

Think 101

(Thinking about Thinking: reasoning, judgement, the choices we make, decision making, and expertise)

Reference: <https://www.youtube.com/c/Think101Org/playlists> Part of Edx course called "The Science of Everyday Thinking" by University of Queensland.

Episode 1: Taste

- How do we make choices? Decision Making.
- How do we turn someone who does not know anything to an expert?
- Bringing scientific rigor out of labs to everyday life.
- How to learn? Not easy. The ultimate survival skill.
- Its possible to imbibe false memories into people. Intellect there does not protect you.
- Part of being skeptical to be have an open mind. Demanding evidence. Then make up your mind.
- To test whether you will be able to do something in future, is to simulate it now.
- Smartest people often say that they don't know.
- Science is not for scientists but for anyone with integrity who wants to know the world.
- Making mistakes is important. If it feels easy, you probably are doing it wrong.
- Get realistic idea How to mind works.

Episode 2: Illusions

- Tap a song and let audience guess it. 2.5% do it right. Even if it very familiar like National Anthem.
- Issue is, only you (the tapper) knows weather the pause is a musical rest or continuous note!!
- It's a major divide between you and the audience. You feel it's obvious, but others simply don't.
- Looking from others perspective is the key.
- Memory = bits and pieces of experience at different times and places taken together. False memories are possible.
- Backward messages: Actual saying is something, but some may hear (or sounding like) differently. Some instrumental sounds may be taken as "Do It". That's Illusions.
- In a scary night, at a jungle, while walking, many things/sounds may appear like that of predators, even though the animal may not be there. These illusions are important for survival as one needs to be extra careful. But in a normal situation, you need to calibrate how much to believe the illusions. Ie. in a busy city road, what's the chance of something sounding like a roar?
- Your mental status also calibrates what you hear vis-à-vis what's there.
- Payoffs decide the calibration of illusion, the sense that is it useful to interpret the illusion in a specific way.

Episode 3: Know Thyself?

- Unconscious is working all the time. You plant a thought while sleeping, you may get some answer next day.
- Planning fallacy: We can't plan complex things. Too many variables to plan for.
- Naïve realism: The world is what we see.

- What we see, goes into memory and is retrieved when necessary in form of experience.
- People are not good at (self) assessments.
- Identical products should get preferred with equal probabilities, but order seems to play here.



- People chose the right most, most. Why? Order matters, unconsciously. We don't know how decisions are made in our mind.
- Know Thyself: We claim to know but we don't know how we make the decisions. No access to the process. You have a slave working for you. That's your unconscious. Being quite may help.
- Know Thyself: People cannot self-assess correctly. 1 in 100 would agree that he/she is below average in the driving skills!!!
- We cannot predict what people will think.
- Know Thyself: We think we know what will make us happy. But not so, at least all the time. If I get good marks, I feel happy. That's agreed. But, say a general idea is that rich are happy and vice versa? Not sure. Higher salary job but with a longer commute, preferred? Only for some.
- Happiness and Sadness does not last long. Famous saying: "Even this will pass!!"
- Will knowing something personally vis-a-vis reading article, help make decision better?
- But either don't matter. In interview you may get impressed, but later the employee does not do well. Variance was around 8% ie. interview is about 8% more effective. So, its useless. Past performance may be a better indicator. Hard to fake.
- Continuous evaluation is better than one final exam or interview. Just being lucky or unlucky.
- Thinking can be upgraded by understanding concepts like Opportunity cost, sunk cost, control group sampling, etc.
- We don't know what makes us happy.
- Job interviews cannot really judge people. Better to make a question bank and ask the same whoever the interviewer may be. Just a good benchmarking.

Episode 4: Intuition and Rationality

- World is complex and ambiguous. So much information is coming our way. How do we deal with this?

