

Evolution & Rationality

Next Wed Exam (rough breakdown)

- INTRO: 4
 - BRAIN: 9
 - FREUD: 9
 - SKINNER: 9
 - COG DEV: 9
 - LANGUAGE 9
 - PERCEPTION/ATTENTION: 9
 - MEMORY: 9
 - LOVE: 7
 - EVOLUTION 4
 - RATIONALITY 4
 - EMOTION: 18
- = 100%

Next Wed Exam

- Lectures
- Gray textbook
- Norton readings (less detail)

See old exam for examples ...

Review sessions

- Monday, 2/26, 4-6 PM
- Tuesday, 2/27, 6-8 PM

Dunham labs 220

Evolution & Rationality

The other
“astonishing hypothesis” ...

The argument from Design

Problems with creationism

- Pushes back the question
- Evidence for evolution
 - fossils, vestigial characteristics, continuity with other animals

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But there was no alternative!!!

Natural selection

- Random variation
- That gives rise to differences in survival and reproduction
- And gets passed from generation to generation

Gives rise to "that perfection of structure that justly excites our imagination"

But why are we talking about evolution in an introduction to psychology class?

Our cognitive mechanisms were evolved for the purpose of survival and reproduction. They have been shaped by natural selection to solve certain problems.

Evolution of the Brain

- Perceiving the world
- Communicating with other members of our species
- Getting nutrition & rest
- Selecting and attracting mates
- Learning about our physical and social environment
- Making decisions
- Choosing our allies and enemies
- Figuring out the beliefs and desires of others

Misconceptions about evolution and psychology

- Natural selection causes animals, including humans, to want to “spread their genes”

Misconceptions about evolution and psychology

- Natural selection causes animals, including humans, to want to “spread their genes”
 - WRONG!
 - distinction between ultimate causation and proximate causation

Misconceptions about evolution and psychology

- Natural selection entails that everything is adaptive
- WRONG
- There are:
 - adaptations
 - by-products and accidents

Who cares?

**Why should it matter to a
psychologist how the mind
evolved?**

**Applying evolutionary theory
to the mind is controversial**

With the exception of the reactions in infants to sudden withdrawals of support and to sudden loud noises, the human being is entirely instinctless....Man is man because he has no instincts, because everything he is and has become he has learned...from his culture, from the man-made part of the environment, from other human beings.

-- Ashley Montagu, 1973

Every aspect of life has a biological foundation in exactly the same sense, which is that unless it was biologically possible it wouldn't exist. After that, it's up for grabs.

-- Louis Menand, 2002

Why evolution is relevant (I)

- The origin of consciousness, reasoning, morality, etc. is deeply interesting

Why evolution is relevant (II)

- It tells us what could be innate and specialized, and what cannot
- Some problems have been around for a long time and could lead to special adaptations
 - communication through speech, mate selection, child care ...
- Other problems are recent and our brains cannot be specialized to deal with them
 - written communication, continued interactions with strangers, driving a car, playing chess ...

Why evolution is relevant (III)

- It tells us what sorts of human differences in human psychology to expect

Why evolution is relevant (IV)

- Looking at something from the perspective of design often leads to interesting insights about its current nature

Surprising predictions

- Timing of onset and offset
- Types of foods avoided
- Relationship with miscarriage and birth defects

Attraction and Love

II. Why Do We Love Whom We Love?

A. The Big Three

1. Proximity
2. Similarity
3. Familiarity

Attraction and Love

II. Why Do We Love Whom We Love?

A. The Big Three

1. Proximity
2. Similarity
3. Familiarity

Who are you most close to, most similar to, and most familiar with?

Your Siblings

~~Your Siblings~~

Incest avoidance

- Predicted by evolutionary biology
- Instinctive (proximal vs. ultimate causation)

Incest avoidance

- Predicted by evolutionary biology
- Instinctive (proximal vs. ultimate causation)
- But how can you tell?

