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# This World of Humans: Episode #9
# Guide for Educators

## Attraction and Mate Choice

These activities address NGSS LS1.B and LS4.B as well as specific Cross-Cutting Concepts and Science and Engineering Practices (see page 8). Many are also suitable for courses designated as "Writing-Intensive."

### About the Article

This article describes two studies in which a Euclidean algorithm was tested as a means of predicting attraction to potential mates. Findings suggest that a Euclidean algorithm can holistically integrate a multiplicity of mating preferences and thereby predict short- and long-term attraction.

### About the interview

In this interview, Dr. Conroy-Beam discusses the computational approach used in the article, describes how multiple variables combine in our minds when we're attracted to people, and considers what consequences attraction has on both short- and long-term mate choice.

Both the article and the interview can be found here: www.visionlearning.com/en/twoh#ep9

**Recommended**: pair these materials with the Visionleaning module, *Scientific Controversy*. For students new to evolutionary concepts, also see: *Charles Darwin I*, *II*, and *III* and *Adaptation*. (www.visionlearning.com)

### Use in the Classroom

These materials are useful for exploring ways in which scientists can parse the relationship between culture and biology. They also assist in building understanding of how scientists try to make sense of human behavior and how they communicate their findings to various audiences. Students will likely benefit from listening to the interview before reading the article and it is not crucial to thoroughly comprehend the mathematics un order to grasp the approach and results of this research.

1. **Pre-reading and pre-listening activities** are provided to prompt prior knowledge and help students make connections between the research they are learning about and their own lives. Materials may be used in the classroom to generate discussion, or as homework if the article or interview will be read/listened to in-class. Having students write before speaking helps focus discussions and reading.
2. The **worksheets** are explicitly designed to walk students through the process of reading a scientific paper and build disciplinary vocabulary. Worksheets serve as excellent homework assignments (if the article is read outside of class) and will direct students toward identifying important information about the research. While the answers provided can be used to check student reading, it is really an opportunity to assist students in how to read scientific material. Completed worksheets are excellent for small group discussions or as a debrief with the entire class.
3. **Post-reading and -listening activities** are designed to extend student thinking and engage them more deeply with the text and interview. These questions are great for small groups, for large class discussions, or for short-answer writing assignments.

## Pre-reading and –listening activities

1. **Vocabulary preparation:** Provide students with the Vocabulary Worksheet and ask them to offer definitions. Clarifying terminology as a class is recommended. This worksheet is suitable for a 20-minute in-class activity if students have access to dictionaries or the internet. Many of the terms are specific to evolutionary psychology, thus *context* is critical to reinforce when assigning this activity.

2. **Free-writing exercise:** Prompt students to get out a pen and paper and free-write on the topic of "attractiveness." Ask students to consider what it means to be "attractive," and provide five minutes of uninterrupted writing time during which students should not: a) erase, cross out, or otherwise correct anything they are writing; b) worry about formulating complete sentences; c) stop writing until prompted to put their pens down. Explain that free-writing is a brainstorming exercise meant as a "warm up" to help them think about attraction as a concept and appreciating the difficulty of measuring or quantifying it. Then, use this as an entry-point into the interview and article.

   OR

   **Pre-reading worksheet:** For a more guided version of the above exercise, provide students with the Pre-reading Worksheet and have them answer questions in 3-5 complete sentences. There are no right or wrong answers; instead, this is meant to get them thinking about some of the complexities of measuring and discussing attraction in both scientific and social/cultural dimensions.

## Post-reading and –listening activities

1. **Revisiting vocabulary in small groups:** Using the vocabulary sheet students completed at the start, clarify in groups how the authors used terms. Does everyone in the group have matching definitions? If not, which definitions are most appropriate in context? Why? Share any disparate definitions in a full class discussion and explain how your group decided which definitions were ultimately most appropriate.