- We are so rushed that we don't get time to sit down and analyze by doing +ves and -ves of the decision. We just do it. We often use shortcuts, habits to navigate through.
- Generally, you make decision intuitively and then back it up later with evidence, feeling that you have done correct due diligence. Reviews by others are similarly un-founded, biased.
- Daniel Kahneman "Thinking Fast and Slow":
 - System 1: Immediate, impulsive decisions. Habitual and intuitive. Useful for survival
 - System 2: Logical, well-thought, slow decisions. For long term planning.
 - Anchoring: If the hint is on higher side, the guess is on higher side as well and vice versa.
- Our pupils dilate (expand the hole) when we use System 2, amount reflects efforts needed.
- Who is an Expert?
 - Chess experts know 1000s openings. Their System 2 has become System 1. It's a reflex now. Driving becomes habitual later, goes to autonomous system. Like breathing.
 - Some say, it needs 10000 hrs for this to happen. Practice with feedback. High quality instructions can reduce the time.
 - Face recognition is reflex. Upside down faces are difficult to detect.
 - Acting Experts maybe just confidence. Real Experts gets the results.

Episode 5: Learning to Learn

- Small classes do not help dramatically unless there is some special activity.
- Engage in activities related to the topic.
- Practice should be distributed.
- Highlighting and re-reading techniques does not help.
- Medical categorization: from symptoms doctors need to decide which disease it is, ie categories it. Exemplar way to collect samples for each category and then any new case is matched with all groups to find the one that matches the best. Sort of ML KNN way.
- Question: Say, you have been living in a area where there are only Huskies. How many chihuahuas do you need to see to recognize them separately. Answer: One. [So, do we come with pre-trained network??]
- Daniel Kahneman: Fast judgements (System 1) should be avoided as they are error prone, say, in serious cases like medical diagnosis. Geoff Norman contradicts. Says, accuracy of slow or fast is almost similar.
- Good Practice (learning by doing) and Quality Instructions (learning from experts/books) and upgrading based on Feedback are the keys to becoming expert.
- Is our memory limited? Meaning, once it gets full, if something new comes, it replaces some earlier portion. Do we retrieve information faithfully, i.e. the way it was recorded?
- Associating concepts being learnt with everyday examples helps encode/store it better.
- Writing notes verbatim from lecture, highlighting texts, re-reading, all do not help. Flashcards, activities, teaching/present-to-someone, help.
- Desirable Difficulties: Students if must put some efforts then the learning is retained more. Everything, if spoon fed, washes away easily.
- "Ignorance is Bliss" ie. System 1 or System 2? Think.

Episode 6: Experiment

- Intuitive Scientist? Or is it always that Scientist are thorough, analytical, rigorous, so basically System 2.
- Finding things firsthand. Adding salt while cooking rice, should you do it. Check yourself. Many are myths, they need to be verified, firsthand. We believe in myths as they seem to work and we don't have interests/time/patience to examine all of them.
- Perception of randomness is not clear.
- Gambler's Fallacy: If you see 6 HEADs in a row, people expect 7th to be TAILS. But the reality is, that again is 50-50. Almost, thinking like we are DUE for a TAILS!!
- Superstitious beliefs: We are over-eager to find patterns, relationships, etc. People report arthritis pain when storm is coming. There is no relation.
- Confirmation Bias: we automatically notice that confirms our belief and others, we don't. We seek evidence for what we believe.

Episode 7: Finding Things Out

- Science is not just for Elites, its for common people. Can everybody think critically? Can they bust myths? Need curiosity of Finding Things Out.
- Law of Large Numbers: as the number of trials grow, the representative values (like average) converge.
- "After this, so, because of this". We attribute things to something in past, which may not be true causation (even though there is correlation). That's superstition.
- How many times correlation must happen to prove it as causation? Unless principally proven.

Episode 8: Extraordinary Claims

- Out-of-body experience: Seeing yourself as a shell. Perception grows bigger and bigger, so everything is me and not me. Studied in Parapsychology.
- Such experiences or extra ordinary powers you seem to get, cannot be demonstrated statistically.
- Why people believe weird things? UFOs, Astrology, Paranormal experiences, etc.
- Astrology predictions are generic. "Your potential has not been unleashed yet!!"
- Extra ordinary claims require extra ordinary evidence
- All people who have gone through these, are not lying. They HAVE seen this. So, what's that cognitive perception?

