http://llwproductions.files.wordpress.com/2012/03/animatedthinkingcap.gif?w=680

THINKING

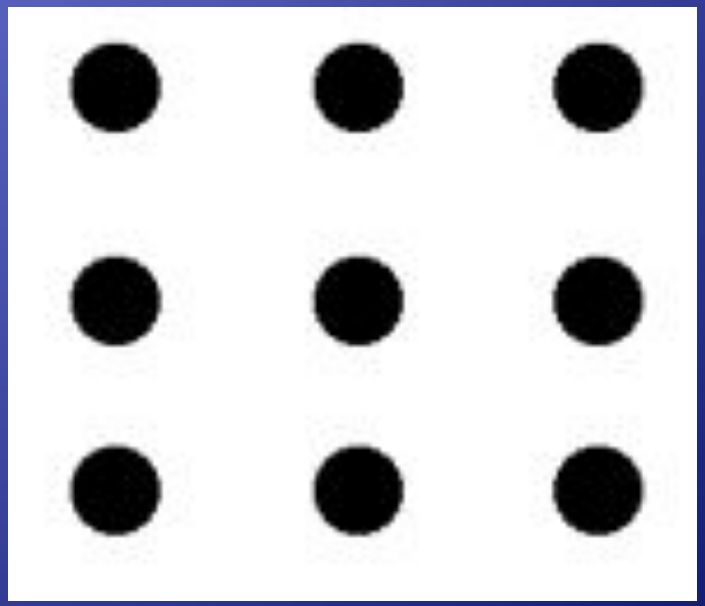
"THERE IS NO SUCH THING AS FORGETTING"

one just doesn't learn in the first place

How do you study thinking?

Problem solving

- Get out a scratch piece of paper and draw nine dots, you mission is to connect all the dots with 4 straight lines and you may not lift your pen.



- 9 dot puzzle solved
http://www.youtube.com/watch?v=Lm6ZWaKpmfo

Problem solving – one way we think

1. The maker doesn't want it, the buyer doesn't use it, and the user doesn't see it. What is it?

(a coffin)

2. What is the next number in the series: 10, 4, 3, 11, 15, …?

(13 because when each number is spelled out, the number of letters is longer than the previous one by one letter, i.e. 10 = ten, 4 = four, 3 = three, etc. .Also 14, 18, 19, 41 and 42 are 8 letters but not the next)

10,	4	3	11	15
Ten	four	three	eleven	fifteen
3	4	5	6	7

- 3. How can you physically stand behind your father while he is standing behind you?

(Stand back to back)

4.What is so unusual about the sentence below? (other than it doesn't make a lot of sense)

"Jackdaws love my big sphinx of quartz"

Use all the letters of the alphabet

5. What occurs once in every minute, twice in every moment, and never in a thousand years?

(The letter "M")

- 6. **A man left home in the morning. He turned right and ran straight ahead. Then he turned left. After a while, he turned left again, running faster then ever. Then he turned left once more and decided to go home. In the distance he saw two masked men waiting for him. Who were they?**
-

(the catcher and the umpire)

7. I O S N E I

Tennis anyone

Cognition

- Another term for thinking, knowing and remembering

Does the way we think really matter?

https://encrypted-tbn1.google.com/images?q=tbn:ANd9GcSHXGLX6Ol2t8bLpIBLBwQFHOEoddcp3dzqgUZDLN2f-dWD4NzGrQ

Maybe by studying the way we think, we can eventually think better.

How do we Problem Solve?

http://llwproductions.files.wordpress.com/2012/03/problem-solving-02.jpg

We base our concepts on ….

