Behavioral genetics and evolutionary psych.

- Where did your personality come from?
- Where did this trait come from in the first place?
- 2 biologically based approaches to how personality might be “inherited”—characteristic patterns of behavior encoded on genes and passed from parents to kids across generations
  1. Behavioral genetics
     - How individual differences in behavior—personality traits—are passed from parent to child, and are shared by biological relatives
  2. Evolutionary psychology
     - How patterns of behavior characteristic of all humans originated in the survival value of these characteristics over history
     - These 2 approaches are connected b/c the evol approach assumes that inherited personality attributes that promoted survival became more prevalent across generations, and the personality attributes we inherited from our ancestors—ancient and recent—are the final result
     - Behavioral genetics focuses on how personality can be inherited like a bank account or an estate; evolutionary psychology asks, where did all this money come from in the first place?

Behavioral genetics

- Similarity in physical appearance and personality is from the genes that bio relatives share with each other
- Are you psychologically similar to your sibling because you are biologically related?
- Genes can influence broad patterns of behavior
- A pattern of behavior that is relevant to more than one situation is a personality trait

Calculating heritabilities

- Compare similarities in personality between individuals who are/aren’t genetically related, or who are related to each other in different degrees
- What is the degree to which variation in the phenotype (observable traits of a person), can be attributed to variation in the genotype (underlying genetic structure)?

Twin studies

- Identical (monozygotic or MZ)—genetically identical
  - “one-egg” twins come from splitting of a single fertilized egg
- Fraternal (dizygotic or DZ)
  - “two-egg” twins come from 2 eggs fertilized by 2 different sperm
  - even though born at the same time, are no more genetically related than any other 2 siblings
- Humans are highly similar to each other genetically
  - >99% of all human genes are identical from person to person
- Behavioral genetics focuses on the <1% of the human genome that doesn’t vary
  - MZ twins are identical in all of these varying genes
  - DZ twins share about ½ of them, on average
  - i.e. a mother who shares 50% of her genetic material with her child is sharing the 50% that varies across individuals
- Like trait psychology, behavioral genetics focuses on aspects of the personality that differ from one another
- The inheritance of “species-specific” traits that all humans share
What heritabilities tell you

1. Genes matter
   - Psychologists used to think that personality was determined environmentally by early experiences and parental practices
   - Heritabilities challenge that idea when they turn out to be >0 and they almost always do
     * This should be called the first law of behavior genetics
     * Not all of personality is environmental; some is from the genes

2. Insight into etiology
   - Heritabilities sometimes can tell you whether specific behavioral or mental disorders are part of the normal range or are pathologically distinctive
   - Severe mental retardation (IQ <50 with 100 as ave) isn’t heritable (violates the “first law”)
   - The ave IQ of a sibling of a severely retarded child is normal 103
   - However, moderate MR (IQs ranging 50-69) does seem to be heritable with the ave IQ of the sib of the mod MR child is 85
   - This suggests that severe MR comes from something other than inheriting it—likely something from the environment

3. Insight into effects of the environment
   - The major finding of behavioral genetics is this: growing up together in the same home doesn’t tend to make kids similar to each other
   - The personality traits of adoptive sibs raised in the same family resemble each other with a correlation of only .05 which means that a mere 5% of the variation in their personalities is due to their common family environment
   - Important is the early environments that sibs don’t share with each other
     - Effects of birth order (firstborns treated differently from later-borns), friendships outside the home, and other outside interests and activities

Does the family matter?

1. Psych Judith Harris wrote articles and a book arguing that parents—and the rest of the family environment—don’t matter at all
   - The evidence from past research is not quite as strong as summaries by Harris and others might make it appear
   - Several dev outcomes like juvenile delinquency, love styles, and aggression have been found to be affected by the shared family environment

2. Decades of research in developmental psychology have documented the effects of child rearing, family environment, and even social class on personality
   - It must be admitted that research on how parental styles affect children has been confounded by the fact that parents and their kids are genetically related
   - So, some of the effects that psychologists have believed were due to the way parents raise their kids may be due to the genes that parents share with their kids
   - Experiments have shown that when mothers and fathers are taught how to be better parents, their kids both behave better and control their emotions more effectively

Sexual orientation and twin research—CBS News—60 minutes

http://www.cbsnews.com/stories/2006/03/09/60minutes/main1385230.shtml

Does the family matter? (cont.)

