

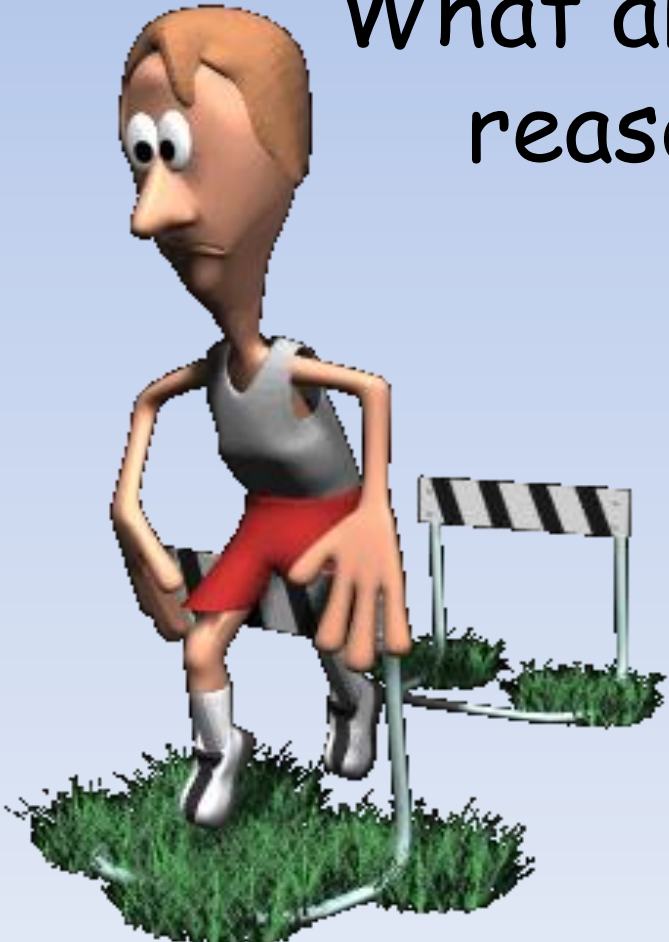
That concludes our discussion about

PROBLEM SOLVING STRATEGIES



Barriers to Reasoning

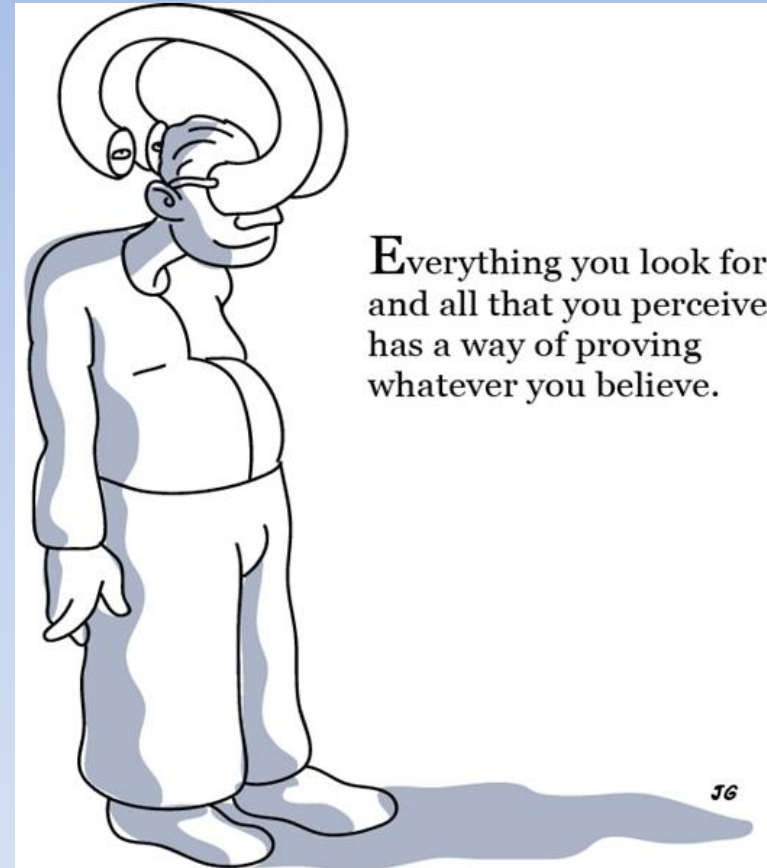
What are some obstacles to using reason and problem solving?



