

# Evolutionary Psychology: An Overview

Behavioural Business

Week 11

# Reading

- ▶ Cosmides and Tooby, Evolutionary Psychology: A Primer
  - ▶ <https://www.cep.ucsb.edu/primer.html>

# Survival

- ▶ For most of history, human concerns boiled down to just **one**:
- ▶ Survival
- ▶ Most (all?) forms of life are still ruled by this unique concern, and develop “instincts” (heuristics) for the same reason
- ▶ Example: **Fear** is a key instinct for survival purposes
- ▶ Many animals are afraid of humans
- ▶ Why?
- ▶ Because humans are dangerous predators

# No Humans? No Problem!



**Figure:** Ray Glasrud and penguins in Antarctica

# Overview

- ▶ Our main question today:
- ▶ How do we know what to do to survive and be successful?
- ▶ i.e., how do **strategies** with higher **payoffs** become more frequent?
- ▶ We'll cover 3 answers:
  1. Natural selection
  2. Reinforcement learning
  3. Imitation (success-biased)
- ▶ Armed with these, we will turn to **costly signalling**

# Instincts

- ▶ Antarctica penguins do not have a fear instinct w.r.t. humans
- ▶ Do we have fewer “instincts” than other species?
  - ▶ Gut feeling: Yes! We humans are creatures of reason!
  - ▶ But are you so sure?
  - ▶ Is it just that our instincts work so well that we are unaware of them?
  - ▶ e.g. why do we smile when happy? why not frown? why not clap?
- ▶ This is known as **instinct blindness** (William James, 1890)
- ▶ How prevalent are instincts?
- ▶ Where do they come from?

## Origins of Instincts: Two Views

- ▶ Blank slate:
  - ▶ all behaviours come from lifetime exposure to environment – now discredited
- ▶ Predictable circuits:
  - ▶ “human minds reliably develop a standard collection of reasoning and regulatory circuits” (Cosmides and Tooby)
  - ▶ Babies under 10 minutes old respond to facelike patterns but not to similar scrambled objects (Johnson and Morton 1991)
- ▶ Some people hand-raise wild animals, e.g. wolves / bears / lions
- ▶ If the “blank slate” view is correct, then *every* hand-raised wolf / bear should be fully domesticated
- ▶ Not true: see e.g. [https://usatoday30.usatoday.com/news/nation/2009-10-05-bear-kills-woman\\_N.htm](https://usatoday30.usatoday.com/news/nation/2009-10-05-bear-kills-woman_N.htm)

# Natural Selection

- ▶ Guiding principle:
- ▶ Our neural circuits were designed by natural selection to solve problems we faced during our evolutionary history
- ▶ What's a bad smell?
- ▶ Notice that we don't like the smell of faeces, but flies do
- ▶ Faeces to flies are food; to us they are disease
- ▶ ⇒ Our reaction: Disgust!

# Disgust

- ▶ Notice the wrinkled nose
- ▶ And narrowed eyes
- ▶ Both serve to **protect** you from contamination from particles
- ▶ Disgust is a universal expression across cultures!!
- ▶ Speaks to its biological function



# The Evolutionary Process

- ▶ It is often stated that natural selection “knows” what is good for the species
- ▶ This is **false!**
- ▶ Natural selection gives a reproductive advantage to holders of a particular feature
  
- ▶ Why do faeces smell bad to all of us?
- ▶ Because we descend from people who were disgusted by that smell
  
- ▶ Assume three types of individuals: A, B and C
- ▶ Type A likes the smell; type B doesn't mind; type C hates it

# The Evolutionary Process

- ▶ Type A is sickly; does not find a mate
- ▶ Type B finds a mate, but their children are not so healthy
- ▶ Type C mates with another Type C; their children are healthy
- ▶ ⇒ Types A and B eventually disappear
- ▶ ⇒ Types C survive and thrive due to their **disgust** of the smell
  
- ▶ Evolutionary process has two parts:
  1. Chance: **random mutations** determine if you are type A, B or C
  2. Natural selection: reproduction odds ↑ if mutation is adaptive (type C)

# Key Questions

- ▶ To understand where behaviours come from, we need to ask:
- ▶ What is the problem we are trying to solve?
- ▶ i.e what is the problem our evolutionary ancestors needed to address?
- ▶ How do we solve it?
  - ⇒ The answers to these two questions give us the **circuits** and **heuristics** that regulate our behaviours
- ▶ Some of these are innate; some are learned (culture)

# Key Problem

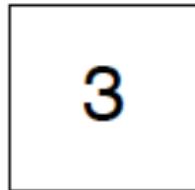
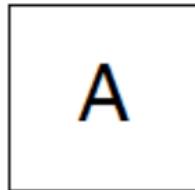
- ▶ To help set the stage, the key problem we have assumed so far is **survival**
- ▶ But that is an over-simplification
- ▶ **Reproduction** is actually the objective
- ▶ Why?
  
