is the longest line?

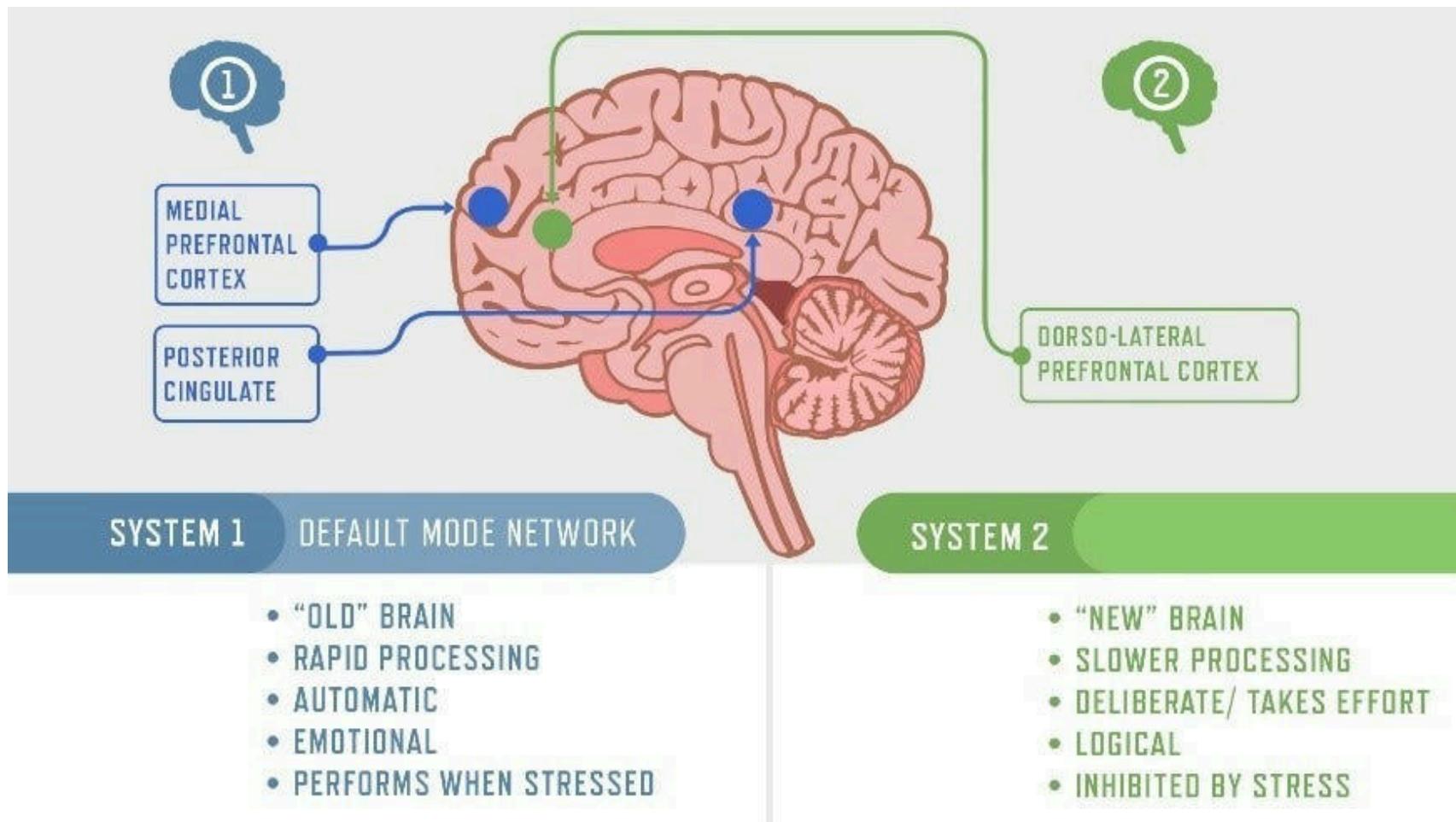


# Which is the longest line? (fixed)



Even if you know, you can't see it.

