

## Final Project Guidelines and Rubric

Purpose of the project: This project should demonstrate that you have learned how to apply the theory of evolution by natural selection using the tools we developed in this course. You should choose a topic that is relevant to your interests and use concepts discussed in class to explain the evolutionary origins of that trait.

Eligible topics: Choose any **human** trait that could plausibly have an evolutionary explanation. You should not choose something that is discussed in one of the recorded lectures (because that wouldn't be fair to others). There is a document on Gauchospace that lists some topic ideas. I will try to reduce overlap between student topics as much as possible.

The format:

You will present about your topic in a 5 minute (range: 4-6 mins) Powerpoint (or similar) presentation on one of the last two days of class, September 7 or 8. Your presentation should include:

1. A brief description of the trait, including but not limited to:
  - What is the trait?
  - How common is it?
  - Are there certain populations or people that this trait is associated with (e.g. ancestry, geography, ethnicity, age, sex, etc.)?
  - Is this an obligate trait, a facultative trait, or a susceptibility?
  - If it's facultative or a susceptibility, what does it respond to?
2. An attempt to explain the mechanisms for that trait, including:
  - An estimate of heritability, where possible
  - Are there any genes associated with this trait? Which ones and what do they do?
  - Are there any environmental causes of this trait? What are they and how do they affect the phenotype?
3. An attempt at the comparative method or reverse engineering:
  - A case of convergence
  - A case of divergence
  - Or** a good justification for why the comparative method is impossible and an attempt at reverse engineering
4. A plausible evolutionary explanation for the trait:
  - How does the trait affect fitness?
  - What types of environments would favor this trait getting passed on (the EEA)?
  - How could the genes for this trait get passed on?
5. One (or more) slides with a list of your sources

You can present these ideas in whatever order makes sense for your topic.

You will **turn in your slides on Gauchospace by 9:30 AM on September 7**, prior to the presentations.

Sources:

Since this is a research project, you should include reliable sources for your information. At minimum, **you should cite 3 sources beyond the class material**, but you will likely need to cite more to cover all the information you'll need to present on. Aim for an APA-style citation, but I won't take off points as long as I can clearly find where your information comes from. Reliable sources could include peer-reviewed journal articles, official government or NGO websites (CDC, WHO, UNICEF, etc.), books, and publications from reliable newspapers or magazines (e.g., New York Times, National Geographic). Information from the class lectures, problem sets, and textbook don't count toward your 3 sources. However, you can count any of the papers in the "Supplemental Resources" folders on Gauchospace toward your 3 sources. Not sure if a source is acceptable? Ask me!

Grading: The final project will be worth 50 points total. See the rubric below for a detailed grading scheme. The instructor and TA will each give you a score based on the rubric below, and your grade will be the average of the two scores.

Rubric

	10 points	7-9 points	4-6 points	0-3 points
<p>Description of the trait</p> <p>Worth 10 points</p>	<p>Explains what the trait is</p> <p>Explains the variation in the population</p> <p>Explains how the trait works (e.g. is it facultative? What does it react to?)</p>	<p>Explains what the trait is</p> <p>Explains some of the variation, but missing some key details</p> <p>Missing key details on how the trait works (e.g. not saying what a facultative trait responds to)</p>	<p>Explains what the trait is</p> <p>Says there is variation, but does not explain what the variation looks like</p> <p>Minimal explanation of how the trait works/what it does</p>	<p>Doesn't offer any description of the trait</p> <p>No discussion of population variation</p> <p>No explanation of how the trait works/what it does</p>
<p>Mechanism and heritability</p> <p>Worth 10 points</p>	<p>Provides a heritability estimate and states what that estimate means (or justifies why there is not an estimate)</p> <p>Provides evidence that the trait has a genetic influence</p> <p>Explains one or more environmental influences on the trait (or explains why there are no environmental influences)</p>	<p>Provides a heritability estimate with incorrect interpretation</p> <p>Provides some evidence that the trait is genetic, but the evidence is unclear or not convincing</p> <p>Environmental cause is given, but the evidence is unclear or not convincing</p>	<p>Provides a heritability estimate without explanation</p> <p>Says the trait is genetic with little additional explanation</p> <p>Gives an environmental cause with little additional explanation</p> <p>Incorrectly categorizing an environmental cause as a genetic cause (or vice versa)</p>	<p>No heritability estimate (or justification for not including one)</p> <p>Does not provide any evidence that the trait is genetic</p> <p>Does not explain an environmental influence on the trait (or explain why there are no environmental influences)</p>
<p>Comparative Method OR Reverse Engineering</p> <p>Worth 10 points</p>	<p>Provides and explains an example of convergence <b>and</b> of divergence</p> <p>OR</p> <p>If comparative method is not possible (state why this is the case), an attempt at reverse engineering</p>	<p>Mixes up convergence and divergence, but attempts to provide and explain examples of each</p> <p>OR</p> <p>Reverse engineering is based on flawed assessment of the form or function of the trait, but the process is correct</p>	<p>Provides and explains only convergence <b>or</b> divergence (not both)</p> <p>OR Examples for each are provided without explanation</p> <p>OR</p> <p>Reverse engineering is done incorrectly or is extremely minimal (e.g. based on only one feature of the trait)</p>	<p>Does not provide or explain an example of convergence or divergence (or give a justification for why a comparison isn't possible)</p> <p>OR</p> <p>Does not attempt reverse engineering (if comparative method is impossible)</p>

<p>Evolutionary explanation</p> <p>Worth 10 points</p>	<p>Explains how the trait plausibly affects fitness</p> <p>Explains how natural selection is shaping the trait (e.g. favored or disfavored? population-dependent? mismatch?)</p> <p>Explanation of the EEA that would favor this trait</p>	<p>Explains how the trait plausibly affects fitness</p> <p>States how natural selection is shaping the trait, but explanation is lacking some key details</p> <p>EEA is given, but explanation doesn't match why the trait was selected</p>	<p>Fitness is misinterpreted in the explanation/ Falls into trap of one or more misconceptions</p> <p>States that natural selection is shaping the trait with very little explanation</p> <p>EEA is given but not explained.</p>	<p>No explanation of how the trait affects fitness</p> <p>No explanation of how selection is shaping the trait</p> <p>No EEA given or attempt to explain EEA</p>
<p>Sources, logistics, and other grading criteria</p> <p>Worth 10 points</p>	<p>Cites at least 3 reliable sources</p> <p>Can clearly tell which pieces of information come from each source (i.e., in-text citations)</p> <p>Incorporates feedback from the mid-quarter submission</p> <p>Presentation was between 4 and 6 minutes long</p> <p>Presentation was clear and easy to understand</p> <p>Slides were turned in on time</p>	<p>Cites less than 3 reliable sources</p> <p>Only some pieces of information indicate the original source</p> <p>Incorporates most feedback from the mid-quarter submission</p> <p>Presentation is a little too short or long</p> <p>Had some minor issues presenting the ideas clearly</p> <p>Slides were turned in late (w/in 24 hours)</p>	<p>Cites less than 3 reliable sources</p> <p>No pieces of information indicate the original source</p> <p>Incorporates some feedback from the mid-quarter submission</p> <p>Presentation is much too short or long</p> <p>Had some significant issues presenting the ideas clearly</p> <p>Slides were turned in late (more than 24 hours late)</p>	<p>No sources cited within the presentation or at the end</p> <p>Incorporates no feedback from the mid-quarter submission</p> <p>Presentation is shorter than 3 minutes</p> <p>Was very unclear or difficult to follow</p> <p>Slides were not turned in before Saturday, Sept. 10.</p>