Evolutionary Theories in Psychology

Instructor Manual

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The Evolutionary Theories in Psychology module encapsulates the central concepts of the field, such as natural and sexual selection, as well as theories of gene selection, sexual strategies, and error management.

Learning Objectives

- **Relevant APA Learning Objectives (Version 2.0)**
    - Describe key concepts, principles, and overarching themes in psychology (1.1)
    - Develop a working knowledge of psychology's content domains(1.2)
    - Describe applications of psychology(1.3)
    - Use scientific reasoning to interpret psychological phenomena (2.1)
    - Demonstrate psychology information literacy (2.2)
    - Build and enhance interpersonal relationships (3.2)
    - Adopt values that build community at local, national, and global levels (3.3)

- **Content Specific Learning Objectives: Evolutionary Theories in Psychology**
    - Learn what "evolution" means.
    - Define the primary mechanisms by which evolution takes place.
    - Identify the two major classes of adaptations.

- Define sexual selection and its two primary processes.
- Define gene selection theory.
- Understand psychological adaptations.
- Identify the core premises of sexual strategies theory.
- Identify the core premises of error management theory, and provide two empirical examples of adaptive cognitive biases.

Abstract

Evolution—change over time—occurs through the processes of natural and sexual selection. Its primary products are adaptations—solutions to problems of survival and reproduction. Sexual selection theory describes evolution due to mating advantage rather than survival advantage and occurs through two distinct pathways: intrasexual competition and intersexual selection. Gene selection theory, the modern formulation of evolutionary biology, occurs through differential gene replication. Evolutionary psychology synthesizes evolutionary principles with modern psychology and focuses primarily on psychological adaptations—information processing procedures inside the head. Two major evolutionary psychological theories are described. Sexual strategies theory describes the psychology of human mating strategies and the ways in which women and men differ in those strategies. Error management theory describes the evolution of cognitive biases in domains ranging from perception to mating.

Class Design Recommendations

The "Evolution Theories in Psychology" module can be taught over a single class period. Please refer to the Noba PowerPoint slides that compliment this outline.

First class period (50-75 min):

- Describe the basics of evolutionary theory
- Explain sexual selection and gene selection theory
- Discuss the field of evolutionary psychology and describe two of its theories

- Sexual strategies theory
- Error management theory

Module Outline

Basics of Evolutionary Theory

- In simple terms, **evolution**is change over time. Central to theory of evolution is the idea of **natural selection**, which postulates inherited traits that lead to reproductive success and survival will be passed on to subsequent generations. Humans have evolved in many different ways from their ancestors through two levels of **adaptations**, evolved solutions to problems that in the past contributed to reproductive success. Survival adaptations are mechanisms that have allowed our ancestors to survive environmental challenges (e.g., food shortage, extreme weather, predators). The other type of adaptation has helped our ancestors in mate selection, or as Darwin would put it "**sexual selection theory**".

Sexual Selection Theory

- It makes sense that humans have evolved to prefer certain foods, like fat or sugar (they provide sustenance), or have fears of snakes, darkness, or strangers (these help keep us out of dangerous situations). But what is the adaptive value of the colorful peacock feathers or the large antlers of male stags? They seem rather detrimental to survival. Darwin proposed that these characteristics evolved as a result of **sexual selection**rather than natural selection.

- Sexual selection is the evolution of certain characteristics that may attract potential mates through either **intrasexual competition**or **intersexual selection**. Intrasexual competition refers to a process in which members of the same sex engage in competition in order to gain preferential mating access to members of the opposite sex. An example of this would be a male stag's antlers used to battle with other stags. The winner of the competition then gains mating access to the female. Intersexual selection, on the other hand, denotes a process in which members of one sex display preferences in characteristics of the opposite sex. An example of this would be male peacock feathers. The brighter the feathers, the

more desirable the male is to female peacocks, which gives the male peacock with the most brilliant plumage a selective advantage.

Gene Selection Theory

- Modern evolutionary theory postulates that evolutionary processes boil down to differential gene reproduction or replication. Genes increase their replicative success in two ways: 1) They influence the body they reside in to ensure survival and reproduction; and 2) they impact their "genetic relatives" (the bodies that contain copies of their genetic material) by ensuring their survival and reproductive success.

Evolutionary Psychology

- Evolutionary psychology seeks to apply modern evolutionary theory to **psychological adaptations**, which can be thought of as information processing devices, mechanisms of the mind designed to resolve problems of survival and/or reproduction.
- An example would be sexual jealousy. If individuals receive information such as their loved one is flirting with another, the feeling of jealousy may activate procedures to evaluate the physicality of the rival and their partner's interest in the "other" romantic prospect. This might lead to behavioral reactions ranging from vigilance (e.g., snooping text messages on a partner's phone) or physical confrontation (e.g., threatening violence). Other hypothesized psychological adaptations can include habitat choice, fears about the antagonistic forces of nature, and group living, etc.
- Notably, jealousy and its behavioral reactions would not activate unless an individual received relevant information from the environment or culture. For this reason, evolutionary psychology is considered an interactionist framework. For instance, cultural norms of premarital sex dictate how desirable virginity is in a potential life-long mate.