# THE CAT



# Intelligence vs Rationality

*“Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in antinuclear demonstrations.”*

# Intelligence vs Rationality

*“Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in antinuclear demonstrations.”*

**You have 5 seconds. Which is more likely?**

1. Linda is a bank teller.
2. Linda is a bank teller and is active in the feminist movement.

**Raise left hand for 1, right for 2.**

# Framing

*The way of presentation of information influences how it is perceived.*

- Patients like Jon commit crimes with a probability of 10%.
-

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**Option 2 was considered way more dangerous by psychological practitioners.**

- $2 + 2$
- 
-

- $2 + 2$
- $21 \cdot 13$
-

- $2 + 2$
- $21 \cdot 13$
- $77 + 33$

# Agenda

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1. Intro
2. Agenda
3. Priming
4. Cargo Cult
5. Shiny Object Syndrome
6. Anchoring
7. Overconfidence
8. IKEA effect
9. Sunken Cost Fallacy
10. Curse of knowledge
11. Bikeshedding
12. Outro

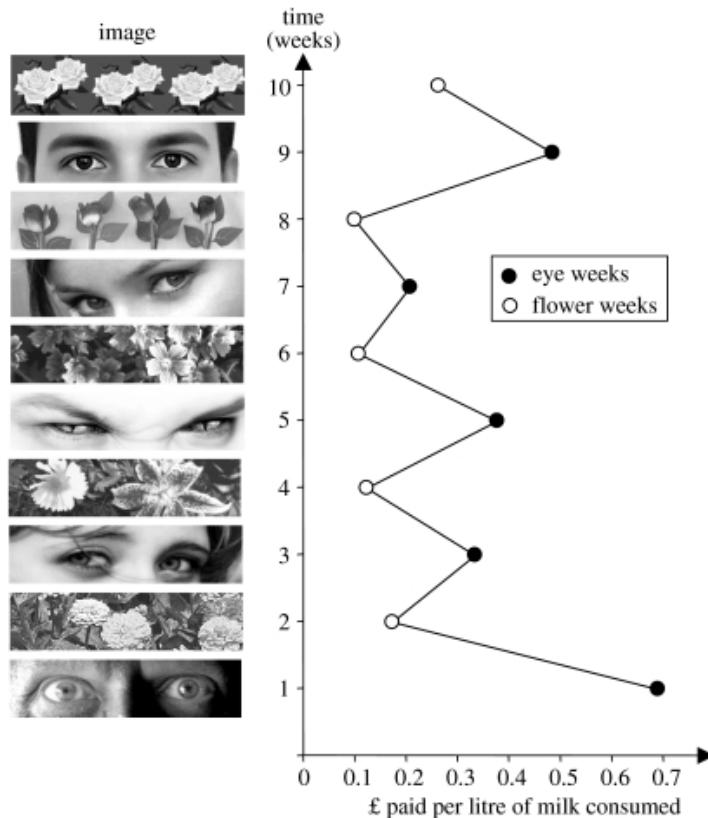
3 slides per cognitive bias:

- Experiment (Quiz, Story time, ...)
- Explanation
- Effect

# Priming

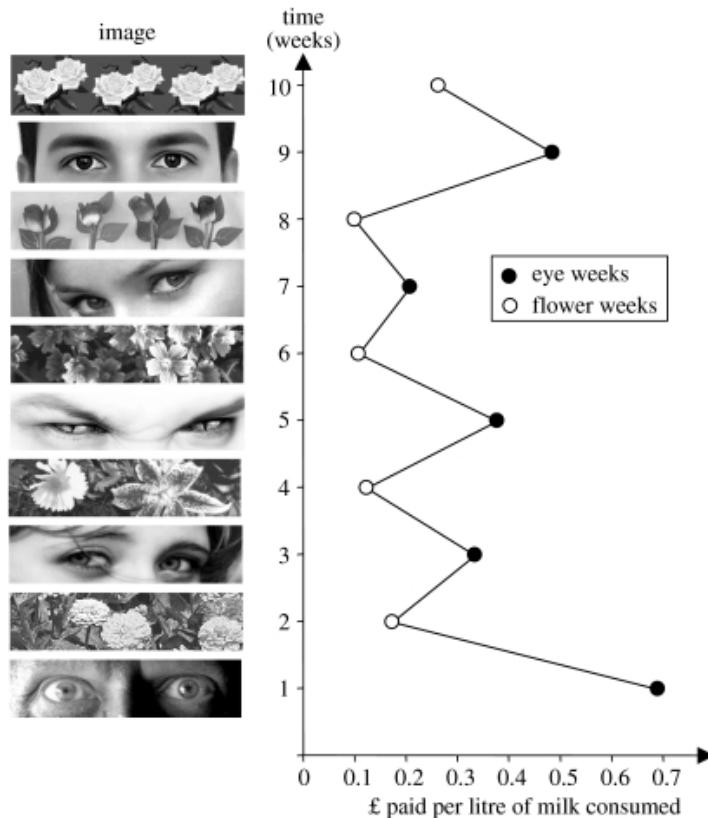
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# Experiment