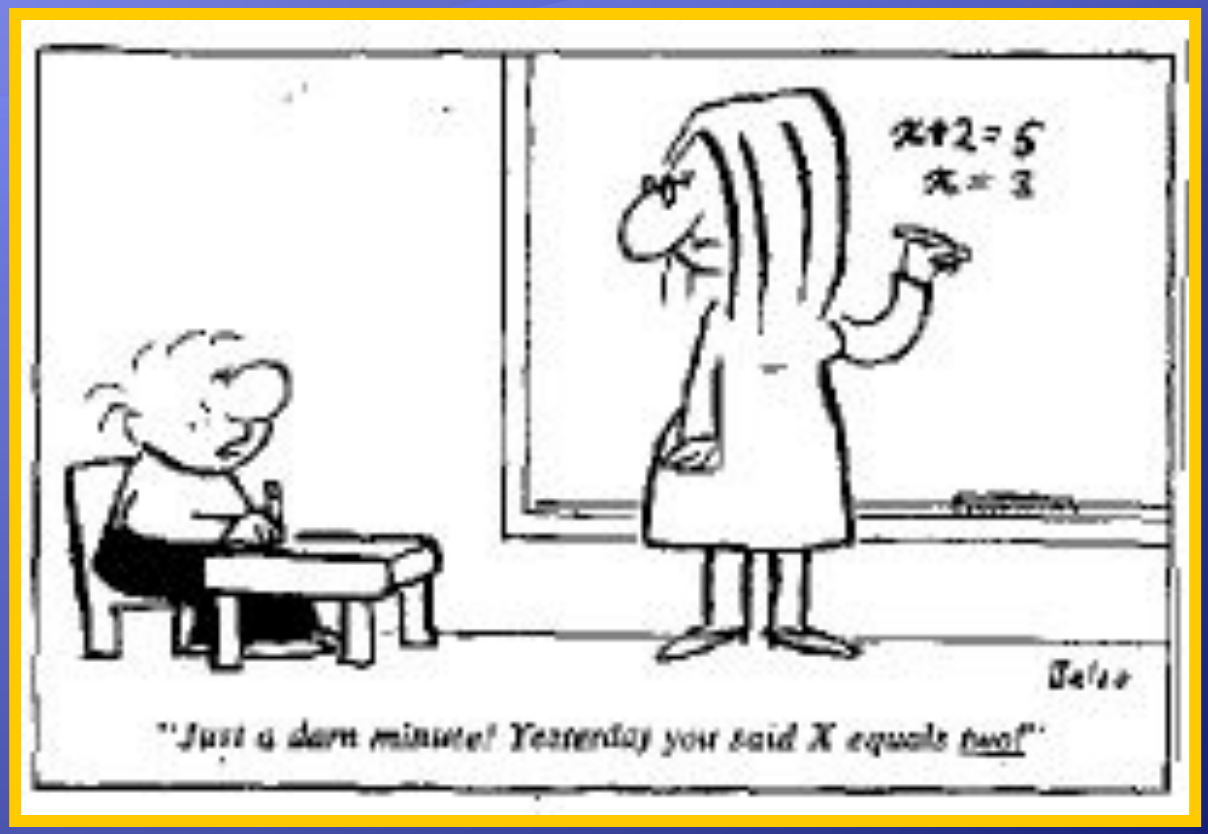
Prototypes derives from the Greek "primitive form"

- *A mental image or best example of a category.*

•If a new object is similar to our prototype, we are better able to recognize it.

Algorithms

- A rule that guarantees the right solution to a problem.



Usually by using a formula. They work but are sometimes impractical.

Heuristics

Who would you trust to baby-sit your child?

- A rule-of-thumb strategy that often allows us to make judgments and solve problems efficiently.
  - A short cut (that can be prone to errors).

Your answer is based on your heuristic of their appearances.

TYPES OF HEURISTICS (THAT OFTEN LEAD TO ERRORS)

Availability Heuristic

Do we have more deaths due to car accidents or sickness?

Although diseases kill many more people than accidents, it has been shown that people will judge accidents and diseases to be equally fatal. This is because accidents are more dramatic and are often written up in the paper or seen on the news on t.v., and are more available in memory than diseases.

- Estimating the likelihood of events based on their availability in our memory.

•If it comes to mind easily (maybe a vivid event) we presume it is common.

Representativeness Heuristic

Who went to Harvard? "judge a book by its cover."

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.

•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 major at Harvard University.