1. The conclusion that shared family environment is unimportant for the development of adult personality was reached too quickly on the basis of limited data
2. Personality can be studied using different kinds of data and all should be used:
   - Conclusions based on only one kind of data are at risk and less likely to hold up
   - The overwhelming scientific evidence is that parents do matter

C. Social scientists disagree about the role of the family in shaping personality

D. Some studies suggest that family environment is important, while others do not

E. The debate about the role of the family in shaping personality is still ongoing.
Nature vs. nurture

- Scientists have looked for a simple number to resolve this debate
  - What % of any given trait was due to nature (heredity) and what % to nurture (upbringing and environment)
  - The heritability coefficient has seemed like that number since it yields a figure between 0-100% reflecting variation in a trait due to variation in genes
  - Consider the # of arms you have.
    - Was this determined by your genes or your childhood environment?
    - On the trait of arm quantity there is almost no variation across individuals—2
    - Heritability is the proportion of variation from genetic influences so if there's a variation, then the heritability approaches zero
    - Generally the less variation there is on a trait across individuals, the lower the heritability is likely to be
    - This means that if a given trait has a high heritability, 1 of 2 things is possible
      1. That trait may vary greatly across individuals, or
      2. It might be a trait for which genes are important
    - The difference between people with one arm and two is produced by the environment and not genes
      - This is why the heritability for the # of arms people have will be near zero

How genes affect personality

- Association method
  - Molecular geneticists try to determine whether differences in a trait are correlated with differences in a particular gene across individuals
  - Genes themselves can’t cause anyone to do anything any more than you can live in the blueprint of your house
  - The genotype only provides the design, and so affects the behavioral phenotype indirectly by influencing biological structure and physiology as they develop within an environment
  - The next challenge is to understand how those aspects interact with environmental experience to affect behavior

Gene-environment interactions

- Genes and the environment interact to determine personality
  - I.e. in an environment where every child receives adequate nutrition, variance in height will be controlled genetically (heritability of height will be a large #), but in an environment where food is scarce and some kids have good nutrition while others don’t, variance in height will be under the control of the environment (heritability of height will be a small #)
  - The way people choose their environments
    - I.e. person who inherits a tendency toward sensation seeking may take drugs which could harm their health or involve them in the drug culture—either could have effects on their experience and the development of their personality
  - Most importantly is the way genes and environments interact
    - The same environment can affect different individuals in different ways
      - I.e. a stressful environment may lead a genetically predisposed person to develop mental illness
    - Behav genetics often seen as pessimistic and suggesting that we’re born a certain way and it can’t be changed
      - If the way genetic predisposition interacts with the environment is understood, then it should be possible to change the environments of people at risk for various outcomes to help them to avoid them or find an environment where their personality can lead to good rather than bad outcomes

The future of behavioral genetics

- Genes are important in the determination of personality
  - Behavioral geneticists need to explain how genes create brain structures and aspects of physiology that are important for personality
  - They also need to explain how a person’s genetically determined tendencies interact with their environment to determine how they behave
Evolutionary theory

• The foundation of modern biology
• Began with Darwin’s Origin of the Species to compare one species of animal or plant to another, to explain the functional significance of various aspects of anatomy and behavior, and to understand how animals function within their particular environments
• Wilson’s Sociobiology applied evol theory to psych and soc
• Lorenz’ On Aggression tried to explain human behavior using analogies to animals and their evolution
• This approach assumes that behaviors seen in people are present b/c in the evol hx of the human species, these behaviors were helpful or necessary for survival
• The more a behavior helps an individual to survive and reproduce, the more likely the behavior is to occur in future generations
• This approach to explaining personality identifies a common behavior pattern and then asks how that pattern could have been adaptive (beneficial to survival and reproduction) during the development of the human species