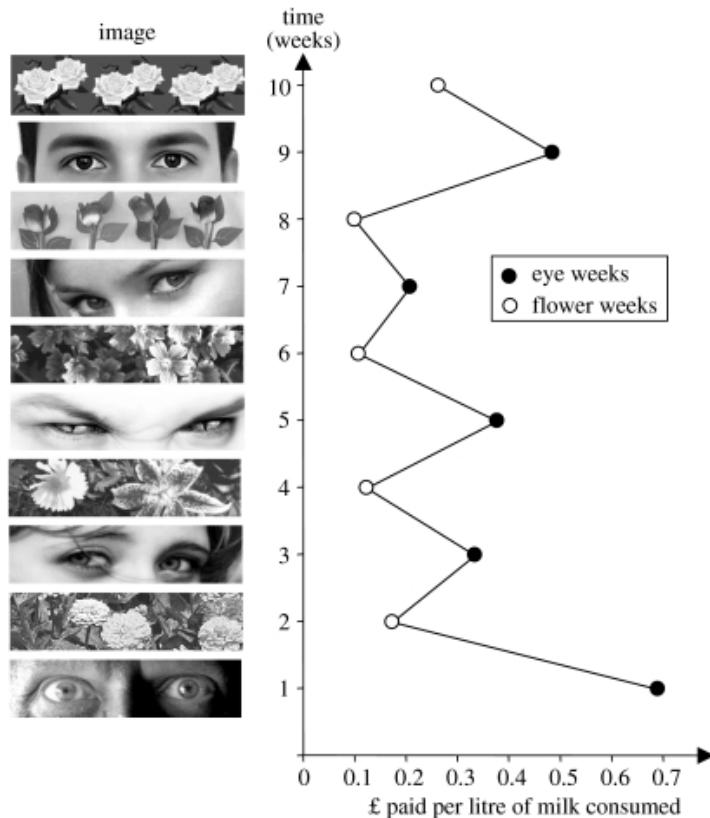
- A trust fund for coffee milk in office.
- 
-

# Experiment



- A trust fund for coffee milk in office.
- Amount of £ was based on trust.
-

# Experiment



- A trust fund for coffee milk in office.
- Amount of £ was based on trust.
- Images on the left was put above the £ box & changed weekly.

# Explanation

- Feeling watched changes our behavior.
- 
-

# Explanation

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# Explanation

- Feeling watched changes our behavior.
- Thinking of happy moments improves our mood.
- Thinking of money makes us more greedy.

# Effect

TODO:

- errors?
- pre-mortem? Prime yourself about errors before they happen.

# Cargo Cult

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# Cargo Cult: Story



# **Cargo Cult: Explanation**

Doing rituals in the hope of gaining a benefit without understanding what leads to the benefit.

For Software: Usually emulate successful software houses.

# **Cargo Cult: Effect**

- Copy & Paste solutions that worked elsewhere without understanding. (Use your brain, Luke!)
- Fixing applications by “Shotgun debugging”.
- Applying tools like k8s - because Google uses it.
- Applying patterns (e.g. GoF) without limit.

# **Shiny Object Syndrome**

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# Experiment



# Explanation

- New and exciting things release Dopamine.
- Applies to...
  - ▶ ...choosing new technology.
  - ▶ ...distractions in projects.
  - ▶ ...trends.



