

In this (last!) brief unit, we'll take a look at the field of evolutionary psychology, a branch of psychology (or biology, depending on your perspective) that deals with understanding human behavior from an evolutionary perspective. In this brief overview, we'll take a look at:

1. the historical and theoretical underpinnings of EP;
2. the premises, types of questions, and general methods used by EP to investigate human behavior;
3. a few examples to illustrate the range of questions, approaches (and quality) of EP investigations.

The material for this unit comes primarily from Buss (1999), Evolutionary Psychology: The New Science of the Mind and Cosmides and Tooby, Evolutionary Psychology: A Primer ([http://humanitas.ucsb.edu/users/steen/CogWeb/EP-primer\\_contents.html](http://humanitas.ucsb.edu/users/steen/CogWeb/EP-primer_contents.html)).

#### EVOLUTIONARY PSYCHOLOGY

- A. Evolutionary psychology represents a synthesis of biology and psychology that extends the study of animal behavior as we've reviewed it this semester (including both proximate and ultimate analyses) to the study of human behavior.
1. Definition from Buss (1999): Evolutionary psychology focuses on **“the analysis of the human mind as a collection of evolved mechanisms, the contents that activate those mechanisms, and the behavior generated by those mechanisms.”**
    - a. “collection of evolved mechanisms” implies
      - i. a specific view of the structure/function of the human mind (we'll discuss shortly)
      - ii. the role of natural selection in shaping the structure/function of the human mind
    - b. EP's hope that, by focusing on the evolutionary processes involved in shaping the mind, they can understand both the process itself, and the products of that process – i.e., the specific behaviors that arise from it.

2. The major contributions to EP from evolutionary biology include theories/hypotheses that are especially important for understanding social behavior
  - a. we are social animals; social contexts have been part of our selective milieu for millions of years
  - b. although EP doesn't focus exclusively on social behavior, social behavior is arguably the most common focus
  - c. the major theories/hypotheses are:
    - i. Neo-Darwinian theory of natural selection
    - ii. the theory of inclusive fitness and kin selection (i.e., that selection can favor traits that enhance genetic representation via relatives other than offspring) – W. D. Hamilton
    - iii. sexual selection theory and its resulting hypotheses about mating tactics, mating systems, etc. – Robert Trivers
    - iv. reciprocity theory -- also Trivers. Briefly, sets the conditions under which cooperative behavior (e.g., food sharing and other “altruistic” acts offered to non-kin) can be an evolutionary stable strategy -- i.e., be maintained by selection evolve without being “wiped out” by “cheating”. Specifically, individuals must have cognitive mechanisms allowing them to:
      - a) recognize cheating when it happens
      - b) remember cheaters
      - c) deny cooperation to cheaters in the future
3. In psychology, EP stems from the “cognitive revolution”, which involves (ed?)
  - a. rejection of “radical behaviorism” (extreme “Skinnerism”) – the idea(s) that
    - i. human behavior is nearly infinitely flexible because
    - ii. our minds consist of a few general learning mechanisms that let us acquire a nearly infinite range of responses to different environmental conditions

- iii. major problems with this view are that:
    - a) learning is clearly not infinitely flexible in rats or humans
    - b) anthropological studies reveal lots of human “universals” that shouldn’t exist under strict behaviorism (if cultures vary, then learning outcomes will vary)
  - b. new ways of thinking about the mind as a collection of information-processing systems – and a new emphasis on studying the actual processes involved
  - c. according to Buss, EP brings the “final step” to the cognitive revolution: recognizing the role of evolution and the process that shapes information-processing systems lets EP’s provide “a broad specification of the kinds of information-processing problems the human mind was designed to solve – problems of survival and reproduction.”
- B. What EP is not – common misconceptions, abuses, etc.:
- 1. EP is not behavioral genetics:
    - a. behavioral genetics focuses on behavioral differences among individuals and seeks to explain the causal processes responsible for them
    - b. EP, in contrast, focuses on “universals” – species-specific patterns of behavior that should, because they’re species-specific, represent the products of evolutionary processes
    - c. think, e.g., of the difference between trying to understand height variation among individual humans vs. trying to understand why humans are, in general, fairly tall, slender primates.
  - 2. EP does not suggest that the human mind is a general-purpose “fitness-maximizing” computational device –
    - a. an alternative view of human behavioral evolution – characterizing early sociobiology (a precursor to EP) holds that the mind can (generally unconsciously) “figure out” what would constitute fitness-maximizing behavior under any particular set of circumstances