2. **Computing Mate Value visual exercise:** Using the Visual Exercise Worksheet, invite students to complete their own graphical depiction of preference integration as shown in the article. Then, connect to the interview during full-class discussion by prompting students to imagine visualizing 20 dimensions instead of just three). For expansion on this, ask students to practice this visualization method in comparison to a more linear model like list-making (simply listing preferred traits as opposed to plotting them on a cube). This is a helpful activity to "warm up" for a thought-provoking discussion or writing assignment.

3. **Discussion/Writing questions:** Use the following list of questions to engage students in thinking more critically about studies that explore socially and personally relevant topics like attraction and mate selection, which nearly all humans experience and engage with. These questions also help reinforce concepts from both the article and the interview, and help students connect content to the role of technology in their lives. These questions can be assigned as short-essay prompts, used for small-group discussion, or used to prompt whole-class discussion. Ask students to refer directly to the paper or interview to support their answers.

   - *When Dr. Conroy-Beam states in the interview that "All humans have a psychology of both long-term and short-term mating," what does he mean? How does he frame this idea in relation to the preferences of men and women when it comes to attraction?*
   - *What is meant by the term "highly evolvable" on p.2 when the authors write that "the Euclidean algorithm proves to be a highly evolvable means of integrating mate preferences?"*
   - *Why do the authors conduct two studies instead of one? What were the goals of Study 2?*

- *The studies conducted in the article use text-based profiles only. What limitations does this put on the study, and what benefits does such an approach provide?*
- *In the interview, Dr. Conroy-Beam suggests that part of how satisfied a person is in their relationship can be understood as the Euclidean distance from preference in relation to other people available. If this is true, how might the proliferation of dating apps make it difficult to feel satisfied in a relationship? How might this affect attraction?*

4. **Scientific Controversy Worksheet:** Use the worksheet as a take-home assignment for students. It should be paired with the Visionlearning module *Scientific Controversy* (https://www.visionlearning.com/en/library/Process-of-Science/49/Scientific-Controversy/181/resources ).

## Extension activities

### Vocabulary Worksheet

Below are a list of terms and phrases that you will encounter while reading the article and listening to the interview. Using a dictionary, provide definitions for each term or phrase. If you cannot find a formal definition, write down what you *think* the term or phrase might mean. Keep in mind that the meanings of these terms *in science* may be different from the way we used them in common speech. *Most likely definitions provided in blue.*

**Adaptive**

*An adjective for a trait that helps an organism maximize its reproductive success.*

**Algorithm**

*A process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.*

**Euclidean distance**

*The straight-line distance between two points in a plane or three-dimensional space and measures the length of a segment connecting the two points; the most obvious way of representing distance between two points.*

**Evolutionary psychology**

*The study of behavior, thought, and feeling as viewed through the lens of evolutionary biology; presumes all human behaviors reflect the influence of physical and psychological predispositions that helped human ancestors survive and reproduce.*

**Fitness**

*Also called Darwinian fitness; the ability to survive to reproductive age, find a mate, and produce offspring.*

**Non-linear**

*Used to describe a process, series of events, etc. in which one thing does not clearly or directly follow from another.*

# Guide for Educators

**Pre-reading Worksheet**

Use the following worksheet to think through your current ideas on attraction and mate selection. There are no correct or incorrect answers – this is simply your thoughts prior to reading the article or listening to the interview.