# Effect

- Use well-tested & renowned software.
- Strategy first and stick to it.
- Get used to be skeptic about new technology:
  - ▶ Does it solve an actual problem?
  - ▶ Can the technology improve software quality and reduce complexity?
  - ▶ Can I understand the new technology?
  - ▶ Do not ask: “Does it make my life easier?” or “Is it cool?”
- **Opposite:** Status Quo Bias.
- **Bonus:** Zero risk bias

# Anchoring

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# Anchoring: Experiment

- Divide in two groups!
- Answer the question below, but

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**How high is the Eiffel tower? Is it higher than 1000m?**

# Anchoring: Experiment

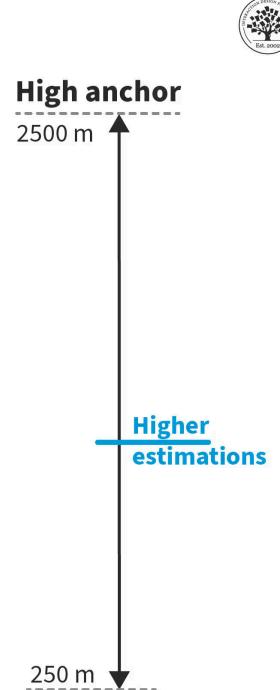
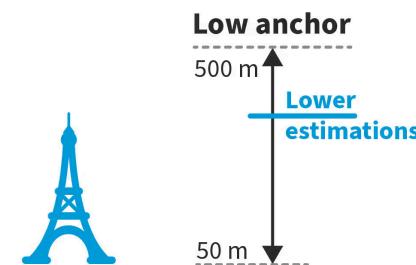
- Divide in two groups!
- Answer the question below, but

**How high is the Eiffel tower? Is it higher than 100m?**

# Anchoring: Explanation

- We initially imagine something.
- The initial image is the anchor.
- We iterate until we feel happy about our guess.

## Anchoring Effect



Interaction Design Foundation  
[interaction-design.org](http://interaction-design.org)

# Anchoring: Effect

## Dangers:

- Effort estimations.
- Fixation on initial ideas.
- Dark patterns in frontend.

## Bonus: Affinity Bias.



# **Overconfidence**

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# Story

- Dunning Kruger
- Cognitive Dissonance.
- Illusory superiority
- Worse-than-average-effect (for very hard tasks)

# Explanation

- People with the required skill do not have the ability to judge themselves.
- The value of a skill is often not recognized.
- A positive self-image has positive effects on mental health.
- Cognitive Dissonance
- Recognizing the own incompetence is required for growth.

# Effect

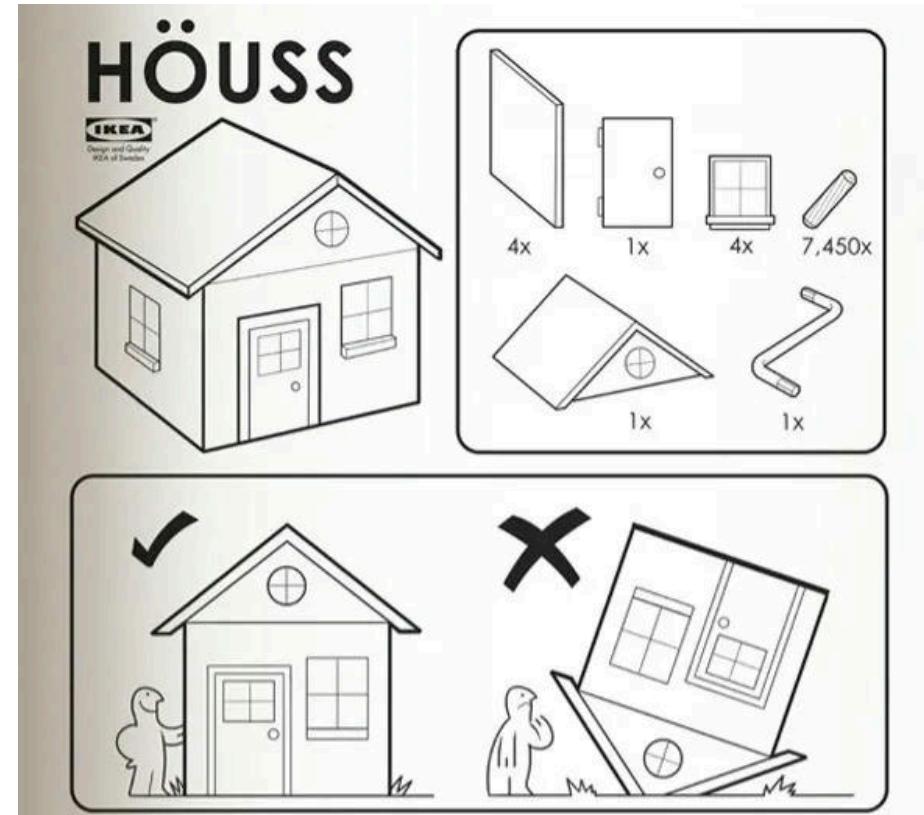
- If you feel like you are lacking, it might be a good sign!
- Force overconfident people to explain.
- Don't write code that overloads your brain.