- ▶ Who are we more likely to descend from:
  - ▶ (1) individuals who save themselves first, or
  - ▶ (2) individuals who sacrifice themselves to save their children
- ⇒ Natural selection is not magic!

# Social Interactions

- ▶ Types of social interactions:
- ▶ helping others vs. hurting others
- ▶ conditional vs. unconditional
- ▶ How do we know when to help or hurt others?  
⇒ Selection pressure steers us towards traits that help us reliably identify situations where we should help / harm others

## Wason selection task 1

- ▶ Let's see how good we are with logical reasoning
- ▶ 4 cue cards are below
- ▶ They are two-sided: one side has letters; the other numbers
- ▶ **Rule:** If there is an A on one side, there is a 3 on the other side
- ▶ **Your job:** Make sure the rule is enforced
- ▶ Which of these cards do you need to turn over to check?



## Wason selection task 2

- ▶ **New rule:** if a person is drinking beer, then that person must be over 18 years of age
- ▶ Which of these cue cards do you need to turn over?

Drinking  
beer

Drinking  
coke

22 years  
of age

16 years  
of age

## Correct Answers

- ▶ In Task 1, cards A and 7 are correct
- ▶ In Task 2, cards “Drinking Beer” and “16 years of age” are correct
- ▶ In previous iterations of these selection rates, success rates were:
- ▶ Letters / numbers task:  $\approx 25\%$
- ▶ Drinking task:  $\approx 80\%$
- ▶ What's going on??

## Correct Answers

- ▶ The logical structure of the two decision tasks is identical:
- ▶ Conditional statement “*if... then*”
- ▶ So correct answer rate **should** be the same across tasks
- ▶ Pattern found in adults in US, UK, Germany, Italy, France, HK
- ▶ Schoolchildren in Ecuador
- ▶ Shiwiar hunters in the Amazon

# Cheating Detection

- ▶ Turns out: using the same logical structure, we are much better at detecting rule violations...
- ▶ ... if the rule has to do with prohibited behaviour in a **social context**
- ▶ The ability to detect “cheating” is very useful to survive & reproduce!
- ▶ Natural selection process weeds out those who are not so good at it
- ▶ Result: those of us left have circuitry that picks up on social violations quite well

# Reinforcement Learning

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# Reinforcement Learning

- ▶ Trait mutations are **fixed** with an individual's lifetime
- ▶ **Reinforcement learning** is not:
- ▶ We learn from consequences of our actions during lifecourse and adjust behaviour accordingly
- ▶ High payoff behaviours get consolidated
- ▶ Example:
- ▶ Can you teach a pigeon to dance?

# Dancing Pigeon

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# Reinforcement Learning

- ▶ Reinforcement learning of this type can be used to teach a wide variety of behaviours:
- ▶ potty training (human and non-human), eating your vegetables, quitting smoking, etc
- ▶ “Reinforcers” are things that we like: rewards of some form, e.g. food, status, physical safety, ...
- ▶ Things *natural selection* conditioned us to like!

# Sucess-Biased Imitation

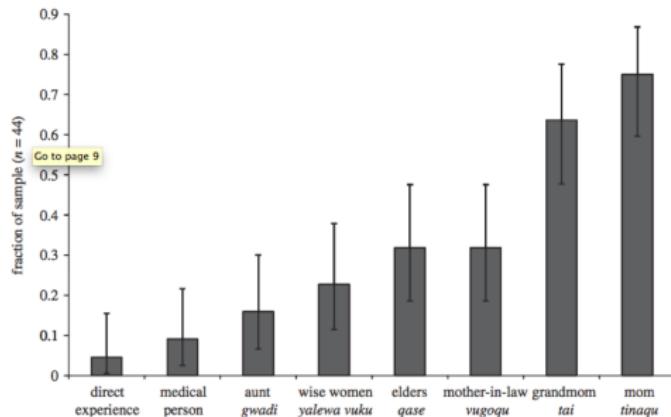
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# Imitation

- ▶ Intuitive: monkey see, monkey do
- ▶ If I have no idea what strategy is good, observe and form belief based on others' success
  - ⇒ Higher payoff individuals more likely to be imitated:
    1. Those who display clear signs of *domain-specific* success
    2. Spill-over: Those who display signs of success in other domains

# Fijian Women (Henrich and Henrich 2010)

- ▶ How do Fijian women learn pregnancy food taboos?
- ▶ i.e. which foods to avoid when pregnant / lactating?



- ▶ Family (as last week)
- ▶ Other women who had success with children (elders / wise women)
- ▶ But comparatively little from medically trained!