Insight

- **A sudden and often novel realization of the solution to a problem.**

•No real strategy involved , Kohler studied chimpanzees and found out that in a flash of insight (sudden understanding) the chimp understood what he needed to do to get the banana.

https://encrypted-tbn2.google.com/images?q=tbn:ANd9GcRU6OYZdJlRofl3eDBNemEKMJlJ5VVSTp4lMpIzvzE3-UCG-A7k

http://www.youtube.com/watch?v=fPz6uvIbWZE

Study of Latent Learning

- **Tolman** believed early researchers underestimated animals cognitive process. He noted when allowed to roam aimlessly in a maze with no food or rewards rats seem to develop **a COGNITIVE MAP** or mental representation of the maze.
- **Example of Latent Learning:** you see how your parents make dinner but until they leave you home to make it for yourself you don't realize you know how.

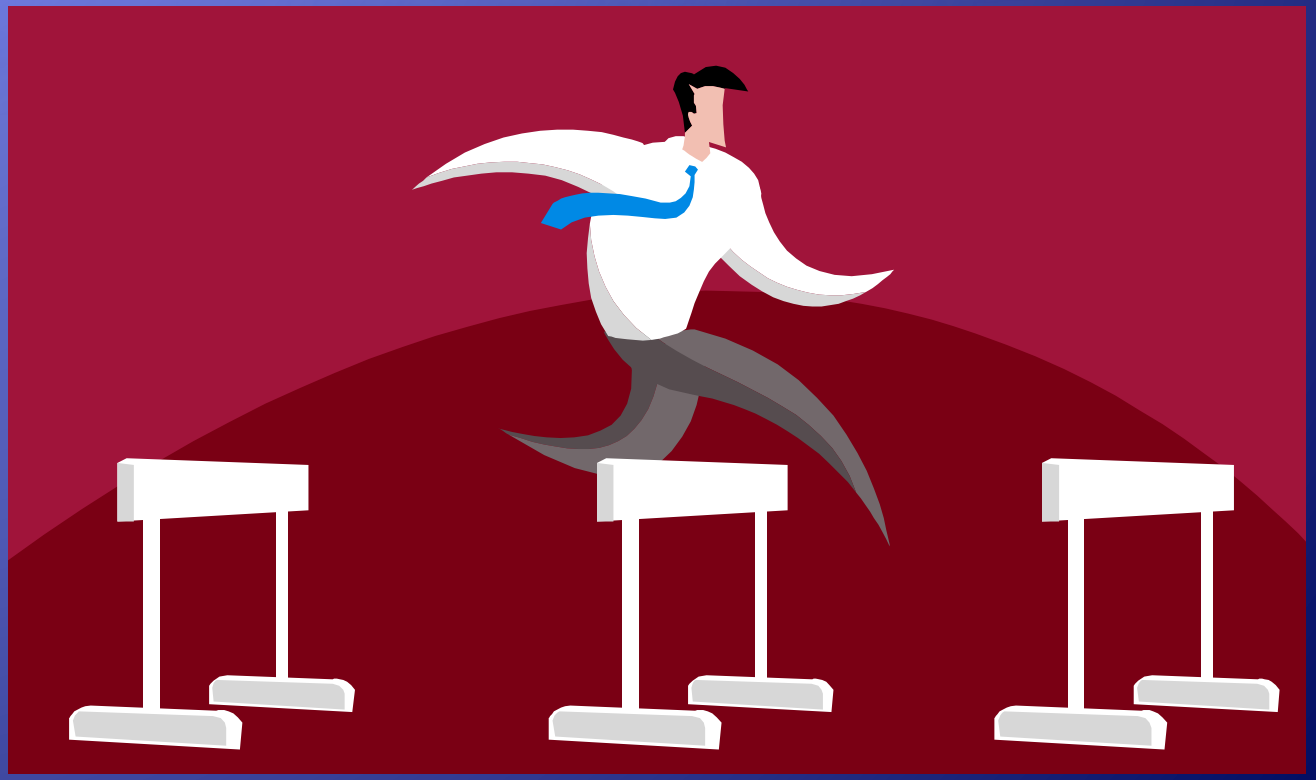
http://www.youtube.com/watch?v=SBTP7W5c3c8&feature=related

Overconfidence

- The tendency to be more confident than correct.
- To overestimate the accuracy of your beliefs and judgments.