BBC--Sex and the Brain

http://www.bbc.co.uk/science/humanbody/sex/add_user.shtml

Sex differences in mating behavior--selection

• Mate selection
  – What one looks for in the opposite sex
  – Is the average heterosexual more likely to be interested in the person’s (a) physical attractiveness or (b) financial security?
  – In North Am, men are more likely to value attractiveness more and women economic security
  – Men more often choose younger mates and women vice versa
  – Evol explanation is that the differences in what each is seeking is about the same thing—the greatest likelihood of mating with someone with whom they will have healthy offspring who will survive to reproduce
  – Women bear and nurse the children and so attractiveness relates to a cue for men that the woman is young, healthy, and fit to bear children
  – Women look for a mate who can provide an environment and resources for her children’s survival

Sex differences in mating behavior--strategies

• Mating strategies
  – How one handles heterosexual relationships
  – Men tend to want more sexual partners and are less faithful or picky about whom they mate with
  – Women are more selective about their partners and once mated seek monogamy and a stable relationship
  – These differences can be explained by reproductive success
    • Males may succeed in the # of children to reproduce in the future by having as many children with as many women as possible
    • Females are more likely to have viable offspring by convincing the man to stay and support the family
Buss—study on jealousy

In a seriously committed relationship, imagine the person you're seriously involved with becomes interested in someone else. What would distress or upset you more:

a) imagining your partner forming a deep emotional attachment to that person, or
b) Imagining your partner enjoying passionate sexual intercourse with that person?

60% of males chose b) and 82% of females a)

Buss—follow up jealousy study

What would upset you more:

a) Imagining your partner trying different sexual positions with that other person, or
b) Imagining your partner falling in love with that other person?

45% of males chose a) and only 12% of females chose a) So, 55% of males chose b) and 88% of females chose b)—both genders were more threatened by their partner falling in love with someone, but somewhat more for women

Evol explanation of Buss study

• For a man who has committed to one woman and supports her family, his greatest worry is sexual infidelity — he might not be the bio dad of the kids he’s supporting

• For a woman, the greatest danger is emotional infidelity — the development of an emotional bond between her mate and another woman will cause support of she and her family to be w/d or that her mate will share resources (that would belong to her and her kids) with another woman and kids

• “Sexy son hypothesis” — Suggests that some women follow a reproductive strategy different from that of most other women
  - Instead of trying to maximize the reproductive viability of her offspring by mating with a stable male, they choose an unstable, but attractive one
  - The theory is that if they produce a boy, even if the dad leaves, the son will be just like dad
  - When he grows up, this “sexy son” will himself spread many kids in the same irresponsible manner as his dad

Individual differences

• Evol psych’s focus on general human nature vs. differences implies that individual differences are unimportant b/c maladaptive behavioral variations should’ve been selected out of the gene pool long ago

• It’s also true that evol requires differences to be maintained

• Species only change through selective survival into later generations of the genes of the individuals who’ve been most successful in earlier generations

• Evol psych tries to account for differences in 3 ways
  1. Behavioral patterns evolve to be reactions to particular environmental experiences — Caucasian skin has a bio tendency to darken if and only if exposed to the sun
  2. People may have evolved several possible behavioral strategies and use the one that makes the most sense given their other characteristics — We may have innate abilities to be aggressive and agreeable — The aggressive style works only if we’re big and strong; otherwise the agreeable one is wiser
  3. Some bio influenced behavior may be frequency dependent in that it adjusts according to how common it is in the population otherwise
Objections and responses

1. Methodology
   - It's interesting to speculate "backward" as evolutionary theorists do, by wondering what in the past might have produced a behavioral pattern we see today
   - But how can these speculations be empirically tested?
     - What kind of experiment can see whether men actually seek multiple sexual partners to maximize their genetic propagation
     - Not all genetically influenced traits or behavior patterns have evolved for a purpose
       - i.e. child abuse
     - Bits and pieces of this theory can be tested

Objections and responses

2. Reproductive instinct
   - It may be strange to assume that everyone wants as many kids as possible when many people use birth control and abortion to limit their own reproduction
   - Evolutionary psychologists would say that for evol. theorizing about behavior to be correct, it's not necessary for people to be consciously trying to do what they theory says they are ultimately trying to do
   - Whether you want kids or not and you might practice birth control, you wouldn't be here is someone had kids

Objections and responses

3. Conservatism
   - Because it assumes that whatever tendencies exist in human behavior evolved because of past environments experienced by the species, and these tendencies are biologically rooted, the evol approach seems to imply that the current behavioral order wasn’t only inevitable, but probably unchangeable
   - This causes problems for those that believe that child abuse or rape must and can be changed
   - Those who oppose evol psych commit the "naturalistic fallacy" of believing that all that is natural must be good
   - Evol psychologists aren’t suggesting that because something is natural that it’s good

