Human Nature: Methods & Measurement

Criteria for a Scientific Theory (*per Buss):

- Organization
- Parsimony
- Explanatory*
- Predictability
  - Testability*
  - Guide to research and discovery*
- Control

Scientific Theory?

- Creationism?
- Seeding Theory?
  Testable, but not explanatory

(Buss confuses Origins of Life with Origins of Species)

- Natural Selection?
  "Confirmed many times, never disconfirmed"
  "There is really no contest"
  Do differences between groups ⇒ a change within any group
    Per Galapagos Finches?
    (Moths)

Can Present Form Inform Us About Past Contingencies and Behaviors?

Baker & Bellis, 1995:

Functional Analysis (per Evolutionary Ψ) of Different sperm morphology

- Fast, wavy-tailed "Egg Getters"
- Coil-tailed, "Kamikaze" which attack and kill sperm of other Men

- Implies earlier Adaptive Problem for males:
  - Inter-Male-Interval for females less that 1 week (the life of a sperm)
    - Morphology suggests sperm competition
    - Modern psychological analogue in jealousy?

- Implies previous adaptive benefit for females of mating with many males

I Can Do That Too!

Brain cells communicate with neurotransmitters

- Bind to receptor molecules on (close by) target cell
  - Opens ion channels
- Many neurotransmitters also hormones released by glands into blood supply
- Hormone receptors have same structure as “super-family” of NT receptors

Is the brain a gland that went Uptown?

- Paracrine Gland

Ion channels in Protista

- Did neurotransmitters originally signal communication
  - Between unicellular organisms (lymphokines)

Three Products of Evolution

1. **Adaptation:**

Solves a problem of survival or reproduction (functionalism)

Inherited

Reliably Developing – at right time, across all members (Sex)

In normal environments

Window of opportunity ⇒ adaptation (language)

Kagan: "The brain is wired to learn language and learning language rewires the brain"

"Species Typical" – Lactose Intolerance?

If we were Finches, we would be different species

Mediated by genes

Each generation a little different (height)

Adaptation Continued

Benefits:

Direct: Fear of snakes

Indirect: Desire for Social Status ⇒ future access to desirable mate

Very Indirect: Helping siblings to reproduce (Inclusive Fitness)

Originates with spontaneous mutation

Mistake in replication of DNA fragment

Single Individual (cooperative hunting? Lions v. Tigers, post hoc)

Usually harmful, not retained in gene pool

Spreads to **Every** Individual

Environment of Evolutionary Adaptedness (EEA):

Selection pressures during **Period of Evolution** of characteristic

Product of **many** genes (e.g.: eye)

2. By-Products

- Do not solve adaptive problems
- Have no function
- By-product of an adaptation
  - Must identify the adaptation (umbilical cord vs. belly button)
    - Vermiform Appendix?

3. Random Effects

Not linked to an adaptation (per By-Products)

Results from mutations or sudden changes in environment

Can be positive, neutral, or negative

Only carried along if non-negative

Relative Size of 1-3?

Language as Incidental by-product of large brain or Adaptation?

(R.L: Elaboration of primate facial communication with increasing social complexity)

Adaptations are primary product of evolution by selection

Including psychological adaptations

Levels of Analysis

1. **General Evolutionary Theory:** Inclusive Fitness
   - Viable Offspring (Classical Fitness)
   - Fitness of Kin

   Not tested directly

   "observed many times in laboratory and field"

   Mutations?

   Selective breeding (characteristic must already be present)

   Maze-bright rats, Aggressive dogs

   Industrial Revolution soot → darker moths

   Potential falsification:

   Adaptations too short for evolution, for other species,

   or same-sex competitors

2. Mid-Level Theories

Broad Domains, Not predicted from General Evolutionary Theory:

E.G. Trivers's Parental Investment Theory of sexual selection

Leads to **Predictions**

E.G.: Aspects of Mate choice and Intra-sexual competition

Parent investing more will be more choosy

Parent investing less will be less choosy leading to more competition

vs. Parental Investment: Ham & Eggs

A poor choice by females has more profound consequences

(An explanation for modern pathologies?)

