# Human Inheritance

Objectives:

- Determine your phenotype for several traits.
- Determine (as far as possible) your genotype for the same traits.

Procedures and Observations:

You will determine your phenotype and try to determine your genotype for the traits listed below. Remember, if you have a dominant trait, you may be homozygous or heterozygous fro that trait. If you know that one of your parents has the recessive trait, you must be heterozygous. If neither of your parents have the recessive trait, put a blank (_) for the unknown gene. If you possess the recessive trait, record it as the genotype, with two recessive genes.

- Free earlobes are dominant, L. people whose earlobes are attached directly to the side of the head have the recessive genotype, ll. Have your partner check your earlobes.
    1. Record your phenotype and genotype in a table. (Remember that if you have the dominant trait, you may not be able to determine whether your genotype is homozygous or heterozygous, in that case, record L_ in the table. The blank means an unknown gene).
- Inheritance of eye color is controlled by multiple genes, but people having the homozygous recessive genotype, bb, have blue eyes. People who have a dominant gene, B, may have different shades of brown, hazel, or green eyes. Check your eye color.
    2. Record your phenotype and genotype in the table. (Remember that you may not be able to determine your exact genotype; in that case, record B_ in the table).
- A Widow's peak is a hairline that forms a downward point in the middle of the forehead. This is caused by a dominant gene, W. A smooth hairline is caused by the recessive genotype ww. Have your partner check your hairline.
    3. Record your phenotype and genotype in the table.
- A dominant gene, r, gives some people the ability to roll their tongue into a "U" shape when it is extended. People with the recessive genes, rr, cannot roll their tongues. Check to see if you can roll your tongue.
    4. Record your phenotype and genotype in the table.
- A dominant gene, T, gives some people the ability to fold their tongues over. People with the recessive genotype, tt, cannot. Check to see if you can fold your tongue.
    5. Record your phenotype and genotype in the table.
- A dominant gene, F, results in the end joint of the little finger of each hand bending inwards. Straight little fingers are a result of the recessive genotype ff. Place your hands on a flat surface, palms down, and relax. Check to see if the first joints of your little fingers are bent or straight.
    6. Record your phenotype and genotype in the table.

- Individuals who have hair on the middle joints of their fingers have at least one dominant gene, H. Those with two recessive genes, hh, do not have hair on that joint. Check to see if you have hair on the middle joints of your fingers.
    7. Record your phenotype and genotype in the table.
- Individuals who have red hair have the recessive genotype nn. Individuals with any other color hair have at least one dominant gene, N. Check your hair color.
    8. Record your phenotype and genotype in the table.
- Individuals having curly hair have at least one dominant gene, C. People having straight hair have the recessive genotype, cc. Check your hair type.
    9. Record your phenotype and genotype I the table.
- Long eyelashes are the result of the dominant gene S. Short eyelashes are the result of the recessive genotype, ss. Have your partner check your eyelashes.
    10. Record your phenotype and genotype in the table.
- Some individuals are born with 6 or more fingers on each of the hand. This is a trait caused by the dominant gene P. Individuals with 5 fingers on each hand have the recessive genotype pp.
    11. Record your phenotype and genotype in the table.
    12. Create the table in an easy way to record your phenotypes and genotypes, in addition, include 10 women and 10 men to investigate your own culture features. You can be included in those 10 men or 10 women. Take a range or a fixed age of the people that is going to be asked. (16 year old).
    13. Go person by person recording everyone's traits.