A case-study in evolutionary psychology

Rationality

There is no Nobel Prize in psychology

- Yes, but ...

We are not logical thinkers;
we have evolved instead to
reason using rough-and-
ready heuristics

Sometimes this can lead us
astray

Heuristics

- Framing effects (and loss aversion)
- Ignorance of base rates
- Availability bias
- Confirmation bias

Vulnerability to “Framing” effects

Imagine the US is preparing for the outbreak of an disease which is expected to kill 600 people. Two programs to combat this disease have been proposed.

Program A: 200 of these people will be saved

Program B: There is a $1/3$ chance that 600 people will be saved and a $2/3$ chance that nobody will be saved

Vulnerability to “Framing” effects

Imagine the US is preparing for the outbreak of an disease which is expected to kill 600 people. Two programs to combat this disease have been proposed.

Program A: 200 of these people will be saved	72%
Program B: There is a 1/3 chance that 600 people will be saved and a 2/3 chance that nobody will be saved	28%

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Program A: 400 of these people will die	
Program B: There is a 1/3 chance that nobody will die and a 2/3 chance that everyone will die	

Vulnerability to “Framing” effects

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Program A: 200 of these people will be saved 72%

Program B: There is a 1/3 chance that 600 people will be saved and a 2/3 chance that nobody will be saved 28%

Program A: 400 of these people will die 22%

Program B: There is a 1/3 chance that nobody will die and a 2/3 chance that everyone will die 78%

Vulnerability to “Framing” effects

80% FAT-FREE!

Vulnerability to “Framing” effects

20% FAT!

Ignorance of “base rates”

There are 70 engineers and 30 lawyers.
John is chosen at random from this group.

John is a 40-year-old married man with three children. He is conservative and cautious. He has no interest in politics, and is awkward around people. His hobbies include carpentry, sailing, and solving mathematical puzzles.

What do you think John is? How confident are you?

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Ignorance of “base rates”

- There is a disease that strikes 1 in 1000 people
- There is a test for a disease.
- If you have the disease, the test will definitely say that you have it. There are no misses.
- But the test is not perfect.
- It has a false positive rate of 5%
(Even if you don't have the disease, 5% of the time the test will say that you have it.)

You take the test. It says you have the disease. What are the odds that you actually have the disease?

Imagine 1000 people, all who take the test

On average, 1 will have the disease.
This person will test positive

This leaves 999 people who do not have the disease. The test will mistakenly say that 5% of these have the disease -- about 50 of them.

So for every 51 people who test positive,
only 1 will have the disease

$$1/51 = \text{about } 2\%$$

Availability Bias

- Availability is an excellent cue to frequency.
- But it can sometimes go wrong ...

___ NG
___ ING

Misled by the media ...

Potato Salad Attack!

Confirmation Bias

- Imagine that you serve on the jury of an only-child sole custody case after a messy divorce.
- Parent A has an average income, average health, average working hours, a reasonable rapport with the child, and a relatively stable social life
- Parent B has an above-average income, minor health problems, lots of work-related travel, a very close relationship with the child, and an extremely active social life.

Which parent would you award custody to?

Confirmation Bias

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Which parent would you deny custody to?

Confirmation bias

Confirmation bias

Wrong if D on one side and NOT 3 on the other side

Confirmation bias

Need to check D (to see if there is a 3 on the other side)

Need to check 8 (to see if there is a D on the other side)

Improvement in real-world
situations

Improvement in real-world
situations

Violation if (under 21) on one side and beer on
the other side

Improvement in real-world situations

Need to check (under 21) (to see if there is beer on the other side)

Need to check beer (to see if there is (under 21) on the other side)

Reading Response

Choose some aspect of human psychology that could plausibly be a biological adaptation. Apply “reverse engineering” to it, and present a theory of why it evolved.

Use your theory to make a novel prediction about its current nature.