Cognitive Biases

Cognitive biases impact decision-making.

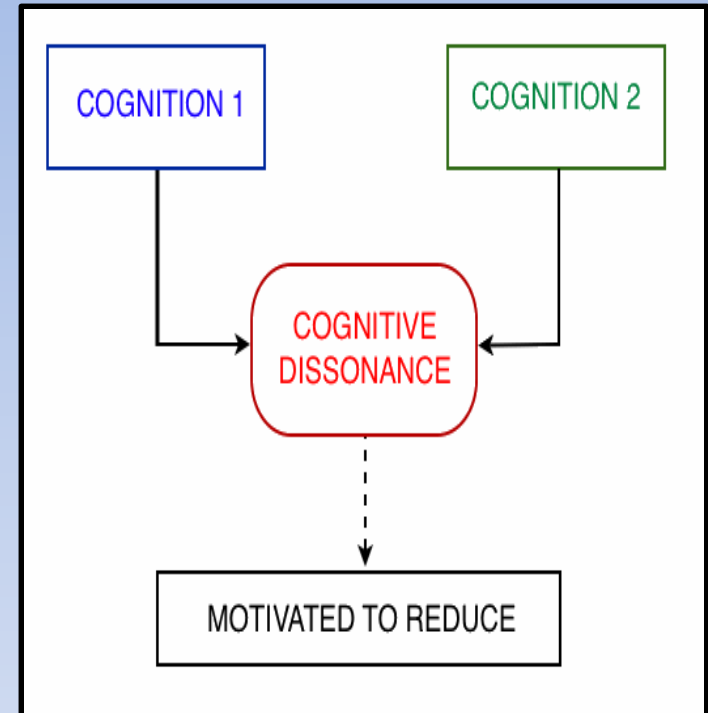
- Cognitive biases are mental mechanisms that: systematically influence judgment and decision-making.
- Cognitive biases occur without our conscious awareness.
- (They help us make decisions quickly, but can impair our ability to make rational judgments.)
- *Note: we're not going to focus on why we have cognitive biases, but instead on their effects.*



Cognitive biases sound vaguely familiar.

A bias you have probably heard of is cognitive dissonance:

- an unpleasant state of arousal that results when two cognitions are in conflict, that you are motivated to reduce.
- *For example, if you voluntarily do a favor for someone you don't like very much, you begin viewing the person more positively.*



You have cognitive biases. Everyone has them.

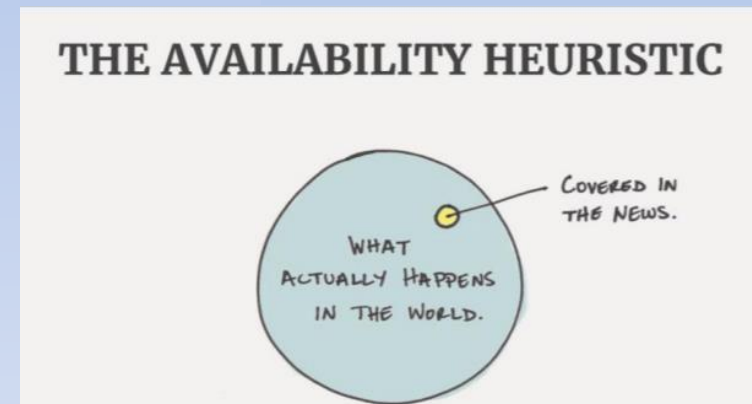


Oh! Don't forget **FAE**, that is a bias too, right? Wait... What is **FAE** again? Can someone help me out?