RAW DATA:

| Individual | Gender | A | B | C | D | E | F | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M | L_ | B_ | ww | R_ | tt | F_ | hh | N_ | C_ | ss | pp |
| 2 | M | L_ | B_ | ww | R_ | tt | F_ | hh | N_ | cc | S_ | pp |
| 3 | M | ll | B_ | ww | R_ | tt | ff | hh | N_ | C_ | S_ | pp |
| 4 | M | ll | B_ | W_ | rr | tt | ff | H_ | N_ | cc | S_ | pp |
| 5 | M | L_ | B_ | ww | R_ | tt | ff | hh | N_ | C_ | S_ | pp |
| 6 | M | L_ | B_ | W_ | R_ | tt | F_ | hh | N_ | cc | ss | pp |
| 7 | M | L_ | B_ | W_ | R_ | tt | F_ | H_ | N_ | cc | S_ | pp |
| 8 | M | L_ | B_ | ww | R_ | tt | F_ | hh | N_ | C_ | S_ | pp |
| 9 | M | L_ | B_ | ww | R_ | tt | F_ | H_ | N_ | C_ | ss | pp |
| 10 | M | L_ | B_ | ww | R_ | tt | ff | hh | N_ | C_ | S_ | pp |
| 11 | F | L_ | B_ | ww | R_ | tt | ff | hh | N_ | cc | S_ | pp |
| 12 | F | ll | B_ | W_ | R_ | tt | ff | H_ | N_ | C_ | ss | pp |
| 13 | F | L_ | B_ | W_ | rr | tt | ff | hh | N_ | C_ | S_ | pp |
| 14 | F | L_ | B_ | ww | R_ | tt | ff | hh | N_ | C_ | S_ | pp |
| 15 | F | L_ | B_ | ww | R_ | tt | ff | hh | N_ | C_ | S_ | pp |
| 16 | F | L_ | B_ | W_ | R_ | tt | F_ | hh | N_ | C_ | S_ | pp |
| 17 | F | ll | B_ | ww | R_ | tt | ff | hh | N_ | C_ | S_ | pp |
| 18 | F | L_ | B_ | ww | R_ | tt | ff | hh | N_ | C_ | ss | pp |
| 19 | F | L_ | B_ | ww | R_ | tt | ff | H_ | N_ | cc | S_ | pp |
| 20 | F | L_ | B_ | ww | R_ | tt | ff | hh | N_ | C_ | S_ | pp |