# IKEA effect

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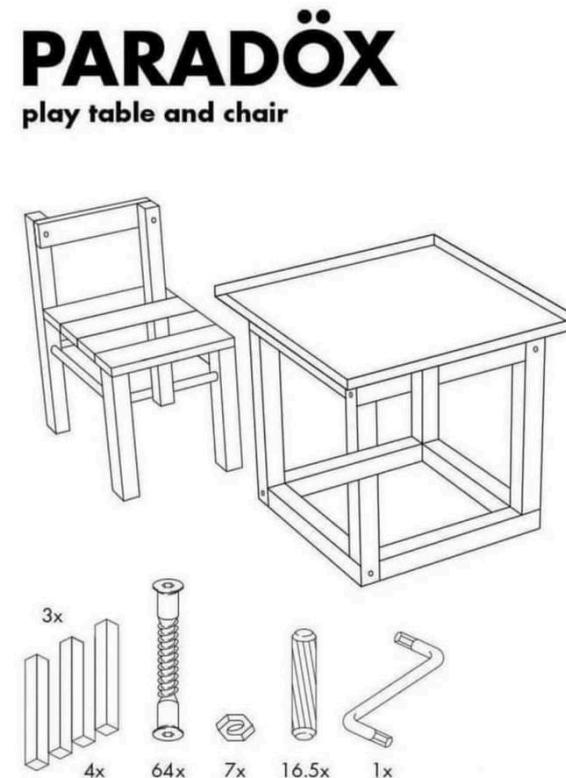
# Story

- Goods are more valued if they are build by themselves.
- Even if done partially only.
- Even if done poorly!



