The Visual Comparison of the Inheritance Patterns of Fingerprints

Senia Lopez

Freeport High School, Freeport NY USA

Abstract. Can fingerprints be inherited? The hypothesis is that fingerprints as a whole are probably not inherited; however there might be several similarities between one's fingerprints and their parent's fingerprints. I gathered plain impressions from my family members and also collected plain impressions from five girls and three boys from my high school class. With the frequency of loops, whorls, and arches, we can conclude that the loop pattern is more common within my family but also my class. My hypothesis can be proved correct due to the variety my class has in patterns and my family's lack of them. I conclude that the large fingerprint patterns can be inherited.
Keyword: Zoology, Forensics

INTRODUCTION

Since the beginning of human civilization, man has identified and used fingerprints, toe-prints, and palm prints for several different reasons. Fingerprints in particularly were used by the ancient Chinese and Assyrians to “sign” legal documents [2]. The ancient Babylonians used their whole palm print to press on clay tablets. In more recent times fingerprints are mainly used for the purpose of identifying individuals. The sole purpose to these prints is to have a better grip.

The importance of this is that it leads to the role one’s genes play in the process of passing on traits during fertilization of an egg and a sperm cell. It also shows that not every gene is passed on and that the new DNA formed for the zygote does not encode for identical fingerprints. This has been researched before and it was found that fingerprints cannot be inherited [5].

METHODS

First, I researched the different patterns of fingerprints and how they are created. Second, I gathered materials. I collected the fingerprints of my family and classmates for comparison. Third, I analyzed the information collected, and I concluded that in general the loop pattern is more common, but there is more variety within my classmates than my family.

RESULTS

The results show that the loop pattern is the more dominant fingerprint pattern and perhaps the most inherited, in general. Ninety percent of my family’s fingerprints have the loop pattern. The remaining ten percent is distributed within the central pocket, the double loop, plain whorl, and accidental whorl patterns (2.5 % for each of these). As for my class, the loop pattern was very common with sixty-two point five percent. The central pocket pattern was the second one with sixteen point twenty-five percent, the double loop pattern with fifteen percent, and the tented arch with five percent. The plain whorl presented itself 3.75 percent of the time while the remaining two patterns; the whorl and the accidental whorl came in 1.25 percent of the time

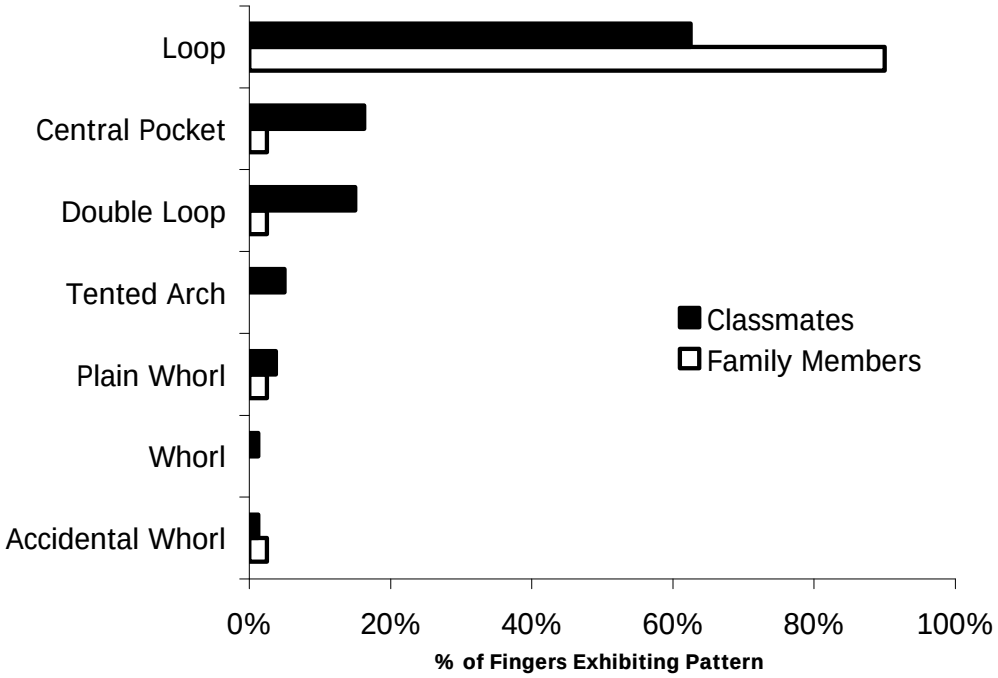

Figure 1. Chart comparing all the fingerprints and their results.

DISCUSSION

The limitations of the results are that I examined the fingerprints the traditional way; with a magnifying glass and an ink pad. Even with the limited materials I had, I came up with the results that concluded that a finger pad as a whole can be inherited, but the small details, like every single ridge can't. Another problem I had was the number of people I used. I limited the number to a low quantity which made my result less accurate.

CONCLUSIONS

The conclusion made from this experiment is that the finger pad can be inherited with its core and deltas. The core of the fingerprint is the center part of the loop and the delta is the triangulation or the dividing of the ridges. The entire fingerprint can't be inherited from one ridge to the other because then individuals wouldn't be able to be differentiated from the other, at least in the crime field.

ACKNOWLEDGMENTS

I gratefully appreciate the help and assistance of Dr. Muratore during my research and the students who helped me very willingly to accomplish this task.

REFERENCES

1. Britt R.R. Lasting Impression: How Fingerprints are created. Live Science: Health Section. November 2004 http://www.livescience.com/health/041102_fingerprint_creation.html accessed on 2008-10-20.
2. Jones GW. Fingerprint Facts. Gary W. Jones Fingerprint Services. http://www.garywjones.com/FingerprintFacts.html accessed 2008-10-19.
3. Lennard CJ, Patterson T. Fingerprint Patterns. The Thin Blue Line 2007; 6(12). http://www.policensw.com accessed 2008-10-15
4. Officer P. The basic fundamentals in the science of fingerprint identification are permanence and individuality. Fingerprints for Dummies. Version March 2005. 5(44) http://onin.com/fp/lpfaq.html#q3jq accessed on 2008-10-15.
5. Shahan G. Heredity in Fingerprints. Identification News. Volume XX, Number 4. April 1970. 3(7) http://onin.com/fp/fp_heredity.pdf accessed 2008-10-17.

6. Skopitz K. History on Fingerprints. Essortment. Pagewise 2002. http://www.essortment.com/all/fingerprintssec_rwkx.html accessed 2008-10-19.
7. Taking Legible Fingerprints. Federal Bureau of Investigation 2008. 1(1) http://www.fbi.gov/hq/cjisd/takingfps.html accessed 2008-10-15.