Probability of Dominant and Recessive Alleles

1.0 Introduction

1.1. Question/Purpose: The purpose of ‘Probability of dominant and recessive alleles’ is to find out if traits are controlled by dominant alleles more common then ones that are controlled by recessive alleles.

1.2 Background Information: Gregor Mendel is the father of heredity who discovered the truth about recessive and dominant alleles by observing the F1 and F2 generations of pea plants. He noticed that some traits are dominant over others.

If a punnett square is utilized then one can predict the possible results of genetic crosses because it takes into consideration all possible combination. Skills lab pg 90-91

Vocabulary
Allele-
Gene-
Recessive-
Dominant-
F1 Generation-
F2 Generation-

1.3. Hypothesis: If we record the number of people with dominant and recessive traits in an 11 person sample space Then more people will have dominant traits over recessive traits Because there are two combinations of alleles that come out dominant and only one combination of alleles that come out recessive, therefore it is more likely to have a dominant trait.

1.4. Variables:
• 1.4.1 Independent/Manipulated: People in sample space
• 1.4.2 Dependent: Number of people with various traits
• 1.4.3 Constants: Traits, Species (Humans)

1.5 Materials
recording materials (including paper)
sample space(11 students from science class)
survey i.e. section 2.1
mirror
1.6 Method
Step 1: Take out recording materials and draw a table (Table 2.1)
Step 2: Ask everyone in the sample space to raise their hand when a trait is called out that they have i.e. “Who has a cleft chin?” ‘3 people raise their hand.’ under cleft chin tally 3 and 8 under smooth chin.

2.0 Data
2.1 Tables:

<table>
<thead>
<tr>
<th>dominant</th>
<th>tally</th>
<th>#</th>
<th>recessive</th>
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<tbody>
<tr>
<td>free ear</td>
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<td>8</td>
<td>attached ear</td>
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<td>3</td>
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<td>hairy fingers</td>
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<td>11</td>
<td>bald fingers</td>
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<td>Widow’s peak</td>
<td>I I I I I I I I</td>
<td>3</td>
<td>Straight hairline</td>
<td>I I I I I I</td>
<td>8</td>
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<tr>
<td>Curly hair</td>
<td>I I I</td>
<td>3</td>
<td>Straight hair</td>
<td>I I I I I I</td>
<td>8</td>
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<tr>
<td>Cleft Chin</td>
<td>I I I</td>
<td>4</td>
<td>Smooth Chin</td>
<td>I I I I I</td>
<td>7</td>
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<tr>
<td>Dimples</td>
<td>I I I</td>
<td>4</td>
<td>No Dimples</td>
<td>I I I I I</td>
<td>7</td>
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</tbody>
</table>

2.2 Graphs:

Dominance to Recessive Trait Graph
3.0 Results and Analysis

The graph above shows that 2 of the 6 traits analyzed (free ear and hairy fingers) in the sample space show the dominant version of this trait was more common than the recessive version. The graph also shows that 4 of the 6 traits surveyed from the sample space show that the recessive version of most traits strongly overpower the dominant traits.

This can be very confusing because of the fact that the dominant trait can over power the recessive trait 2 out of 3 times and the recessive trait can only be visible if it is paired with another recessive alleles. This is the Punnett Square of Lucy and Sam’s parents according to the trait of being able to roll your tongue

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MOTHER

Olivia

Sam

Lucy
As you can see 3 of the 4 possible combinations are dominant the remaining 1 is recessive. Since Lucy is the only one of her siblings that cannot roll her tongue she is the 1/4 that Mendel discovered in the F2 generation. This example does not explain why most people in the sample space had the two recessive alleles but it does give a figure. Almost everyone in the sample space have siblings, which means that like, lucy it is likely that it is just by chance that most people ended up with a pair of recessive alleles, it is also likely that the parents of the sample space both had recessive alleles for that trait.

4.0 Conclusion

4.1 Conclusion:
During the experiment a sample space of 11 students were surveyed. To conclude the hypothesis “If we record the number of people with Dominant and Recessive traits in an 11 person sample space Then more people will have dominant traits over recessive traits Because there are two combinations of alleles that come out dominant and only one combination of alleles that come out recessive, therefore it is more likely to have a dominant trait.”. The outcome of the lab does not support the hypothesis because it turned out that most people had the recessive trait over the dominant trait. The results show that the recessive traits over powered the dominant traits in the sample space. This means that most parents of the F2 generation either had tt alleles or Tt alleles as their genotype. That affected the F2 generation by making it more likely for them to inherit the recessive alleles.

4.2 Error Analysis / Improvements:
In the lab there were no errors that could be validly accounted for because of the fact that human error is not considered a sound reason to be mentioned. But there are a few things that could have gone wrong it is a with great sureness that the possibilities for human error did not occur.

The procedures were very simple and the lab didn’t take long to complete. The information being recorded was well done and the way the data was collected from the sample space was clear and uncomplicated. The only improvement would be to get a bigger sample space such as the whole middle high school.