Barriers to Reasoning

- 1- Availability Heuristic
Exaggerating the Improbable
 - Estimating the likelihood of events based on their availability in memory. We assume such events are common.
 - Vivid cases in the news often cause an availability heuristic.
 - "If it happened in the past, then it will happen again / now."



Example:

After reading an article about lottery winners, you overestimate your own likelihood of winning the jackpot.

Availability Heuristic

Availability Heuristic in Action

- Which household chores (out of 20 that were listed,) do you do more frequently than your partner? (e.g. washing dishes, taking out the trash, etc.)
- - wives report 16/20 chores
- - husbands report 16/20 chores
- Ross and Sicoly (1979)
- **Why?** Availability!
- - I remember lots of instances of taking out the trash, washing dishes, but I do not remember lots of instance of my wife doing it

Does this look good?



Wait,
what???

?



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This is an
example
of....



Barriers to Reasoning

- 2- Representativeness Heuristic

Who went to Harvard?



My friend Dan is a smart dude, but did not go to Harvard (but he looks like he did).



- Judging a situation based on how similar the aspects are to the prototypes the person holds in their mind.
- Like thinking everyone from Decatur is preppy, or someone with glasses is nerdy, or a blonde is not smart.

- If I tell you that Sonia Dara is a Sports Illustrated swimsuit model, you would make certain quick judgments (heuristics) about her...like about her interests or intelligence.
- She is an economics / human evolutionary biology major at Harvard University.

Representativeness Heuristic

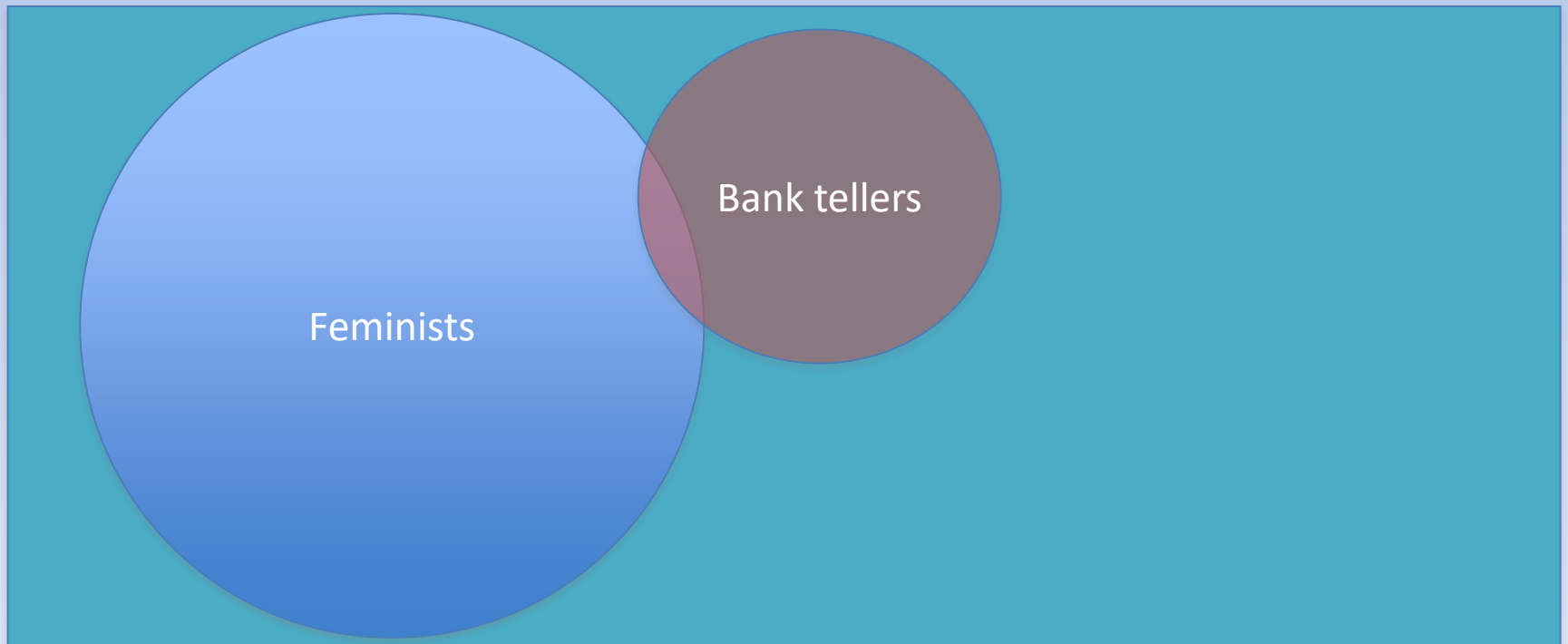
Linda is 31, single, outspoken and very bright. She majored in philosophy in college. As a student, she was deeply concerned with discrimination and other social issues, and she participated in antinuclear demonstrations.