- b. EP, as we'll see in a bit more detail later, is based on the idea that the human mind consists of lots of different "modules" or mechanisms, each "dedicated" to solving a particular adaptive challenge
  3. Although these misconceptions arise in the popular press (and other places), EP does not propose that:
    - a. human behavior is genetically determined (any more than any kind of behavior we've looked at is!);
    - b. because it's evolved, human behavior is unchangeable (so we should just accept things as they are);
    - c. because it's evolved, human behavior shouldn't be changed (because that would be "going against nature", or cause great psychological stress, etc.);
    - d. because it's shaped by natural selection, human behavior is optimally designed = maximally adaptive
      - i. the evolution of human behavior is subject to the same constraints, time lags, neutral consequences, and maladaptive side-effects as the evolution of any other kind of trait in any other kind of organism
      - ii. in particular, most of human behavioral evolution took place in a radically different environmental context than we now experience – so that alone is going to be a good reason to be skeptical about claims of current adaptive function
  4. EP does get a "bad rap" among both scientists and laypeople for a few important reasons:
    - a. Some people (scientists and non-scientists alike) just don't like thinking that human behavior has any evolutionary basis – often because they misunderstand what that means and end up with the misconceptions outlined above.
    - b. Misconceptions about it (especially a-c) have been used (really abused) to promote often repressive socioeconomic and political ideologies – especially

against people of color, women.

- i. This is really an extension of the kinds of abuses (e.g., eugenics, Social Darwinism) that have historically been committed in the “name” of natural selection
- ii. The science gets blamed for the abuse, rather than the folks doing the abusing.
- c. Like other “kinds” of evolutionary biologists, some EP’s fall into the trap of “naive adaptationism” – generating adaptive “just so stories” based on minimal evidence and lacking careful attention to alternative explanations. Here, the “bad science” gets more attention than does the good science.

#### C. What EP is: the framework and scope of EP

1. Five basic principles underlie EP – they should sound very familiar by now!
  - a. The brain is a physical system that functions like a computer, with circuits designed to generate behavior appropriate to environmental circumstances
  - b. Neural circuits were “designed” by natural selection to solve adaptive problems faced by our ancestors during our evolutionary history
    - i. adaptive problems = problems
      - a) that recurred throughout our evolutionary history
      - b) whose solutions affect reproduction of individuals
    - ii. Note that, for the vast majority of our evolutionary history, we were most likely hunter-gatherers living in small groups – very different from our current environmental context.
    - iii. Many of our current behaviors (problems we currently solve) are by-products or consequences of abilities that evolved in that older context.
  - c. Most of the information processing that happens in our minds is unconscious – so our conscious experience may lead us to believe that our circuitry (and the problems we use it to solve) are much simpler than they actually are.
  - d. Different neural circuits are specialized for solving different adaptive

- problems.
- i. As mentioned earlier, EP's view the mind as consisting of many different specialized mechanisms, rather than a few, more general "learning" or "reasoning" mechanisms (the old "general intelligence" of IQ tests).
  - ii. In this view, the mind is like a tool box – and our behavioral complexity and flexibility is a direct function of
    - a) the number of specialized tools – or, more appropriately, dedicated mini-computers, and
    - b) the presence of circuits designed to integrate the output of those individual mini-computers.
  - iii. This view is supported by evidence that we have specialized:
    - a) reasoning circuits – different circuits for reasoning about
      - 1) objects
      - 2) physical causality
      - 3) number
      - 4) beliefs and motivations of other individuals
      - 5) social interactions
    - b) learning circuits – different circuits for acquiring
      - 1) language
      - 2) food aversions
      - 3) snake and other phobias
  - iv. Both reasoning and learning circuits have properties that qualify them, in psychological terms, as instincts – so they can be thought of as such.
  - e. Our modern skulls house stone age minds.
    - i. Our evolutionary history includes some 10 million years of being nomadic hunter-gatherers living in relatively small groups – that's the evolutionary context we have to focus on.
    - ii. Cognitive mechanisms that produced adaptive behaviors in the past may

not do so now – in fact, some EP's are highly suspicious of explanations positive current, rather than past, adaptive functions for behaviors.

