

Talk 1: Wolfram Schultz - Neuroeconomics of Dopamine Reward Processing

- Reward drives economic behavior → as well as exploratory!
- Informativeness processing system approach \Rightarrow Input \rightarrow Output
 → Signal probability: Info arrived by processing cuts well with
 ↳ physical implementations \Leftrightarrow Theory \rightarrow CONSTRAINTS
 → Hec: Utility Theory \rightarrow Try to find with signal + abnormalities
- Single neuron recordings \rightarrow Homo, Schultz (1980) // Schultz 1983
 ↗ Substantia Nigra & Dopamine \rightarrow Moment correlate Robinson's?!
- DeLong et al (1983) vs. Hare et al (2013) Optical Recordings
- Touch of food in box \rightarrow reward related activity!
- General moment related activity? Separate from reward ch! \Rightarrow Pavlovian Conditioning \rightarrow (Informed decision repre. / predictions!)
 ↳ Dopamine Neuron activity
- Reward prediction error \rightarrow Schultz, Dayan, Montague (1997)
 → Rescorla-Wagner Model \Rightarrow TD error learning
 → 1 predictor \Rightarrow 1 behavior \rightarrow LEARNING
 Policy Eval. Policy Updates
 ↳ Stimulus Neurons receive info from cortical inputs \Rightarrow synapse strengthen/weakening \rightarrow EPSP \neq if $PE > 0$?!
- Dopamine neurons \Leftrightarrow Reward probability \Rightarrow learned from experienced freq.!
 ↳ Novel stimuli always attract exploratory behavior in monkeys
 ↳ Loh, Stavroff, Schultz (eLife, 2016) \Rightarrow Novelty response not value /

- Optogenetic Stimulation \rightarrow drives burst of value \Rightarrow dopamine-specific!
 ↳ Stampfer et al (Cell, 2016) \rightarrow leads to behavior!
 ↳ NMDA receptor mod-ant \Rightarrow reversal burst defects \rightarrow reduced reward bursts
- DOPAMINE PLAYS DIFFERENT ROLES \neq LEARNING
 ↳ the more Parkinson it is the more likely dopamine based!
 ↳ can be fast or slow!
 ↓
 safety, stability, fuel! alarm, persistence, reward, stress
 → FUNCTIONAL DIVERSITY!
- Reward is subjective! \rightarrow Kobayashi & Schultz \rightarrow reward circuitry
 \rightarrow Different circuitry across different subjects/animals
 \rightarrow Ordinal relatives \Rightarrow can be found in several related areas by
- Economics \rightarrow Info Utility from behavior \Rightarrow relate to dopamine!
 \rightarrow Danger risk (loss) vs Economic risk (uncertainty)
 \rightarrow Radical choice = Max utility! \rightarrow Parallel: Info, Capital, Time!
 \rightarrow Prediction error \rightarrow Utility Function Slope! \rightarrow VPE learning!
 ↳ Effects of higher-order statistics (sharpening)!
- Build up on eligibility traces (plasticity \leftrightarrow RL)!

Qs afterwards:

- Exploration implicitly driven by dopamine \rightarrow size of softmax action selection
 ↳ i.e. intrinsic motivation \rightarrow superfluous
- No idea about replay \square (but talks about Alpha-Go)
- Towards Econ: behavior / utility better defined than in psychology!

Orthodoxy is the disbelief of the world of thought. It learns not, neither can it forget. — H. Huxley

WORKSHOP — Entrepreneur First — Sonny Clifford

- Edge = Unfair advantage in solving a problem, compared to other founders! → DEEP EXPERTISE
 - ↳ don't work on a problem everyone is busy! → too many people are already working on
 - ↳ framework → when right they w. right people
- Why gain? why know? → procedure gives answers to Qs!
- Types of edges: Tech Edge \oplus Domain Edge
 - Skills / Methods
 - Industry / Market
- Catalyst Taller vs. Catalyst Deeper
- Not necessarily!
- Combinatorial Innovation → Put things together!
- ① What is primary edge? → Expertise of a founder
- ② What do you believe? → What will be different in 5 years?
 - center-invisible / non-trivial beliefs?
- ③ What is your hunch? → How could this belief become reality?
- ④ How can you test this? → Scalable test → talk to potential customers
 - ↳ both customer development → 'The user test'
- Selection process → Went to hear something that they never heard before?
 - free, different, abnormal!

- Try to kill the company as fast as possible! \rightarrow RUN INTO SPOTS!
 - Take evasive action \rightarrow Reactive Mode! \rightarrow Contra!
- Idee \rightarrow New specific?