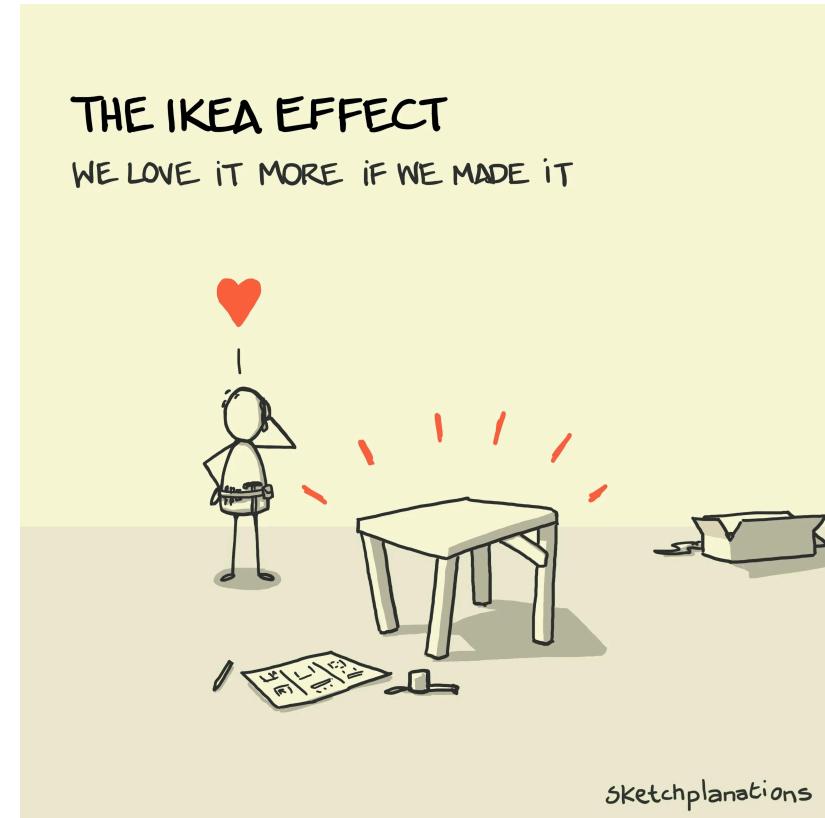
# Explanation

- Building something makes us feel confident about our skills.
- Elevates users to “co-creators”.
- The more effort the more positive we see the product.



# Effect

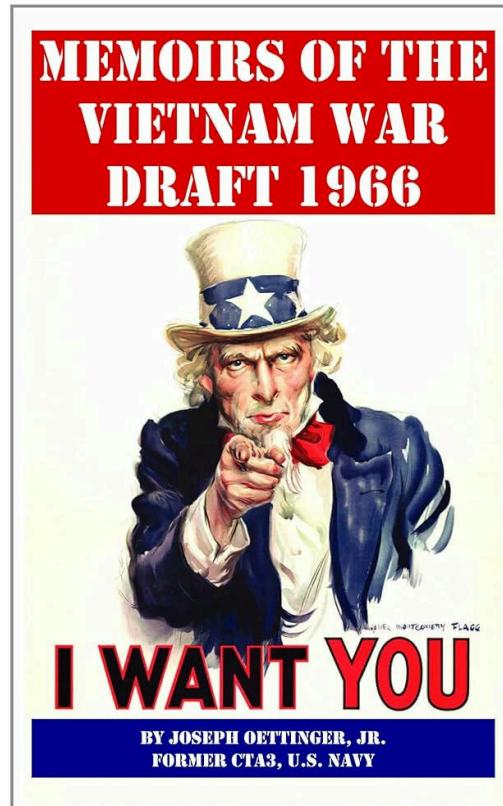
- The primary cause for *Not-Invented-Here-Syndrom*.
- Open Source: Increases contribution.
- Tools we researched more are more appealing.
- If users can adjust something, they love it more (dashboards, profiles)