A=Earlobes

B=Eyecolor

C=widow's peak

D=Roll tongue

E=Fold tongue

F=Bending of fingers

H=Hair on fingers

I=Hair color

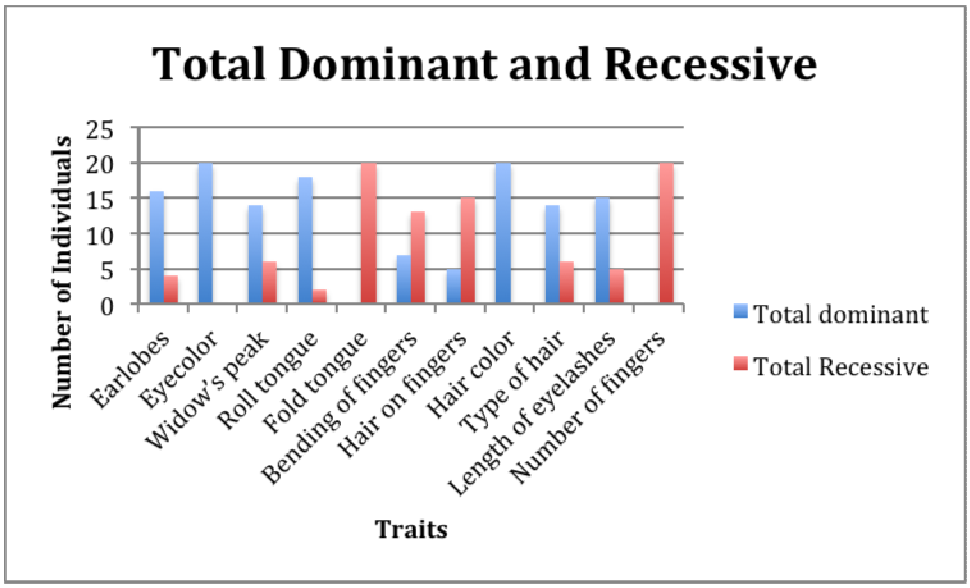
J=Type of hair

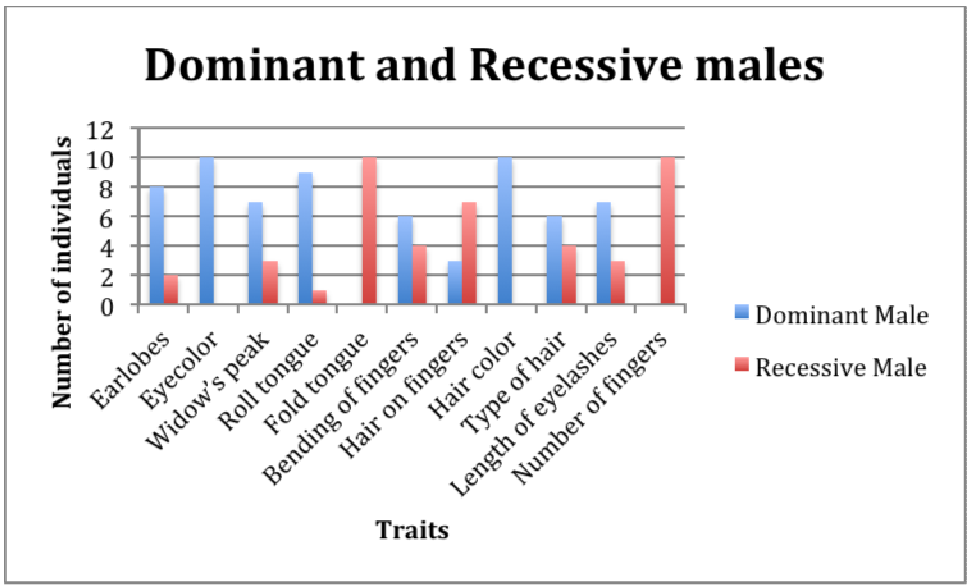
K=Length of eyelashes

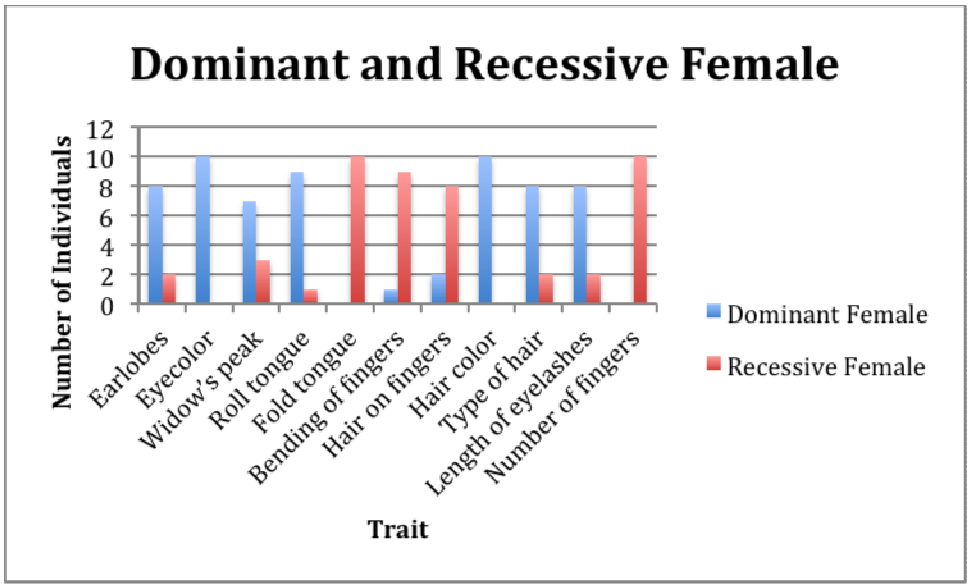
L=Number of Fingers

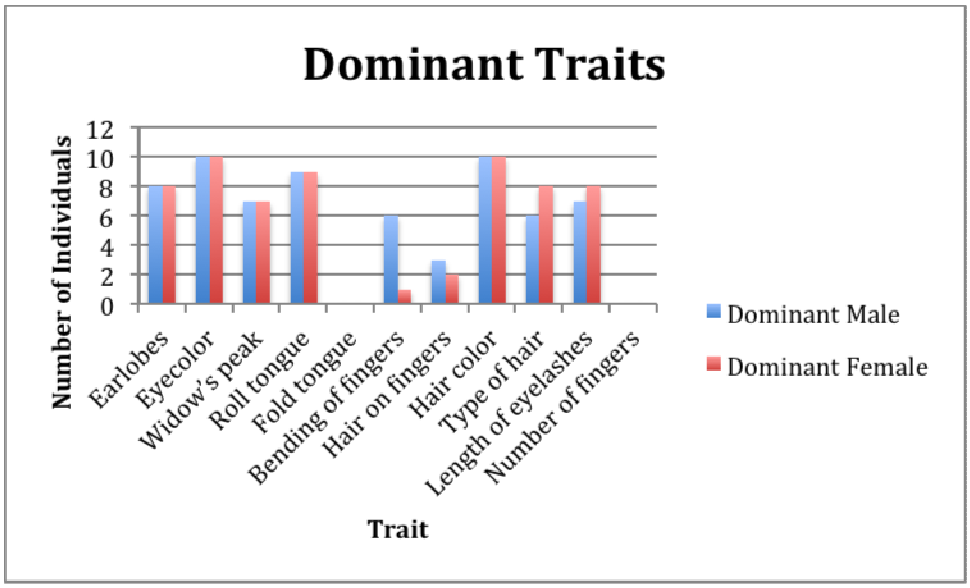
| Trait | Dominant Male | Recessive Male | Dominant Female | Recessive Female | Total dominant | Total Recessive |
|---|---|---|---|---|---|---|
| Earlobes | 8 | 2 | 8 | 2 | 16 | 4 |