What are Two Examples of Evolutionary Psychology Theories?

Sexual Strategies Theory

- The **sexual strategies theory**proposes that men and women have differing short-term mate selection strategies, but align in their preferences when seeking long-term mates. Additionally, the strategies employed rely on external factors, such as culture, social context, and parental influence, etc.

- There are sex differences in how much effort men and women put into parental investment. (e.g., women carry a child for nine months, breast feed, etc.). Therefore, women are highly motivated to avoid making poor mating decisions. For men, on the other hand, minimum parental investment need not require much effort; just the act of having sex would suffice. From an evolutionary perspective, the cost of making poor sexual decisions is minimal for men. Given the low risk level for men, empirical findings have demonstrated that men express a desire to have sex with more partners, allow less time to pass between sexual encounters, are more willing to consent to sex with strangers and expect less emotional investment from their partners, etc.
- In terms of long-term mating, both men and women heavily invest in their relationships and children. Both genders seek smart, caring, healthy, honest and loving mates. Where the two genders diverge is that women seek more ambitious, driven and industrious mates. Conversely, men are more likely to seek women who are highly fertile; as such, men generally tend to prefer younger and physically attractive mates.

Error Management Theory – "It's Better to be Safe Than Sorry!"

- **Error management theory** is a theory of selection under uncertain situations, in which recurrent cost asymmetries of judgment or inference favor the evolution of adaptive cognitive biases that function to minimize the more costly errors. That sounds quite complicated. The easiest way to explain this theory to students may be to illustrate with examples. For instance, if an individual is walking alone in the woods and hears a rustling sound, she may assume that it is either the wind blowing or perhaps a snake. If she assumes the former and it does turn out to be the snake, the consequences could be dire. Alternatively, if she assumes it is a snake and heads in a different direction, the costs and risks are greatly reduced. These types of situations have occurred throughout the ages such that over time, evolution has favored the adaption of responses that err in the direction of avoiding a potentially costly error.

Difficult Terms

Adaptations
Error management theory (EMT)
Evolution

Gene Selection Theory
Intersexual selection
Intrasexual competition
Natural selection
Psychological adaptations
Sexual selection
Sexual Strategies Theory

Lecture Frameworks

Overview

Evolution is a fascinating phenomenon. It won't be a hard to sell the wonder of evolution to your students – many of them are bound to find the topic interesting. Start off your lecture with a bold statement: We can see evolution in action almost anywhere that we look today. In fact, there is a good chance that you are evolving at this very minute, or at least carrying random DNA mutations which can be passed onto your children, giving them either a better or worse chance of surviving in this world. We recommend breaking up the lecture in the middle of the class period to conduct a fun activity and review a related special topic about Darwinian Theory and family bonds.

First Class Period:

- Discussion/warm-up
    - Ask your students what they think evolution means and why it is important for our survival. You are likely to get many responses. There are two simple answers to this question: Evolution means change over time and evolution is a science.
- Lecture: Refer to the slides for the following information:
    - An introduction to Charles Darwin, basic concepts and terminology like "natural selection", "adaptations", "survival adaptations", and "mate competition".
    - Details of the sexual and gene selection theories.
- Activity: Darwinian Grandparenting

- The gene selection theory is a good segue into the Darwinian Grandparenting activity, which can be found in the Activities and Demonstration section. The activity will also allow room for discussion (see below).

- Special Topic: What Does Darwin's Theory Have to Say about Parenting?