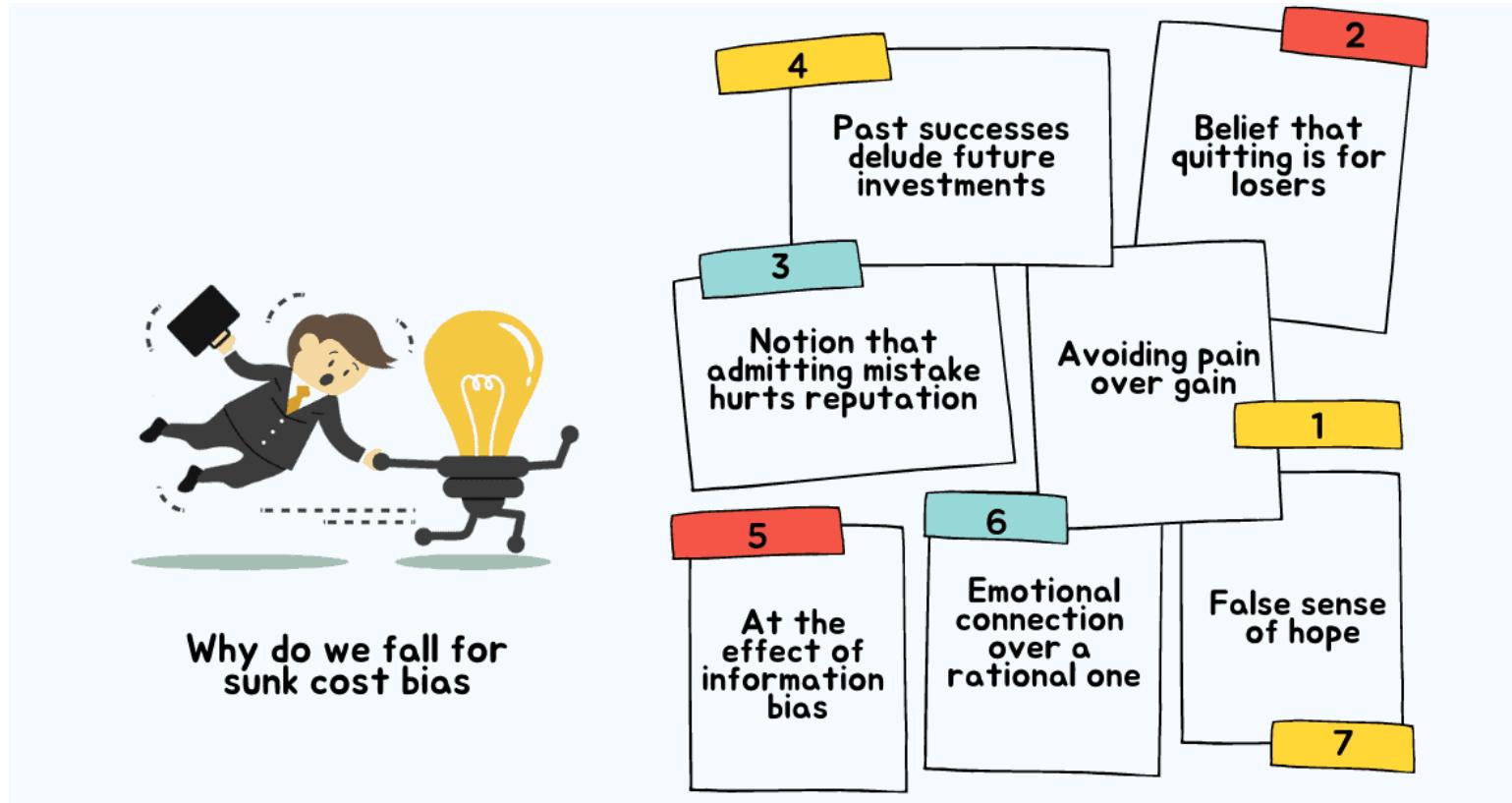
# **Sunken Cost Fallacy**

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# Story



# Explanation



# Effect

- Evaluate choices like you'd start freshly.
- Have a good error culture.
- Get used to abandoning old stuff.
- IKEA effect contributes here.



# **Curse of knowledge**

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# Experiment

**Explain to your seating neighbor a specific detail you assume they have no idea about. What do you notice?**

# Explanation

- We implicitly assume everyone else has the same knowledge as we do.
- This can apply also to future selves  
No comments in code, anyone?
- UI design also suffers from CoS: We assume the user knows.
- Often not called out.



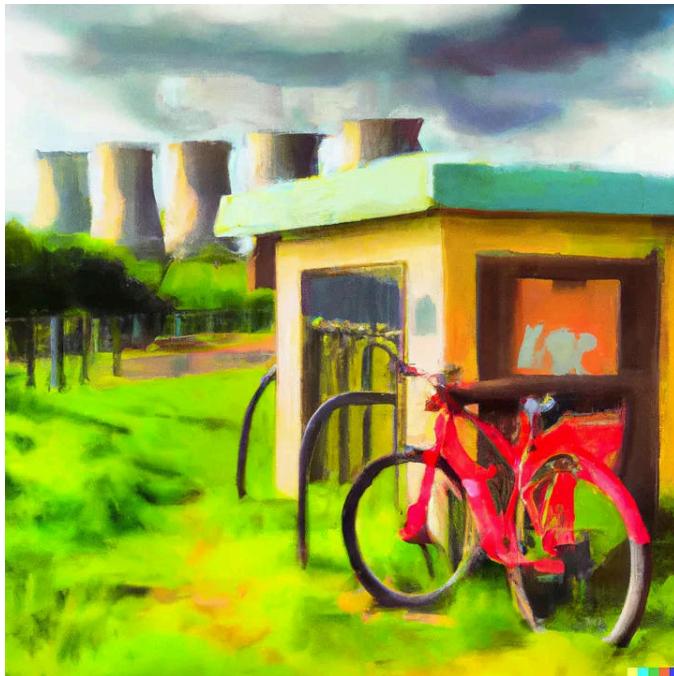
# Effect

- Knowing about it helps. Feel free to interrupt your peer.
- Try to see the world from your peer's perspective.
- Ask questions to see if your peer understood.
- Be patient and do not be an a-hole.