# Fijian Women

- ▶ Food taboos are **adaptive**: foods that are off-limits are those that are more toxic to developing fetuses
- ▶ But **key point**: Fijian women don't know this!
- ▶ When asked why they avoid those foods, the replies are:
- ▶ “it's our custom”
- ▶ “babies would be born with rough skin”
- ▶ “God will smite me”
- ▶ Highly functional behaviour - even if no one knows why
- ▶ Justifications come ex-post, not ex-ante

# Domain Specificity

- ▶ There is sense in pregnant women learning behaviours from “successfully” pregnant women
- ▶ But sometimes we imitate people we have no clear reason to:



- ▶ Hence the importance of celebrity endorsements

# Costly Signaling



# What's a Signal?

- ▶ Think about how we communicate...
- ▶ Partly **signal**, partly **noise**
- ▶ Just like when you are tuning a radio receiver
- ▶ Remember **cheap talk!**
- ▶ How do we know a signal is not cheap talk?
- ▶ ⇒ when it is **costly** to the sender
- ▶ Costly signals are used when the sender wants to **credibly** convey information

# Peacocks and Mating

- ▶ Peacock tails are a classic example of a costly signal



- ▶ Large tails are terrible for flying, escaping for predators, etc

## Peacocks and Humans

- ▶ They also take a lot of energy to grow...
- ▶ ... and that's the point!
- ▶ Only a healthy male can afford to grow an elaborate tail
  - ⇒ Fancy peacocks get picked more often by females
  - ⇒ Their offspring has a higher survival rate
- ▶ Clearly wasteful behaviour in humans: same logic
- ▶ Wasting resources is a **credible, costly** signal

# Humans

- ▶ Assume there are two types of men: Rich (R) and Poor (P)
- ▶ You go out to a club: everyone is well-dressed
- ▶ R and P look the same (for the sake of argument)
- ▶ What information can you infer?
- ▶ Nothing! Signals (looks) are scrambled
- ▶ What is R's optimal strategy?
- ▶ Display resources ⇒ Buy expensive bottles
- ▶ **Only** R can do that; not P
- ▶ The signal is **credible** because it is **costly**
- ▶ It becomes known to all that R is rich

## Conscious Process?

- ▶ For humans, money-wasting is a conscious costly signalling process
- ▶ Both on the receiver and on the sender side
- ▶ How about peacocks? Conscious?
- ▶ No. Peacock captures female's attention via visual stimulus (feather display)
- ▶ Female does **not** consciously know that fancy feathers mean healthier offspring
- ▶ In humans, why is it that physical stature (muscle) is unconsciously favoured in men?
- ▶ We are no longer doing almost any physical labour!
- ▶ Process needs not be conscious

# Gender Pattern

- ▶ Notice the gendered pattern:
- ▶ Males compete; females choose
- ▶ Why?

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# Why Monogamy?

- ▶ Sometimes-heard argument: we are not “meant” to be monogamous
- ▶ So why monogamy then?
- ▶ Not just in humans. Found in many other species.

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# Why Monogamy?

- ▶ Question: does monogamy work well for women?
- ▶ Yes, cost-sharing of rearing children
- ▶ Does monogamy work also for men?
- ▶ Yes! Why?
- ▶ Natural selection approach:
- ▶ Type A doesn't care whether his kids live or die
- ▶ Type B does.
- ▶ What happens to the descendants of type A?
- ▶ They become extinct, and the non-caring trait dies with them
- ▶ Type B is now the dominant type

# What is Beauty?

- ▶ Beauty standards are very different across societies
- ▶ In most “Western” societies, sun-tanned skin is seen as beautiful
- ▶ Actively sought after: tanning booths!
- ▶ In most Asian countries, light skin is beautiful
- ▶ Sun exposure is actively avoided
- ▶ Why the difference?
- ▶ Let’s apply a signalling approach

# What is Beauty?

- ▶ In Western societies, tanned skin means:
- ▶ “I have enough resources to spend time outside instead of sitting at a desk indoors”
- ▶ or “I just came back from a holiday in Fiji, which BTW, I can afford”
- ▶ In Asian societies, light skin means:
- ▶ “I have a job which does not require me to be outside, **unlike many others** who work in agriculture / construction”
- ▶ We don't necessarily think of this consciously...
- ▶ ... but different societies come to view different things as beautiful...
- ▶ ... because they are reliable signals of resources!

# What is Beauty?

- ▶ Notice also that beauty standards in a given society can change quickly:



# Beauty

- ▶ For women, it used to be that heavier than average was considered beautiful
- ▶ Now the “ideal” standard is quite thin - and difficult to attain
- ▶ And **that's the point!**
- ▶ Earlier, only the wealthy could afford to be heavier than average
- ▶ Now, only the wealthy can afford to be very thin, since dieting/gym etc is costly (\$ + time + energy)
  - Beautiful is whatever is difficult to attain
- ▶ Because it is a **signal** of resources
- ▶ So is fashion-following, for the same reasons!

## Optional Readings

- ▶ Ruvolo et al: Infants Time Their Smiles to Make Their Moms Smile
  - ▶ <https://doi.org/10.1371/journal.pone.0136492>