

Genetic Fingerprints

Project ID: #

School's Address : 1500 E 25th St

School's City : Farmington

School's State : New Mexico

School's Zip Code : 87401

School's Country : United States

Introduction

Explain what is known or has already been done in your research area.

Before starting my project I knew that fingerprints were unique to each individual, but everything that creates us comes from our genetics that our parents give us. From this prior knowledge came my project question.

Include a brief review of relevant literature. (Literature review goes here.)

Hooks, Rebecca, director. *Fingerprint Patterns and Characteristics.* , College & Career Ready Labs, 2016.

This YouTube video helps explain the most common patterns of human fingerprints. Rebecca Hooks is a crime scene investigator who uses the science of fingerprint everyday in her job. She also explains the 3 main shapes of a fingerprint including Arches, Loops, and Whorls. She also explain how to see the difference between fingerprint patterns and characteristics.

Davis, Andrew. *8 Most Common Fingerprint Patterns*, Touch N Go, 13 Feb. 2017. Google, www.touchngoid.com/8-common-fingerprint-patterns/

This article goes over the 8 most common patterns of a fingerprint. It also goes over several of the subcategories along with distinct pictures to explain the patterns. The article also goes over how much of the population has each from of fingerprint pattern.

U.S. National Library, of Medicine. *Are fingerprints determined by genetics?*, 10 Sept. 2020. Google, medlineplus.gov/genetics/understanding/traits/fingerprints/

This website explains how genetics effect how our fingerprints look. It also explains and goes through the process of how fingerprints are created. The article also talks about how our

fingerprints can be affected by disease or times of extreme work. This website also gives links to more information if it is needed.

Leupen, Sarah. *How do we get the fingerprints we have?* , The Conversation, 13 Feb.

2020. Google, theconversation.com/how-did-i-get-my-own-unique-set-of-fingerprints-128391

This webpage also goes over the process that it takes to create our unique fingerprint patterns. It also talks about how fingerprints can be influenced by our genes which are partially our parents genetics. This article also talks about how fingerprints are used as a form of identification.

Can Fingerprints Change Over Time?, Smart Eye Technology, 19 Oct. 2020. Google, getsmarteye.com/age-limit-do-fingerprints-change-overtime/

This website talks about how our fingerprints can change over time and by age. However our fingerprints will remain very similar even with age. This article also goes over how our fingerprints are used to not only identify us, but to open and close our phones or even houses. It also talks about how health conditions or heavy work can effect our fingerprints.

Heritage, Gene. "What Percentage of DNA Did I Inherit From My Parents?" , Gene

Heritage, 2 Sept. 2018. Google, <https://www.geneheritage.com/blog/percent-dna-from-parents.html>

This website discuss what portions of our genetics we get from our parents. This is important to the project above because, it lets the performer know that the fingerprints may be similar to the maternal genetics. Therefore it is theoretically more likely that the child's or children's fingerprints are more like their mother's print.

KC, Sudikshya, et al. *Qualitative Analysis of Primary Fingerprint Pattern in Different Blood Group and Gender in Nepalese*, US National Library of Medicine National Institutes of Health , 18 Jan. 2018. Google, www.ncbi.nlm.nih.gov/pmc/articles/PMC5822922/

This webpage goes over a study that was done with 1500 male and 1500 females where their fingerprints were taken and their blood was sampled to see if gender or blood type could affect the pattern of their fingerprints. In the study it was shown that males were more likely to have arch and whorl patterned fingerprints, whereas females were more likely to have looped fingerprint patterns.

What were you trying to find out?

From my project I was looking to see if fingerprints were collected from one family, how the fingerprint patterns would be similar to DNA being passed on through the genetic make up of each set of parents?

Include a description of your purpose, your research question, and/or your hypothesis.

My purpose was to see how our genetics affected our fingerprint patterns. Therefore I asked myself if fingerprints were collected and studied from one family, then will the fingerprint patterns be similar to the similarities in the DNA being passed on by the parents?

Methods

What did you do?

I tested my hypothesis by gathering full and flat fingerprints from a mom, dad, and their biological daughter and son.

What data did you collect?

The data I collected was two samples of each the full and flat print to analyze.

How did you collect that data?

I collected this data by sanitizing the individuals hand with soap and water to give me a clean surface area. I then took the individuals to a flat surface where I inked their right thumb in black ink. Their finger was then stamped onto their labeled piece of paper for me to analyze.

Discuss your control group and the variables you tested.

The variables in this project were the individuals and their genetic makeup. My controls were that they were in the same environment, and their fingerprints were all sampled in the same way.

Results

- Include tables and figures which illustrate your data. (Tables)
- Include relevant statistical analysis of the data. (Graphs)
- My data was not represented in a graph or table. Please reference the visual data analysis page to see the picture and data analysis of my project.

Discussion

What do these results mean?

Compare your results with theories, published data, commonly held beliefs, and expected results.

The data collected proved my hypothesis plausible. The data shows that my hypothesis was semi supported because the father and son and mother and daughter shared similar finger print patterns, but these similarities could also be due to gender.

- Discuss possible errors.

While experimenting I tried to maintain consistency , however errors may have occurred because of not having the access to a larger pool of people and more advanced technology.

Did any questions or problems arise that you were not expecting?

Yes, the question of whether or not gender could affect the fingerprint patterns did arise, however I was able to do more research before drawing my hypothesis to a conclusion.

How did the data vary between repeated observations of similar events?

My data could vary if I decided to do this project again because no one is going to have the same fingerprint, which will always lead my project to come up with a different conclusion. The variations in this project all come to the fact of how many individuals were tested, and were they male or female.

How were results affected by uncontrolled events? ‘

My results could be affected by uncontrolled events because the group of people you have to sample is different in any scenario. This is something that is uncontrollable no matter the situation.

CONCLUSIONS

What do these results mean in the context of the literature review and other work being done in your research area?

My results came out supported by my research. I say this knowing that my data followed the data that others had already gathered.

How do the results address your research question?

My results leave me knowing that I have more questions for my research question. This is a project I hope to continue in the future with more people.

Do your results support your hypothesis?

My results support, but also slightly disprove my hypothesis. They showed me that genetics can play a role in fingerprint patterns. However they could be do to gender.

What application(s) do you see for your work?

I see my data and results being used in many ways but mostly in the world of investigation. From this if a fingerprint is found on a crime scene and it has a lopped pattern, we can learn from my project that it is most likely a female fingerprint.

References

Hooks, Rebecca, director. **Fingerprint Patterns and Characteristics.** , College & Career Ready Labs, 2016.

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