Which statement is more likely?

- a. Linda is a bank teller
- b. Linda is a bank teller and a feminist activist.

Representativeness fallacy

- Judging the conjunction of two events to be more probable than one of the individual elements.



The Availability and Representativeness Heuristics

Table 3.1: The Availability and Representativeness Heuristics

Heuristic	Definition	Example	Downside
Availability	a rule used to estimate the likelihood of a given occurrence based on how easily one can recall an example of that occurrence	Fearing air travel more after the events of Sept. 11	Giving more weight to the scarier, more vivid occurrences without fearing other, more likely instances
Representativeness	a rule used to estimate the likelihood of an event based on how well it fits with your expectations of a model for that event	Thinking that Jen is a librarian because she wears glasses and is considered to be an introvert	Ignoring other important information

Source: Based on Gigerenzer, G. (2004b). Fast and frugal heuristics: The tools of bounded rationality. In D. Koehler & N. Harvey (Eds.), *Blackwell handbook of judgment and decision making* (pp. 62–88). Oxford, UK: Blackwell.

Barriers to Reasoning

- 3- Anchoring and Adjustment Heuristic

A mental shortcut where people use a number or value as a starting point and then adjust insufficiently from this anchor.

(People are over-reliant on the first piece of information that they hear.)

- **Examples:**

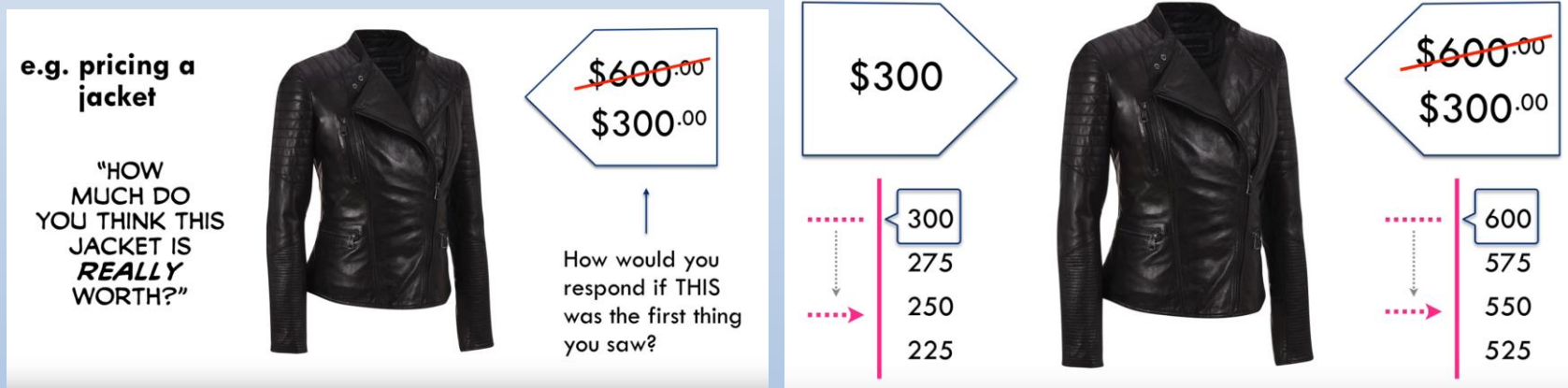
- McDonalds has a lower anchoring price than Starbucks.