Objections and responses

4. Human flexibility
   - Evol psych describes a lot of complex behavior as genetically programmed into the brain, but a general lesson of psych is that humans are extraordinary flexible creatures with a minimum of instinctive behavior patterns compared with other species
     - The outer cortex of the brain functions to plan and think in ways that goes beyond fixed action patterns and other simple responses, but evol psych seems suggest that built-in patterns of behavior can’t be overcome by conscious, rational thought
     - In the domain of behavior, did people evolve general capacities for planning and responding to the environment or specific behavioral patterns or "modules"
     - Is it a collection of specific responses triggered almost automatically by particular circumstances?
       - When explaining behaviors like mate preference, sex differences in jealousy, and child abuse and rape, evol psych seems to favor a "modular" approach
     - Is it the ability to plan, foresee, choose, and override behavioral impulses?
       - When addressing individual differences, it acknowledges the evol the cerebral cortex has given the brain to respond flexibly to changing circumstances and overcome innate urges
Objections and responses

5. Biological determinism or social structure?
   • Many behavioral phenomena may be the result not of evol hx but of humans flexibly responding to circumstances, esp. social structure
   • i.e. the sex differences discussed earlier may be caused not by bio hard-wiring, but by the current structure of society
   • Eagly and Wood have an alternative to the evol accounts of the differences in the criteria used by men and women in choosing mates
   • b/c of men’s greater size and strength and women’s role in childbearing and lactation, societies have developed around the world in which men and women are assigned different jobs and social roles
   • Men around the world tend to be warriors, rulers, and in power
   • Women tend to be restricted to near the home, and gain power and affluence as a function of the men they affiliate with
   • This could explain why women value men’s wealth more and the wealth of women matters less to men
   • Theoretically this argument goes to the question of how much of human nature is evol-determined and bio inherited
   • Practically it’s because the world is changing—the division of labor isn’t as inevitable, but it continue anyway b/c societies are slow to change

The contribution of evolutionary theory

• After the intro of evol thinking into psych, the field won’t ever be the same
• Not every aspect of thought or behavior exists b/c it’s specifically evolved, but researchers should consider whether it did

Will biology replace psychology?

• Bio reductionism
  – b/c psych is a “psychophysical” system, once everything is known about brain structure and physiology, there won’t be anything left for psych to do
  – Bio approaches to psych often tell us more about bio than about psych
    • It doesn’t provide how people act in their daily social environments, or of the important consistencies found in other behaviors
    • It can’t say much about what’s on your mind at the moment
• Remember that different approaches to pers are not different answers to the same question, but different questions

Putting it all together: sexual orientation

• What causes a person to become heterosexual, homosexual, or bisexual?
• Bem shows that anatomical, neurochemical, evol, and genetic perspectives can be combined with social psych and sociology to explain the processes that determine this interesting psych outcome
• The right question is not to ask what is the cause of homosexuality, but what directed sexual orientation in general?
  1. Bio influences (genes and hormones) produce kids with certain childhood personalities (temperaments)
  2. These temperaments interact with the structure of childhood society, which strongly segregates boy and girl/playgroups beginning at about 5 y.o.
  3. A boy who enjoys rough-and-tumble play will fit in well with groups of boys, but a boy whose temperament leads to nonenjoyment of these activities and may seek out girls
  4. One boy will see girls as unfamiliar and “exotic,” while the other sees boys as “exotic.”
  5. People are physically aroused by novel stimuli
    • When they see something unusual or strange, their heartbeat and blood pressure increase
    • This leads to the boy who grew up around other boys to be aroused by girls and the boy who grew up around girls is aroused by boys
  6. The most important aspect of Bem’s theory may be the way it shows how a bio informed theory of pers should look like
• The personality you inherited from your parents/ancestors determines where you start, but where you go from there depends on many things and is ultimately up to you
Bem Sex Role Inventory:
http://www.neiu.edu/~tschuepf/bsri.html

Scoring Sheet:
http://www.neiu.edu/~tschuepf/bsri-sc.html