Considering "overconfidence" who you want to risk 1 million dollars on an audience poll?

Hurdles to problem solving

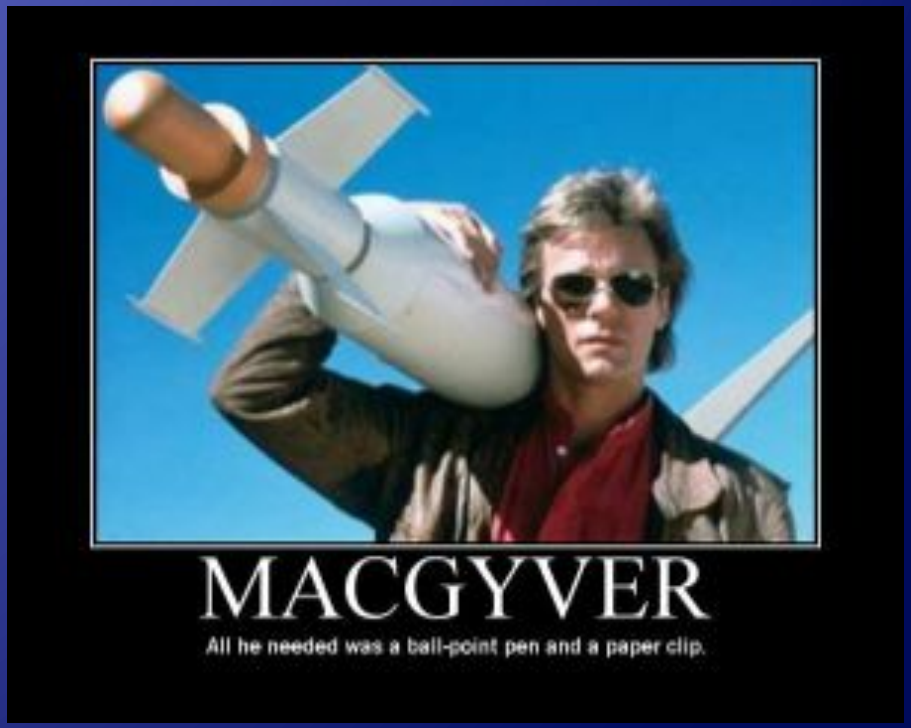


Functional Fixedness

- The inability to see a new use for an object.