| Eyecolor | 10 | 0 | 10 | 0 | 20 | 0 |
| Widow's peak | 7 | 3 | 7 | 3 | 14 | 6 |
| Roll tongue | 9 | 1 | 9 | 1 | 18 | 2 |
| Fold tongue | 0 | 10 | 0 | 10 | 0 | 20 |
| Bending of fingers | 6 | 4 | 1 | 9 | 7 | 13 |

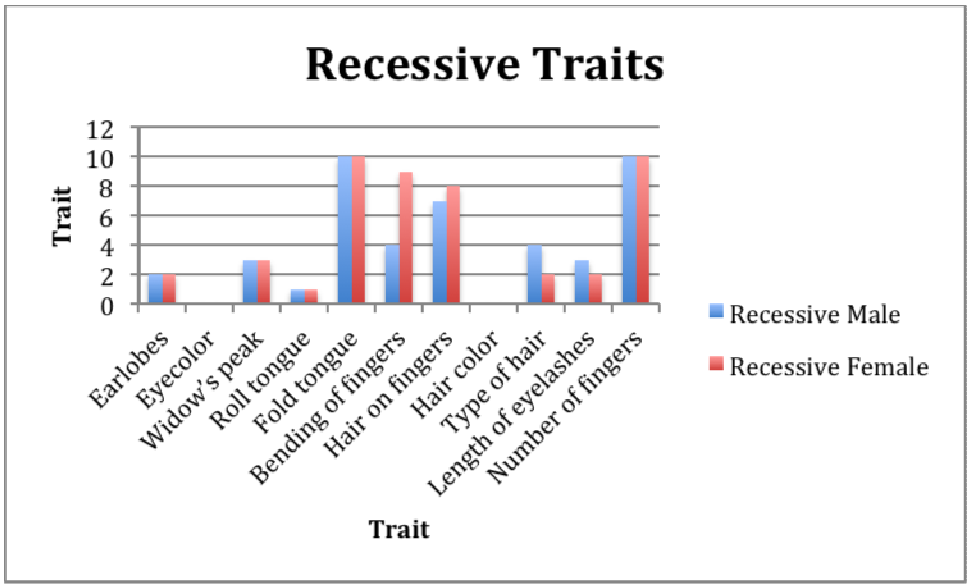
| | | | | | | |
|---|---|---|---|---|---|---|
| Hair on fingers | 3 | 7 | 2 | 8 | 5 | 15 |
| Hair color | 10 | 0 | 10 | 0 | 20 | 0 |
| Type of hair | 6 | 4 | 8 | 2 | 14 | 6 |
| Length of eyelashes | 7 | 3 | 8 | 2 | 15 | 5 |
| Number of fingers | 0 | 10 | 0 | 10 | 0 | 20 |