Weighted
Options 1
Options 2
...
Customer 1
or
Customer 2
or
:
:

Customer:

Edge Fit

Web size

Likely Comp. Advantage

Customer flexibility

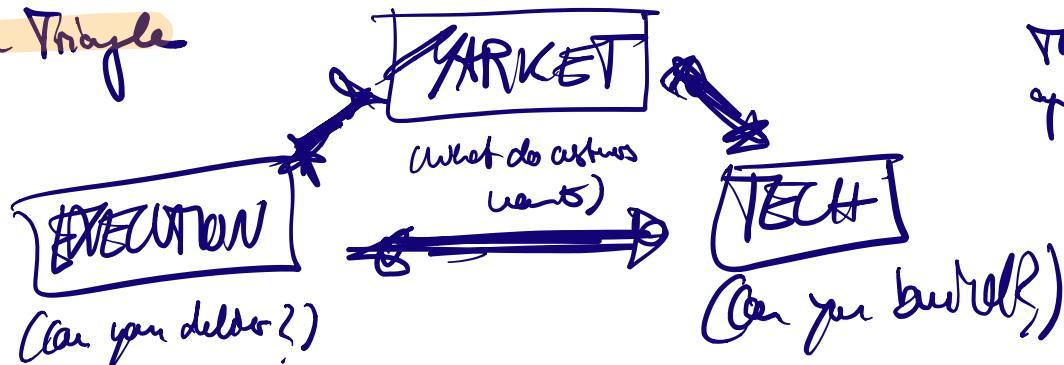
Weighted
Rule

Unweighted
Rule

True to first revenue
Motivation

- Idea Maze (Chris Dickson) = Idea as Search + Optimization
 \rightarrow Before ideas by getting first feedback from customers!

Risk Triangle



Trade-off rules
open each other!

\rightarrow Defensability of Idee \Rightarrow Founder - Idee fit!