# Bikeshedding

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# Story & Experiment



## The Bikeshed Effect

*The amount of time spent discussing an issue in an organization is inversely correlated to its actual importance in the scheme of things.*

**Discuss what trivial detail did you did give disproportional detail?**

# Explanation

- We tend to decide quickly on things we do not know much about.
- If we know much about a subject we tend to over discuss it.
- We see opportunity to demonstrate our skills.
- We forget about the greater goal.

# Effect

Hard to fix, since it often masquerades as useful discussion.

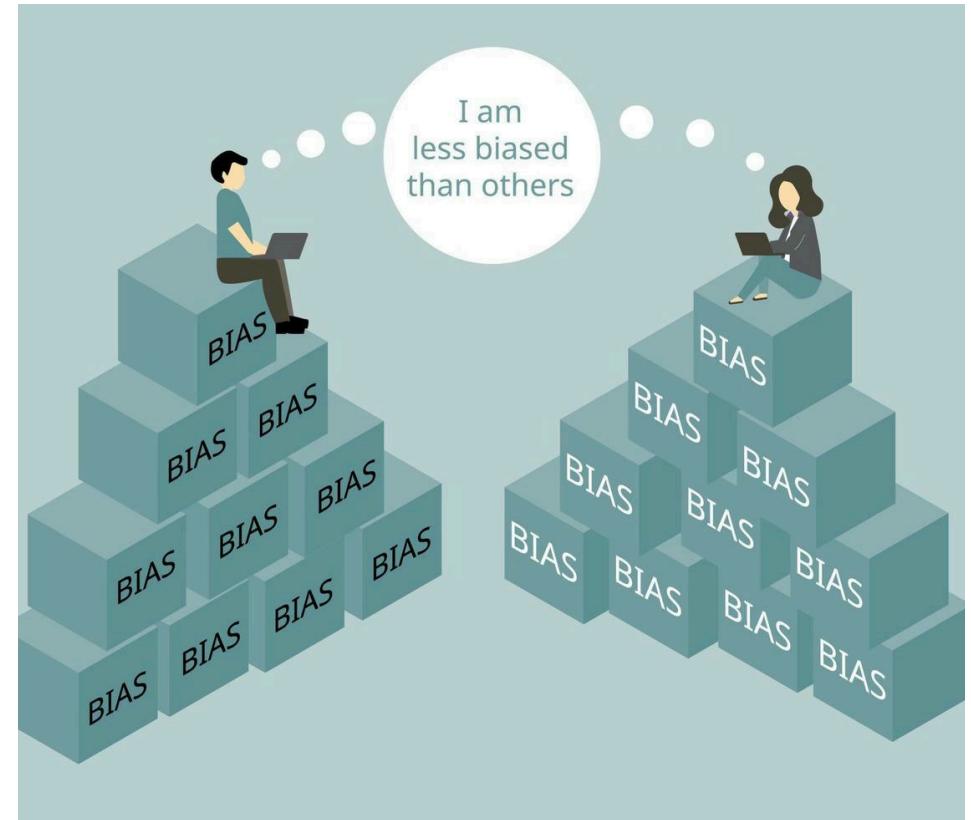
- Have frameworks like OKR.
- Time-box meetings and give priorities.
- Leaders should actively discussions gone wild.
- Explain Bikeshedding.

# **Outro**

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# Summary

- Even if we know about bias, our brain will still experience them.
- Now we can at least debug our past behavior.
- Make it a habit watching your mind.
- Take time for important decisions.
- Build intuition through experience to use System1.
- This talk was not complete (e.g. Dark Patterns in UI/UX)



# Outlook & Homework

I left out something important: Cognitive load.

<https://minds.md/zakirullin/cognitive>

# Outro poem

- Riddled with problems is our mind
- Easy solutions not in sight
- Now no longer as blind,
- but our behavior is still not bright.

# Sources

- [https://en.wikipedia.org/wiki/Cognitive\\_bias](https://en.wikipedia.org/wiki/Cognitive_bias)
- <https://github.com/zakirullin/cognitive-load>
- <https://thevaluable.dev/cognitive-bias-software-development>

# The End

**Tip:** The title slide is clickable!