- In salary negotiations, whoever says a number first may establish a range of reasonable possibilities.



Anchoring Effect

- People were asked to judge the value of a new jacket.



KOHL'S

Barriers to Reasoning

- 4- Confirmation Bias
- The confirmation bias refers to the tendency to selectively search for and consider information that confirms one's beliefs.

- **Examples:**



&



- A reporter who is writing an article on an important issue may only interview experts that support her or his views on the issue.
- One who believes in astrology will believe when the horoscope is "right" and ignore when it is "wrong."



Stone Soup

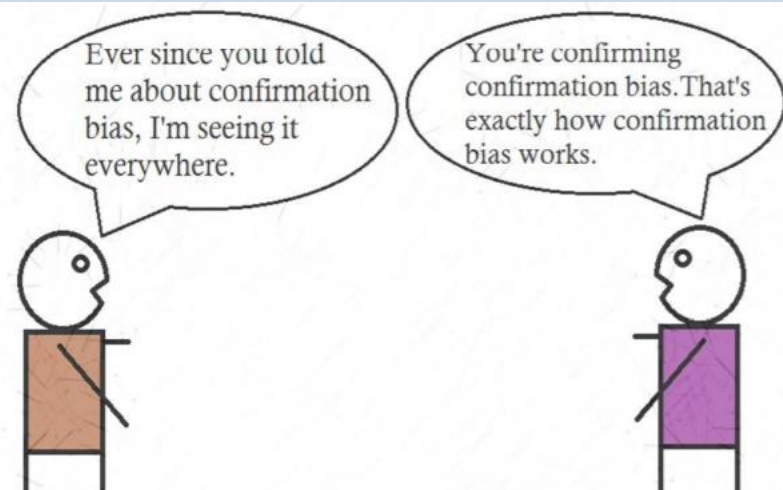
by Jan Eliot



GOAL:



What people do more often



"Here's the conclusion. What facts can we find to support it?"

- Confirmation bias

Barriers to Reasoning

- 5- Framing and the Tendency to Avoid Loss
How an issue is framed can significantly affect decisions and judgments.
- **Examples:**
- If you take chemotherapy, you'll lose your hair. (People will respond cautiously)
- If you take the medication for high blood pressure, you'll be OK. (People will go for it)

Barriers to Reasoning

Our beliefs are, once established, likely to continue.

- 6 - Belief Bias (when an individual's own values, beliefs, prior knowledge, etc. affects or distorts the reasoning process due to the pre-existing belief)
- 7 - Belief Perseverance (Sticking with your own beliefs when presented with conflicting evidence.)

In part, belief perseverance is maintained because of confirmation bias and belief bias.

Examples:

- Bias: Research studying the effect of prayer on illness.
 - A scientific researcher will use data to come to a conclusion.
 - A highly religious person may interpret the data in favor of prayer as a factor in healing.
 - An atheist may discount pro-prayer data.
- Perseverance: Someone who thinks they are a good driver gets a ticket and doesn't accept the fact that they may be an unsafe driver. They make excuses instead and continue to think that they drive safely.

All Cowboy fans who still believe that things are going to get better are suffering from belief perseverance.



Belief Perseverance



Seriously, there are people who refuse to believe the moon landing happened, that Elvis is dead, or that the holocaust occurred. These people continue to hold on to their belief, even with mountains of evidence to the contrary. Their "belief perseveres."

DOES THIS HELP?

- Confirmation: SEEKING

You look for something to support your viewpoint. (Choosing Fox News or MSNBC to get your news, based upon your political leanings.)