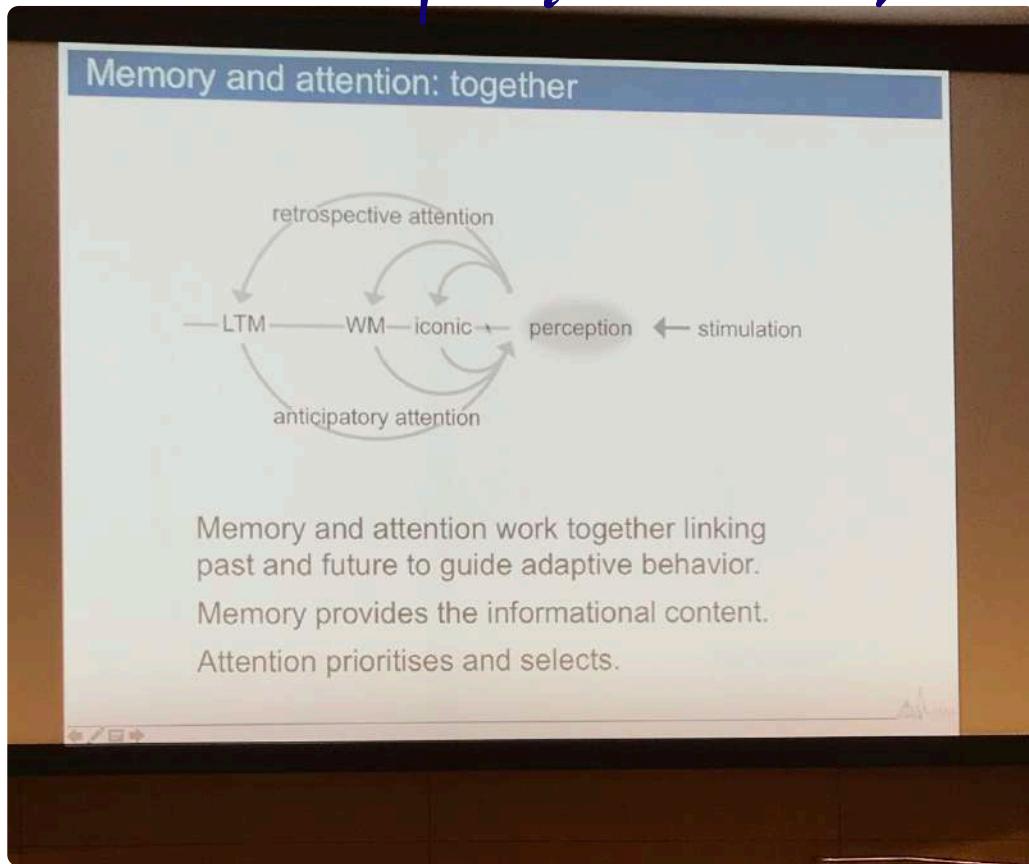
FELS ENCODES PHLD Symposien - Day 2

25/06/19

TABLE 1 - Kira Nobre - Receiving with the benefit of hindsight

- View Cg. Neuro as high-level guidance of lower levels via identification of broad mechanisms!
- Classical dichotomy: Memory \leftrightarrow Past, Future \leftrightarrow Future
 - \hookrightarrow Link together to guide adaptive behavior in present!
 - \hookrightarrow Memory: Informational Content + Attention prioritizes + Selects!
- Mental Experience \rightarrow Hierarchical in their processing
 - \hookrightarrow ensation (features/objects/scenes/episodes)
 - \Rightarrow Hebbian loops \rightarrow trans project onto lower levels to guide new experience! \rightarrow Not purely reactive!
 - \hookrightarrow Perceptible = incomplete, selective, adaptive, proactive
 - \hookrightarrow Example of Shoda and Currier! / Sizable perception
- Top-Down perceptual competition \downarrow \oplus Bottom-up salient items \uparrow
 - \hookrightarrow Neisser (1981, 1990) - Legion shuffles
 - \hookrightarrow Desimone & Duncan (1995)
 - \Rightarrow PROBLEM: STATIC VIEW OF ATTENTION
 - \hookrightarrow NO MEMORIES // AMNESIA!
- Memory Template Decoding (Sketchpad Theory) \rightarrow MEG study
 - \hookrightarrow Template is formed on in the rhythm of the task!
 - \hookrightarrow Myers et al (Elife, 2016) \hookrightarrow Dynamic sketchpad / puppy art!

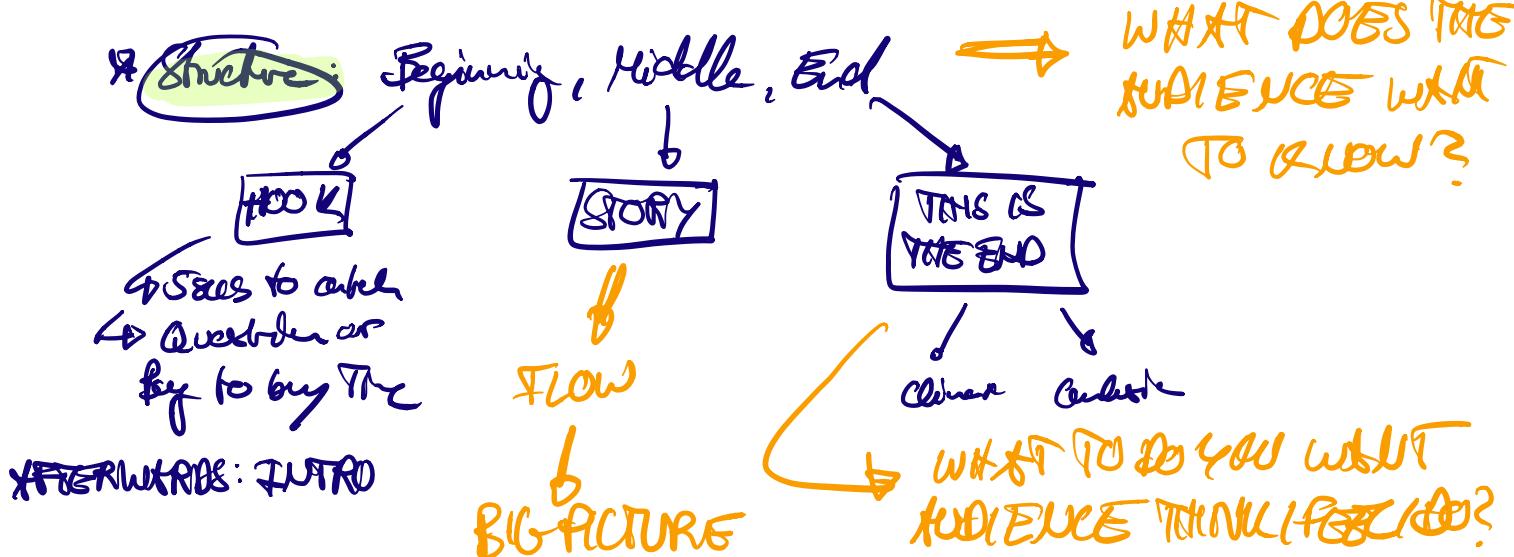
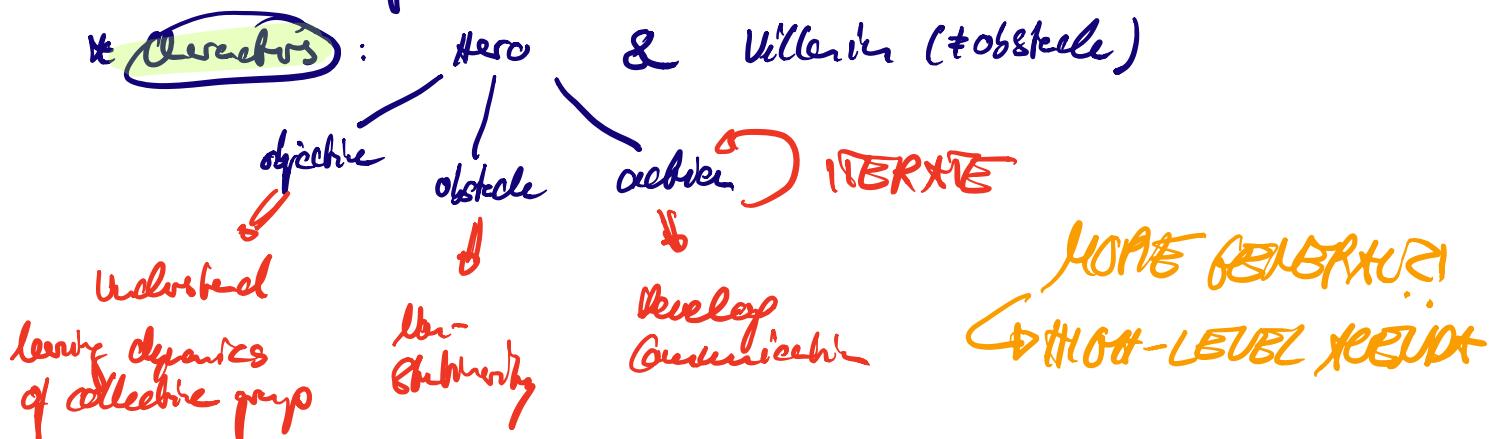
- Contextual dependence → long-term memory → fMRI cues 2-12 secs
↳ frontoparietal network → spatial attention
↳ association scenes + obs → primes network to judge processing!
⇒ memory guides our perception!
- Effect of age → Memory becomes (conscious) relevant
↳ still culture / tech preference possible
↳ Memories still implicitly / subconsciously affect!