  - According to David Buss (2004), there is a high degree of variability in the emotional closeness of kids and their grandparents, such that not all grandparents give the same amount of attention or invest the same amount of resources in their grandchildren. Before providing further information, ask the students why they think this might be from an evolutionary standpoint.
  - Research demonstrates that individuals generally indicate that they are emotionally closest with their maternal grandmother (mother's mother) and the least emotionally close to their paternal grandfather (father's father). According to the evolutionary perspective, grandparent investment is related to genetic certainty. Women are a 100% certain of their maternity, whereas men can be unsure about their paternity. Now, if you look at it from the viewpoint of grandparents, one's mother's mother will be a hundred percent sure that she is the mother of her daughter, and her daughter will also be a 100% certain of her genetic contribution to her children. Thus, a maternal grandmother will be absolutely certain that her grandchildren carry her genes.
  - Ask the students how this would work when considering a paternal grandfather. From his perspective, there are two ways he can be genetically uncertain that his grandchildren carry his genetic material: 1) It is possible that the paternal grandfather is not the genetic father of his child; and 2) It is also possible that the paternal grandfather's son is not the genetic father of his children. That's twice the uncertainty. And if grandparent investment is tied to this genetic certainty (or lack thereof), well…we can all do the math!
  - *Discussion*: If you have extra time, you can pose a related question to your students. Research has also indicated that the maternal grandfather is ranked higher than the paternal grandmother. This is puzzling because both of these grandparents carry one uncertainty. The mother's grandfather may be unsure that he is his daughter's father. The father's grandmother could be unsure that her son is the father of his children. So, why is one ranked higher than the other? Ask the students to generate their own thoughts on this puzzle. One explanation set forth by researchers (there may be more), which has some evidence behind it, is related to the possibility of investing one's resources elsewhere. If the paternal grandmother is also a maternal grandmother (i.e., her daughter has children), she has an alternative in which she is absolutely sure that she is biological grandmother of her grandchildren, therefore, she is more likely to invest less resources in her son's children!

- Lecture: Refer to the slides for the following information:
    - Information about the branch of evolutionary psychology.
    - A discussion of two theories of evolutionary psychology: sexual strategies and error management theories.

Activities & Demonstrations

Darwinian Grandparenting: In-Class Activity

Time: 10 minutes.

Materials: Students can do this activity in their own notebooks.

Directions:

- Ask students to rate how emotionally close they are/were to each of their four grandparents from a scale of 0-100 (0 = I have cold, negative feelings towards this grandparent; 100 = I have warm positive feelings towards this grandparent). Then ask students to rank the grandparent from 1-4 based on the rating. For example, a rank of 1 with the maternal grandmother signifies that she received the highest rating. Note: Students do not have to rate a grandparent who passed away before the students got to know them.
- Then ask the students for a show of hands for which grandparent they ranked as 1st and which grandparent they ranked as 4th.
- For discussion following this activity, see special topic: What does Darwin's theory have to say about parenting.

[Adapted from Randy Smith's Instructor Manual for the David Myers' Introductory Textbook]

Outside Resources

FAQs
http://www.anth.ucsb.edu/projects/human/evpsychfaq.html

Web: Articles and books on evolutionary psychology
http://homepage.psy.utexas.edu/homepage/Group/BussLAB/

Web: Main international scientific organization for the study of evolution and human behavior, HBES
http://www.hbes.com/

Evidence-Based Teaching

Liddle, J. R., & Shackelford, T. K. (2011). Teaching the Evolution of the Mind Current Findings, Trends, and Controversies in Evolutionary Psychology. *Teaching of Psychology*, *38*(2), 128–132.

The past few decades have seen an increase in the acceptance of evolutionary psychology. It is important that the teachers of introductory psychology appropriately introduce students to the field. Liddle and Shackelford's article provides recent findings, trends, and controversies in this field. Due to the controversial nature of the topic, there may be some difficulties teaching evolutionary psychology. As such, the authors offer strategies to teach the important principles of the field to psychology students!

Balter, M. (2005). Evolutionary genetics. Are humans still evolving? *Science*, 309, 234–237.

Balter reviews the research on evolutionary genetics, noting that not all the morphological changes in human beings are due to evolutionary forces. At the same time, however, recent research has demonstrated that humans may still be evolving. He cites the genes associated lactation persistence and inoculation against malaria as a few examples of natural selection, though there are many more. Even though it is likely that the pressures of natural selection will continue to exert some force upon our development, we should be wary of making specific long-term predictions about human evolution as it depends on many factors.

PowerPoint Presentation

This module has an associated PowerPoint presentation. Download it at https://nobaproject.com//images/shared/supplement_editions/000/000/097/Evolutionary%-20Theories%20in%20Psychology.pptx?1475875135.

About Noba

The Diener Education Fund (DEF) is a non-profit organization founded with the mission of re-inventing higher education to serve the changing needs of students and professors. The initial focus of the DEF is on making information, especially of the type found in textbooks, widely available to people of all backgrounds. This mission is embodied in the Noba project.

Noba is an open and free online platform that provides high-quality, flexibly structured textbooks and educational materials. The goals of Noba are three-fold:

- To reduce financial burden on students by providing access to free educational content
- To provide instructors with a platform to customize educational content to better suit their curriculum
- To present material written by a collection of experts and authorities in the field

The Diener Education Fund is co-founded by Drs. Ed and Carol Diener. Ed is the Joseph Smiley Distinguished Professor of Psychology (Emeritus) at the University of Illinois. Carol Diener is the former director of the Mental Health Worker and the Juvenile Justice Programs at the University of Illinois. Both Ed and Carol are award- winning university teachers.

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