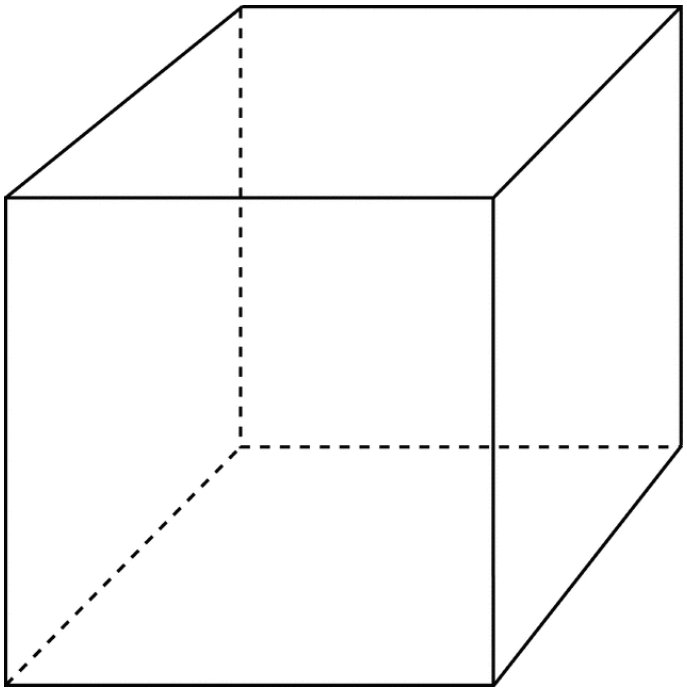
1. Define "attractive" in your own words. What qualities make a person attractive? How many kinds of attraction exist?

2. How might attraction translate into relationships? How many kinds of relationships can result from varying degrees of attraction between two people?

3. Do you think there is a quantifiable way to measure attraction?

4. How much influence do you think culture has on attraction? Explain your reasoning.

**Visual Exercise Worksheet: Computing Mate Value Cube**



**Instructions:** Complete your own Mate Value Cube by selecting three dimensions from the following: *kindness*, *intelligence*, *dependability*, *emotional stability*, *healthiness*. You can only select three dimensions for this exercise. Then, plot your preference by using the letter "P." If you need an example of what this could look like, refer to the article on p.2.

**Scientific Controversy Worksheet**

Use this worksheet in connection with the Visionlearning module *Scientific Controversy.*

1. Why does Dr. Conroy-Beam say evolutionary psychology can be controversial? Why is the content of this study potentially controversial?

2. How might the studies conducted in the article *create progress* by spurring new research?

3. What is the argument the authors are making in the article? How do they develop that argument through data?

4. How might the data collected for this article fuel controversy?

5. What are some of the social and cultural implications of this research?

## Targeted NGSS, Cross-Cutting Concepts, and Science and Engineering Practices

The activities in this guide can be used to address the following standards, concepts, and practices.

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|---|---|
| **Next Generation Science Standards** | |
| **LS1.B: Growth and Development of Organisms** | • Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4) |
| **LS4.B: Natural Selection** | • Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing (3-LS4-2) |
| **Science and Engineering Practices** | |
| **Asking Questions and Defining Problems** | • Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.<br>• Ask questions to clarify and/or refine a model, an explanation, or an engineering problem.<br>• Evaluate a question to determine if it is testable and relevant. |
| **Engaging in Argument from Evidence** | • Construct and/or support an argument with evidence, data, and/or a model.<br>• Compare and evaluate competing arguments or design solutions in light of currently accepted explanations, new evidence, limitations (e.g., trade-offs), constraints, and ethical issues. |
| **Obtaining, Evaluating, and Communicating Information** | • Critically read scientific literature adapted for classroom use to determine the central ideas or conclusions and/or to obtain scientific and/or technical information to summarize complex evidence, concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. |
| **Cross-Cutting Concepts** | |
| Patterns: Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them | • Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.<br>• Patterns of change can be used to make predictions.<br>• Patterns can be used as evidence to support an explanation.<br>• Patterns can be used to identify cause and effect relationships.<br>• Graphs, charts, and images can be used to identify patterns in data.<br>• Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.<br>• Empirical evidence is needed to identify patterns. |
| Cause and Effect: Mechanism and Prediction: Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering | • Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.<br>• Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. |
| Scale, Proportion, and Quantity: In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change | • Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.<br>• Scientific relationships can be represented through the use of algebraic expressions and equations.<br>• Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. |