Boat - Boarding £.45 per London Eye ticket per
↳ Embankment Station → switch sides!

Presentations Skills - Workshop - Dr. Emily Grossman

- Every communication is there = opportunity to progress!
↳ Feedback, Understanding, Network, Funding, etc. → Publicity
- 'Say yes, panic later!' → Take opportunities
- Say of Talk → exercise yourself! → Get into body
- Eye contact → 2-3secs ⇒ if audience too large, pick a subgroup
- Loosen up with Superman pose // Hero (but not too much)
- @ Jaron - know "too alpha" → Mix it up → Go fast / excitement & come back to stories we're gradually agree!
- Exercise: Tree standed and light going up
- Content → Story Telling
→ What makes a good story?



↳ Relevant /
Releventable

Examples 3x → Analogies that make
content releventable ↳ or good picture

↳ Laughter:

Unnecessary to use organs! → Don't need it
↳ Only needs loose listeners

- Recording a talk: Read words vs spoken words
→ (Tallying to prepare a talk.)

TALK 2 - Sophie Scott → Science of Laughter

- songbirds唱歌 birds → struggle recognition ages / fear! → Paradigm
Eleanor Jones
↳ First work on emotions done by Darwin!
- Laughter: most common expression of emotion ↳ Social Deficit
↳ More breathless ⚡ animal call
- Rip Cope: muscles forced by suddenly upright ⇒ Speak: control of fine-grained air flow!
↳ Predictive planning
↳ One breath as unit of speech planning
-  ⇒ Rhythm
-  → loss of control of variety
↳ painful control over motor system
⇒ No clear model yet!
- ↳ Laugh = 'try to kill you'

- Himba tribe Africa → Cultural vs. Universally Shared Emotion Expressions
- Cross-cultural recognition: ages, disgust, fear, sadness, surprise
↳ Himba ↗ English recognisables ↳ higher level cognit.
- Laughter very special to human cognition but also ages & tickling

- But also evidence for laughter in rats \Rightarrow very low power!
- Laughter = Invitable to play \rightarrow often practice of baby fight \Rightarrow need to label/used as non-threatening!

→ laughs a lot more than we think \Rightarrow Gankto-Dysphelia

- learned behavior \rightarrow contagious laughter \Rightarrow related to motor activity
- ① laughing to get other people to agree/understand/recognize!
 - ② labeling kids as play \rightarrow Social Environment \Rightarrow Give me after party a playful cat!
- Eyes involved for smiley
- Hard to ignore laughter \rightarrow Self-fulfilling \Rightarrow Theory of kind network
↳ imitative behavior // always try to infer motives!
- better classification of real/fake laughter \Leftrightarrow better understanding of reasons for laughter!
- Victor Borge - ('Laughter is the shortest distance between two people.')
- Q: Tom - autism - Is laughter learnable?
 - Yes! Rats tickled early on that laugh, laugh also easier as adults!
 - also fake laugh after getting electric shock same response for autistic/ adults