Choosiness in males: Greater reduction in fecundity

Parental Investment, continued

In species where males have greater investment:

- Males more choosy
- Females more competitive for males

Females implant eggs in male

- Mormon cricket
- Poison-arrow frog
- Pipefish seahorse

3. Specific Evolutionary Hypotheses

- Can be tested empirically
- Should exist across a wide variety of cultures

E.G. Women invest heavily in offspring and are relative choosy:

- Choosiness will reflect whatever increased child's survival in the **past**
- Women should have an evolved preferences for men with resources
  - Reflected in specific **Psychological** mechanisms – desires
  - H_1: Should be attracted to attributes associated with resources (even prior to)
    - Social status
    - Intelligence
    - Age

3. Specific Evolutionary Hypotheses, continued

H_2: Frequency/duration of eye gaze in single's bars should
Correlate with visible signs of resources

H_3: Women should be more likely to divorce males who fail to generate resources

H_4: Because 99% of our history as Hunter-gatherers:
Women should be attracted to attributes associated with
Successful hunting

- Athletic prowess
- Hand-eye coordination
- Physical endurance (in the original sense)

(How socialistic were these tribes?; NCUR)

3. Specific Evolutionary Hypotheses, continued

Predicted from and lend support to Middle-Level Theories

Consistent failure of predictions throws theory in doubt

- Were women free to choose mate?
- Did a mutation ever arise?

Theories: General relationships
Hypotheses: Specific instances

R.L.: Theory of Relative Orgasmic Latency?

Theory↔Hypothesis↔Observation

Top-Down: Start with Theory (E.G.: Parental Investment)
Generate Hypotheses and Look for supporting data

Bottom-Up: Start with observations generate a Theory and look for Confirming evidence (Hypothesis testing)

Question: Why do men prefer attractive women (Observation)?

Theory: Beauty is a cue to fertility (men attracted to beauty out Re-produce other men; not an Intentional design)

Hypothesis: Men should prefer a Waist-To-Hip ratio associated With fertility

Theory↔Hypothesis↔Observation Continued

Data:

- Women in fertility clinics with low waste-to-hip rations (WHR) get pregnant sooner

- Women with higher WHR: greater risk of endocrine & heart disease

- Across continents, cultures, and age, men prefer a WHR = 0.70
  Implies not learned
  Independent of preferred build (girth) of the women

The Nature of All Species Arises From Evolved Mechanisms

"All Psychological theories imply a Human Nature"

- Freud: Unconscious Sexual and Aggressive Impulses (Ironic)
- Skinner?
  - Tabula Rasa?
  - Nature is to Learn?

"All Psychological theories are explicitly or implicitly Evolutionary"

- Feminist Theory?
  - No universal nature
  - Cultural
  - Theory?: Testable? Data?
- Margaret Mead

The Mind is a Collection of Evolved Mechanisms

What are the Contexts which evoke these mechanisms?
What Behaviors are generated by these mechanisms?

Evolutionary origins provide insight into Human Nature
The **Process** of Evolution implies the **Product** of Evolution

Clinical Evolutionary Psychology: Getting over the Twentieth Century

Evolved Psychological Mechanisms

A set of processes characterized as:

1. **Recurrently** solved a **Specific** problem in **History**
   - Vis-à-vis **Survival or Reproduction**
   - **Design Features** correspond to features required to solve an **Adaptive Problem**

2. **Activated** by limited information or **cues**
   - Present in **Environment of Evolutionary Adaptedness (EEA)**
   - Or modern simulacrum (pathology?)

     E.G.: Snakes

Evolved Psychological Mechanisms, continued

3. **The Information Input specifies the Adaptive Problem at hand**
    - What food is edible
    - Snake represents aggressive death

    "Almost invariably unconscious… unconsciously triggers Adaptive Mechanism"
        - Freud's Instincts
        - NMR of amygdala to retroactive visual masking

Evolved Psychological Mechanisms, continued

4. Evolved Psychological Mechanisms
   transform information input into behavioral outputs

Via decision rules
Input: Snake

Output:
Attack
Freeze
Run

Evolved Psychological Mechanisms, continued

5. Behavioral Outputs:
   - Physiological response
   - Cognitive evaluation -- e.g.: jealousy
   - Overt motor response

6. Outputs directed toward a solution to a specific adaptive problem
   - Success is stochastic
   - Success can be obsolete -- e.g.: conservation of fat
     - Psychopathology?

Irony

Evolved psychological, adaptive mechanisms provide flexibility:

- In contradistinction to “Instincts,” Fixed Action Patterns
- Invoke decision rules
  - Several response options