Think of as many uses as you can for a ……

Kohler's Study of Insight:
Wolfgang Kohler studied chimps



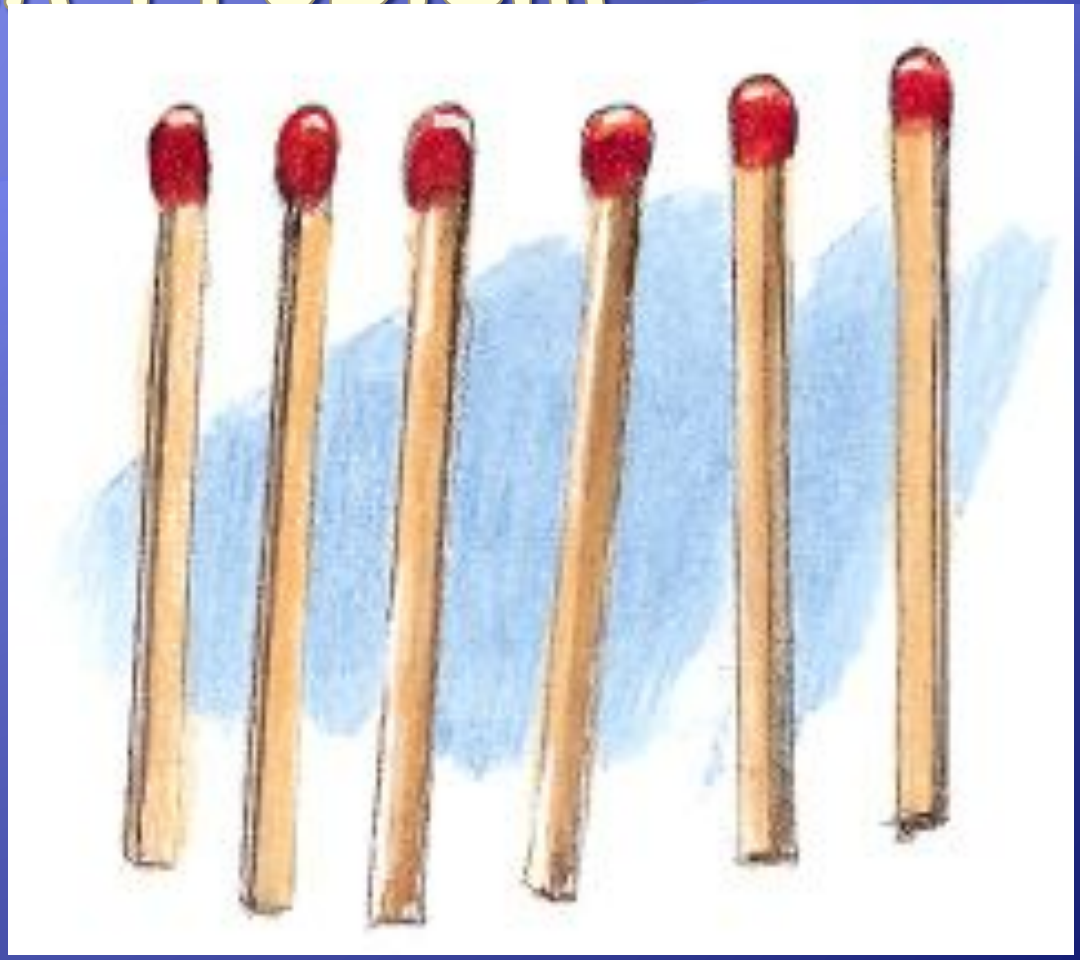
A mental set is a readiness to think about a situation or an object in a particular way, and as a result you may be trapped in a style of thinking that could prevent you from seeing options that may exist

- Below is a famous problem (Maeier, 1931) that illustrates mental sets. In this problem, a person is put into a room with two strings attached to the ceiling. The person must tie the two strings together without removing them. But, it is impossible to reach one string while holding onto the other. The problem may seem insolvable if you do not overcome some common mental sets

Mental set

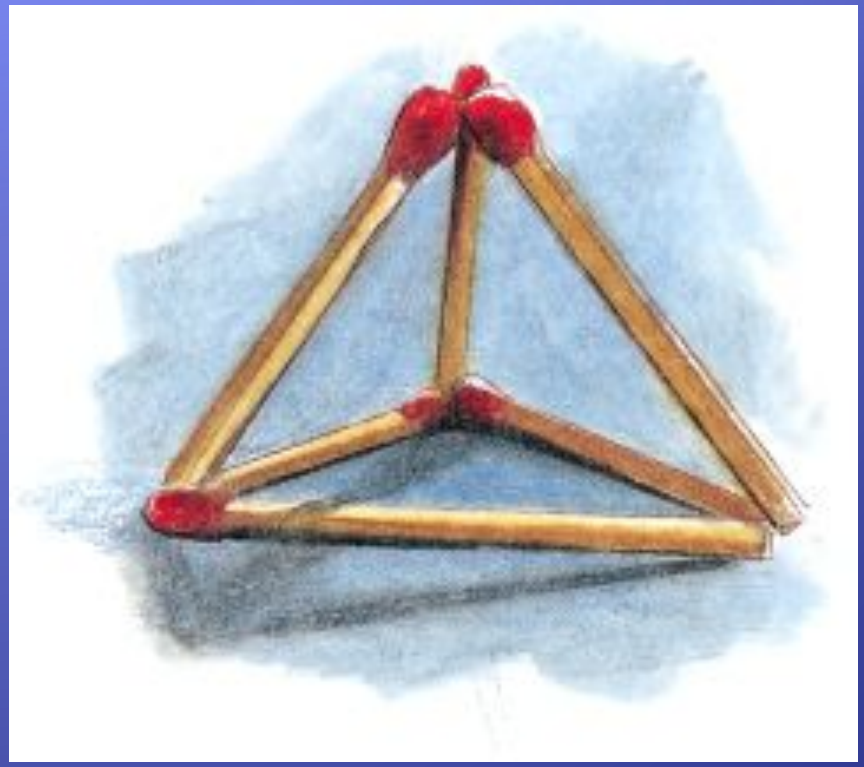
- a.k.a. rigidity
- The tendency to fall into established thought patterns.
- Some examples are….