- Bias: FILTERING

Considering what is in front of you through your preferred lens. (If one supports raising the minimum wage she may ignore the data that shows it does not lift people out of poverty, and support it just because she “believes” it is the right thing to do.)

- Perseverance: HOLDING ON TO

No matter how much evidence contradicts your belief, you still hold your belief.

(Although you have repeatedly been disappointed by your favorite team, you continue to think “this will be our year!”)

**I'M NOT
STUBBORN,
I'M RIGHT.**

Barriers to Reasoning

- 8- Mental set
- An inability to see a problem from a fresh perspective.
- When a person approaches a problem one particular way, usually a way that has been successful in the past. (rigidity.)

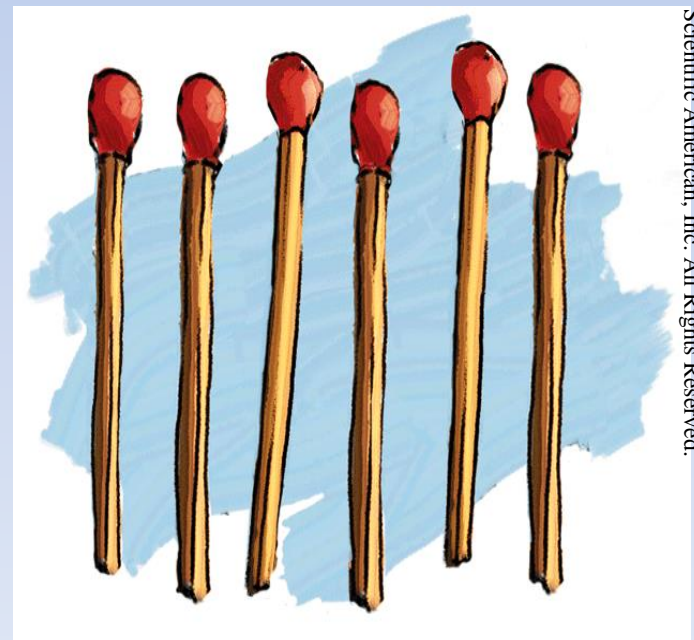


Barriers to Reasoning

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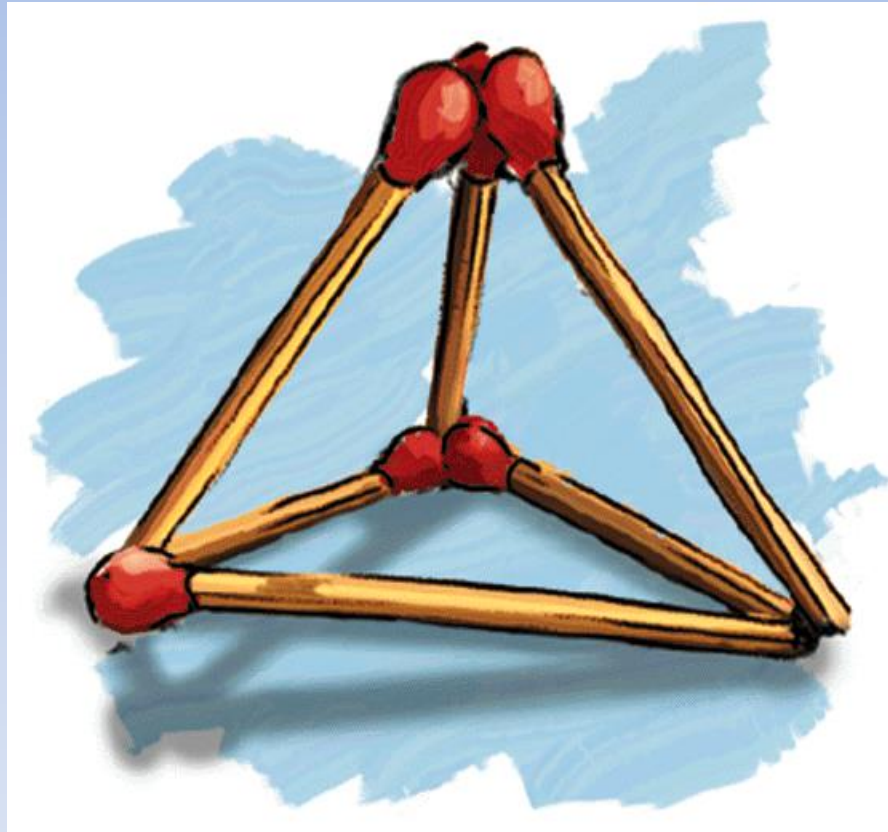
The Matchstick

Problem: How would you arrange six matches to form four equilateral triangles?