Episode 9: Health Claims

- Placebo effects: Why people believe they got cured just by a non-medicine? False Positive response.
- Such alternative medicine cannot cure open wounds but just things like "wellbeing".
- When you are sick, everything is at low, if you get something positive then you develop trust. It may not be addressing the actual sickness but peripheral issues. Most people who are very sick get better anyways (by own body mechanisms) but coincidentally if some treatment is administered around that time, then you build trust.

- Mind over matter: Reasons for placebo:
 - Response bias: example pain in lower abdomen and need to decide to operate for appendicitis or not.

| | Operate | Don't operate |
|-----------------|-------------|-------------------|
| Appendicitis | hit | miss |
| No appendicitis | false alarm | correct rejection |

Bias is a tendency to operate as cost of miss (having appendicitis and you don't operate).

- Regression to mean: getting driven towards average
- All claims can be tested by this quadrant method and think through of all possibilities.
- Homeopathy: More dilute the active ingredient is more powerful it is. 12C is one pinch of salt in entire north+south Atlantic Ocean amount of water. 30C means one molecule in 10^{30} molecules (that's all the atoms in solar system)! The medicine is basically water.
- Chinese medicine: You are what you eat. Rhino horns to make horny. Eat eyeballs to see better!!
- Similar claim: is natural is better? Romantic notion. Snake venom is fully natural. Nature is not good nor bad. Nature is nature. You CANNOT milk from cow as is. It must be pasteurized. Whereas medicines which are chemistry based are not bad. Vaccines are artificial.
- Mother nature is not your Mother!! Mosquitoes bite give you malaria.
- Genetically Modified food is fully bad? Food poisoning can happen by gourd. Testing is a must.
- Food has been modified for thousands of years. Wild food is not always good. We need seedless banana.

Episode 10: Applied Thinking

- Challenged children, say autistic, with facilitator, can communicate well, surprisingly well.
- Help improve thinking: be skeptical, ask questions, with an open mind. Don't make conclusion too early.
- Can animals really learn? Or are they responding to some other event?
- judgements can be influenced by what we expect to see.

- Be careful about what information we allow ourselves to consider. Sometimes, less information leads to better decisions.
- False Consensus: people start to think everybody else thinks like them
- People tend to focus selectively on what they consider to be evidence.
- Anti-establishment bias: Government is against us. They don't believe official account.

Episode 11: Exploit the Situation

- People who have cheated in some situation, may not cheat in all.
- Field theory: behavior is a function of person and his/her environment.
- If you are likely to make mistake in some situations, give some time to think more.
- Fundamental Attribution Error: situation is to be attributed for the behavior more than the person itself.
- Channel Factors: Some things make people act in certain manner. Facilitation helps drive opinion.
- While deciding whether to help someone, personality of that other matters.
- Bystander effect: probability of help to victim is reversely related to the number of bystanders.
- Social conformity: people often go with the group because they think the group has access to the information.
- Diffusion of responsibility: People tend to obey official-looking individuals (men in uniform, suite, formals) even if it some are immoral.

Episode 12: Change the World

- World is complex and ambiguous. Needs simple model of thinking, heuristics (rules of thumbs, superstition, correlations) to navigate.
- We see what we expect to see.
- It's hard to improve the overall thinking. But still, some progress can be made.
- Suggestions to improve thinking
 - Watch yourself. See which intuitions are coming up, question them, analytically.
 - Healthy skepticism. Question things. Try to get answers from First Principles.
 - Association of new info with the old one improves memory. New memory structures get built as needed.
 - We know little. Lesser than what we think we do.
 - Guess and then test.
 - Pick thigs to attach and focus
 - Challenge yourself
 - Read all the time
 - Question the information you are receiving.
 - Only way for success: hard work (practice and improvement by feedback)