Dominant and Recessive Female
Number of Individuals
12
10
8
6
4
2
0
Earlobes
Eyecolor
Widow's peak
Roll tongue
Fold tongue
Bending of fingers
Hair on fingers
Hair color
Type of hair
Length of eyelashes
Number of fingers
Trait
Dominant Female
Recessive Female


Dominant Traits
Number of Individuals
12
10
8
6
4
2
0
Earlobes
Eyecolor
Widow's peak
Roll tongue
Fold tongue
Bending of fingers
Hair on fingers
Hair color
Type of hair
Length of eyelashes
Number of fingers
Trait
Dominant Male
Dominant Female




Mode for every trait

| Trait | Mode |
|---|---|
| Earlobes | L_ |
| Eyecolor | B_ |
| Widow's peak | ww |
| Roll tongue | R_ |
| Fold tongue | tt |
| Bending of fingers | ff |
| Hair on fingers | hh |
| Hair color | N_ |
| Type of hair | C_ |
| Length of eyelashes | S_ |
| Number of fingers | pp |

## Conclusion

In conclusion the results showed in the first graph that dominant traits are more common than recessive traits seven out of eleven have a greater number of dominant traits present in the individuals. The second and third graphs show that recessive traits were more prolific in the female individuals, because the bending of fingers in female individuals was greater than in male individuals. One possible reason for this result is that the work or activities employed by males have altered the shape of the little fingers. The fourth graph show that the commonly males and females have the same number of individuals with dominant traits. One of the dominant traits that differ in the number of individuals having it, was the length of the eyelashes and one possible reason is that women use make up and false eyelashes to change the shape and length of this. In males the recessive trait that produces hair on the middle joints of the fingers was very common, more common than the number of female individuals with this trait

present. This may be caused because of testosterone hormone that in men is proved to produce a large amount of hair in the body.
The mode of each trait helped to theorize on how would a average person will be. This average male or female will have unattached earlobes, may have different shades of brown, hazel, or green eyes, a smooth hairline, will be able to roll tongue but wouldn't be capable of folding it, would have straight little fingers, wouldn't have hair on the middle joint of the fingers, would have any hair color except red, will have curly hair, long eyelashes and five fingers.

Errors and improvements

| Errors | Improvements |
|---|---|
| It was difficult to determine whether the eyelashes were long or short because there wasn't a fixed measurement. | Establish a measurement that differentiates long eyelashes form short eyelashes. |
| The table was difficult to complete because I needed to check with the information given, which alleles qualify for each characteristic. | Design an easier table to recollect data. |
| Only a small quantity of individuals was used and all of them from the same geographical region. | Use a grater quantity of individuals from distinct geographical regions, for more reliable data. |
| The makeup, hair treatments and fake eyelashes interfered with the identification of a special trait. | Ask if previous make up or fake eyelashes were used to obtain the real and natural results. |
| In general the identification of the traits was very difficult because we didn't have a reference. | Show clear images of how the traits were present in different individuals, so that we could have a reference of how they looked. |