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The Matchstick Problem: Solution



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Q. How do you put a bear in a refrigerator?

A. Open the door, put the bear in, close the door.

Q. How do you put a lion in the refrigerator?

A. Open the door, take out the bear, put the lion in.

Q. Noah is hosting an animal conference. All animals but one attend. Which one?

A. The lion who is freezing his butt off in the refrigerator

Q. You want to cross a river that is inhabited by crocodiles. How do you do it?

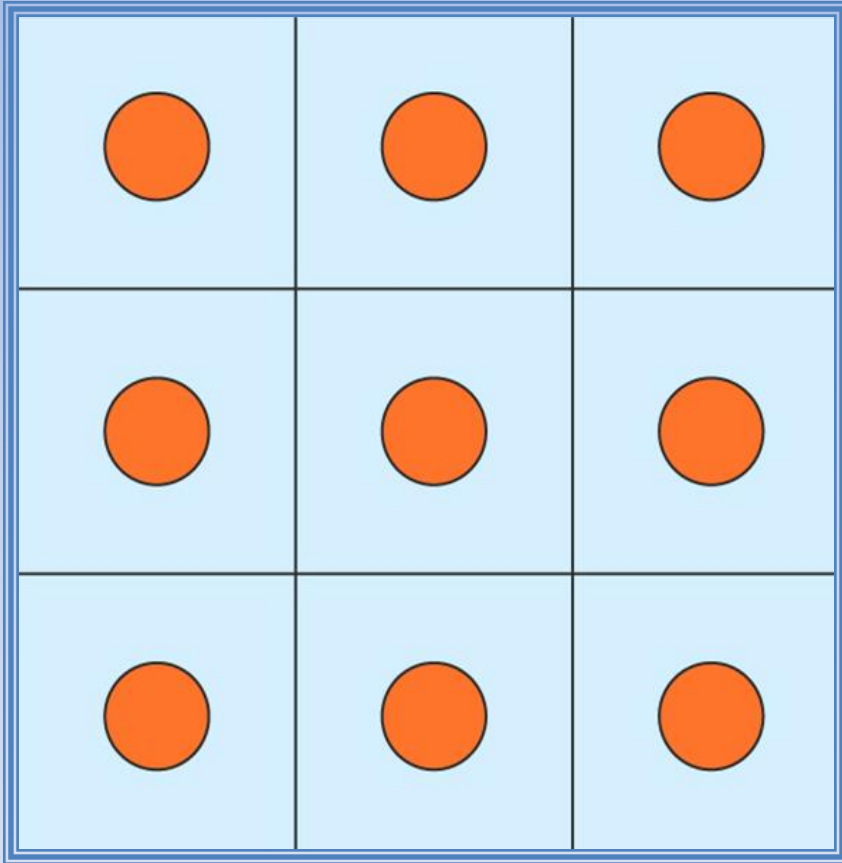
A. Swim across - the crocs are at the conference.

The Mind Can Refuse to Make Connections

Because it gets "stuck"...



Mental Set



Using no more than four lines, can you connect all nine dots without lifting your pencil from the paper?

You can NOT re-trace, nor can you "bend" or "curve" the lines.

(Mental Sets Continued)

Tendency to fall into established thought patterns. Most people will use solutions or past experience to try to solve new problems (they think "what worked in the past is bound to work now").

- To overcome **mental sets** you must "think outside the box"—literally!