Match Problem



Can you arrange these six matches into four equilateral triangles?

Match Problem



Fixation

- The inability to see a problem from a new perspective.

Belief Bias

1. Democrats support free speech

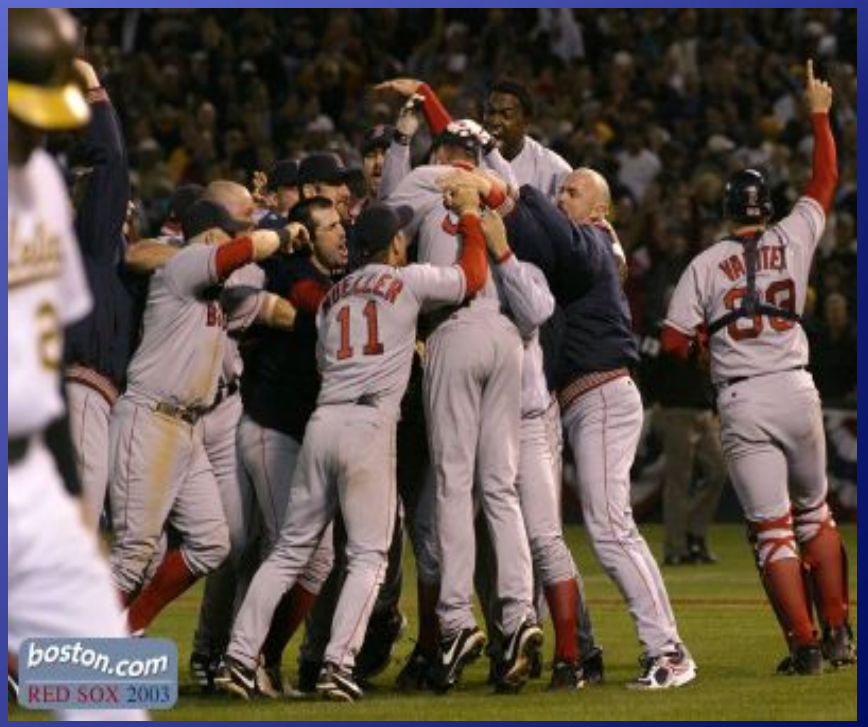
2. Dictators are not Democrats.

Conclusion: Dictators do not support free speech.

- The tendency for one's preexisting beliefs to distort logical reasoning.
- Sometimes making invalid conclusions valid or vice versa.

Belief Perseverance

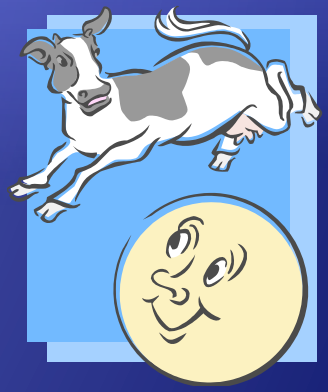
- Clinging to your initial conceptions after the basis on which they were formed has been discredited.



All Red Sox fans who still belief that this is their year are suffering from belief perseverance.

Confirmation Bias

- A tendency to search for information that confirms one's preconceptions.



For example, if you believe that during a full moon there is an increase in admissions to the emergency room where you work, you will take notice of admissions during a full moon, but be inattentive to the moon when admissions occur during other nights of the month.

Framing

- **90% of the population will be saved with this medication…..or**
- *10% of the population will die despite this medication.*
- **You should not drink more than two drinks per day….or**
- *You should not drink more than 730 drinks a year.*

Look at the following question and think about how the question is worded may effect the way it is answered.

- How can businesses become more socially responsible?

- The way a problem is presented can drastically effect the way we view it.

Biology of Learning

- How does learning affect the brain?

- Each time we learn something that alters our brain, we make new synaptic connections.