2. The key questions asked by EP's are the same kinds of questions asked by other behavioral biologists – just about human behavior generally, and on the cognitive mechanisms underlying them specifically:
  - a. Where in the brain are the relevant circuits located; how, physically, do they work?
  - b. What kind of information do the circuits process (visual, spatial, social, etc.)?
  - c. What information-processing programs do the circuits embody (i.e., what kinds of “decision-making rules” do they use)?
  - d. What is the adaptive function (if any) of these circuits?
3. The methods of EP are largely the same as those used in other kinds of evolutionary and behavioral studies, supplemented with data from a large variety of sources and methods from other fields of psychology
  - a. General scientific method is the same
  - b. For adaptive hypotheses, the same kinds of alternative hypotheses are recognized
  - c. The comparative method is very important:
    - i. cross-cultural comparisons analogous to “close relative, different environment” component of “classic” comparative method
    - ii. comparisons to modern hunter-gatherer cultures give some insights into historical selective pressures
    - iii. comparisons with non-human primates are also very important
  - d. A variety of experimental methods can be used – but obviously more limited than can be applied to non-humans!
  - e. Data sources are diverse:
    - i. archaeological records
    - ii. ethnographic information

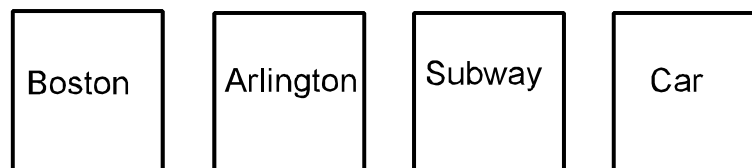
- iii. direct observation
- iv. self-reporting (interviews, questionnaires)
- v. life history and other public information from, e.g., Census Bureau etc.
- vi. human products (cultural artifacts)

#### D. Brief examples of EP studies

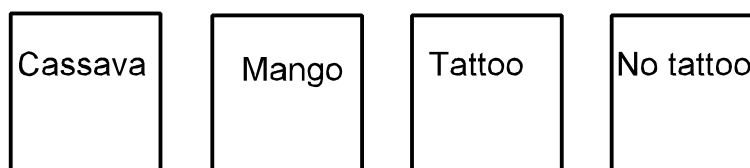
##### 1. Cosmides & Tooby – reasoning instincts

- a. general hypothesis = human mind contains cognitive circuits specialized for reasoning about adaptive problems posed by the social world of our ancestors.
- b. one such “problem” is appropriate practice of reciprocity (“I’ll scratch your back; you scratch mine” or favor-for-favor)
  - i. Social exchanges (reciprocity) have, according to investigators, been part of our evolutionary history for several million years.
  - ii. Social exchange happens in all cultures – it’s a “universal” behavioral phenotype. Its universality, in turn, suggests a universal cognitive mechanism producing it across a range of cultural conditions.
  - iii. Social exchange does result in specific selective pressure:
    - a) individuals only benefit if benefits (food, services, etc.) given to individuals who can reliably be expected to reciprocate at some future date
    - b) so, selection should favor cognitive mechanisms that allow individuals to reliably detect and understand cues to the propensity of individuals to either reciprocate or cheat.
  - iv. **one specific hypothesis = evolved cognitive architecture of human mind should include inference procedures specialized for detecting cheaters**

- c. prediction/test using experimental techniques of cognitive psychology:
- i. Use Wason selection task = test of ability to detect violation of logical rules of the form “if P then Q”
  - ii. e.g.: “If a person goes to Boston, then that person takes the subway”
    - a) present individual with four cards, each representing information on one person
    - b) each card has a destination on one side and a mode of transportation on the other:



- c) task = select only those cards definitely needed to turn over to see if any of these people violated the rule
- iii. frame a “social contract” as a logical statement of the sort “if P then Q”:  
“if you eat cassava, you must have a tattoo on your chest”
- iv. use Wason selection task to test the ability of individuals to detect violations of the social contract = cheating: use four cards, each representing one person, with information about tattoo on one side and food eaten on the other:



- v. prediction: individuals should be better at detecting violation when test framed as social contract than as some other logical rule (note that logical structure is identical – only the content of the test has changed)
- vi. results:
  - a) 20 years of data on Wason tests indicates that fewer than 25% of subjects get “basic” tests right – even when formally trained in logic and even when rules deal with familiar content from everyday life.
  - b) In contrast, when social contract used as content:
    - 1) 65-80% of subjects get the right answer
    - 2) answer is intuitive, not reasoned
    - 3) results stay high even when situation is culturally unfamiliar or bizarre
    - 4) results stay high across cultures and age groups (adults in US, UK, Germany, Italy, France, Hong Kong; kids in Ecuador, hunter-horticulturalists in Ecuador)