

Honors 211 A: DNA & Evolution

Eye Color as a Predictor of Personality

Independent Research Project

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ABSTRACT

A previous study found that eye color is predictor of agreeableness in North Europeans, with lighter eyes tending to be less agreeable. I repeated the study on an American sample collected via social media and found no evidence against my hypothesis that eye color would not predict agreeableness. Possible explanations for the different results due are explored.

INTRODUCTION

Human behavior is undeniably complicated. Throughout history, we have attempted to explain why, turning to everything from astrology to neurobiology. There is also the question of whether our personality is related to our physical appearance and therefore determined by our genes. In particular a 2010 study by Gardiner and Jackson provides data in support of eye color as a predictor of agreeableness in Northern Europeans (Gardiner 2010). I decided to see if these results could be reproduced using a different sample population: Americans.

Gardiner and Jackson hypothesized that light-eyed persons would be less agreeable than dark-eyed persons based on a theory about the operational sex ratio and sexual selection in Northern Europe during the last ice age (Frost 2006) along with rare-color advantage for light eye colors. There were fewer surviving men than women since hunting was a very risky endeavor and the females had to compete to attract males. Therefore, those who were more competitive and aggressive in acquiring committed mates tended to be more successful. These traits were then passed to the next generations, along with physical characteristics like eye color. Their research was conducted on Caucasian Australian university students whose lineage traced back to the United Kingdom. They found a statistically significant result that lighter eyes were correlated to being less agreeable.

Since Gardiner and Jackson had a very controlled, specific population, they were able to consider that society was shaped throughout history. Since I am studying a population known for being a “melting pot,” there are likely to be many societal factors at play, some of which will be at odds with each other. As such, my hypothesis is that eye color is not a predictor of agreeableness. If

my hypothesis is correct, the data would be randomly scattered (Figure 1). If incorrect, the data should show that light eyes are more disagreeable (Figure 2), matching the previous study, though it is possible that a different trend could also appear.

METHODOLOGY

To conduct my experiment, I created an online survey to gather both demographic and personality data. For demographics, participants were asked age, ethnicity, and eye color. Eye color was converted to the following numeric scale: blue - 1, green - 2, hazel - 3, brown - 4, black - 5. The personality survey used was the International Personality Item Pool (IPIP) 50 item form, which was also as used by Gardiner and Jackson. The IPIP measures five aspects of personality: extraversion, agreeableness, conscientiousness, emotional stability, and intellect/imagination. I posted the survey in several places on Facebook and collected 101 responses. The responses were scored according to IPIP guidelines (Administering 2016) and statistically analyzed.

RESULTS

Of the 101 responses collected, there were 14 males and 87 females, with an average age of 22.9 years old. Since the original study looked at both white and non-white European samples, I analyzed the data for the 89 white and 12 non-white respondents separately, as well as for a combined sample. Graphs showing scatterplots and regression lines for the IPIP characteristics and eye color are shown for the white sample only (Figures 3-7). Although there appears to be a relation at first glance, the data were further analyzed using a 1-way ANOVA F-test against the null hypothesis that average scores for each eye color are equal. Table 1 shows the average score

for each of the five characteristics measured by the IPIP sorted by eye color and the resulting p-values. An asterisk (*) is used to indicate statistical significance.

Looking at the results, the data does not provide evidence that there is a relationship between eye color and any of the 5 characteristics tested by IPIP. The only statistically significant result was eye color and extraversion for the non-white sample, but as the sample size is only 12 this would require further testing. The hypothesis that eye color does not predict agreeableness is supported. Additionally, it does not seem that eye color predicts any of the IPIP characteristics better than any of the others.

DISCUSSION

The results of my experiment do not agree with those of Gardiner and Jackson. Though I have no evidence to support it, my theory is the sexual selection during the last ice age occurred so long ago that the years have obscured their effects in modern societies, particularly those that have experienced large amounts of genetic and cultural combination. According to natural selection, a trait will evolve if there is variation, heritance, excess reproduction and differential success. It is clear that both personality and eye color vary from person to person, that eye color is heritable, and that not all humans will survive to reproduce. However, differential success will have changed as our society advanced so that the traits and resources valued will have expanded beyond the ability to find food and survive the elements. In the United States, this would also be amplified by the increased variation caused by migration. Therefore, the selection that Gardiner and Jackson believe took place in Northern Europe would have a very small effect.

It would be interesting to expand the study to include regions other than Northern Europe that may have had different pressures shaping their genetic makeup. For example, does the Mediterranean region have a different trend? For some areas, like much of Asia, these results would not be useful since there isn't as much variation in eye color, but the idea of sexual selection causing a correlation between personality and physical appearance could be explored for other physical characteristics as well. I cannot predict what these may be without a thorough understanding of history and anthropology.

It is also important to note that my results were likely weakened by several factors resulting from the limited time and resources available. First, while 101 is a moderate sample size, more participants is always better. Also, these participants may not truly reflect a random sample as they were all found by a common connection. In particular, the survey was posted to a Facebook page for collegiate members of Phi Sigma Pi, a national co-ed honors fraternity. Therefore, the participants may only reflect the type of person who is likely to seek out and join such an organization to begin with. Additionally, the IPIP is well-known and reputable personality metric, but in proper analysis uses upwards of 300 items rather than the 50 used here and in the original study. The short version is known to be less accurate, but the longer version would have deterred most, if not all, of the volunteers.

FIGURES & TABLES

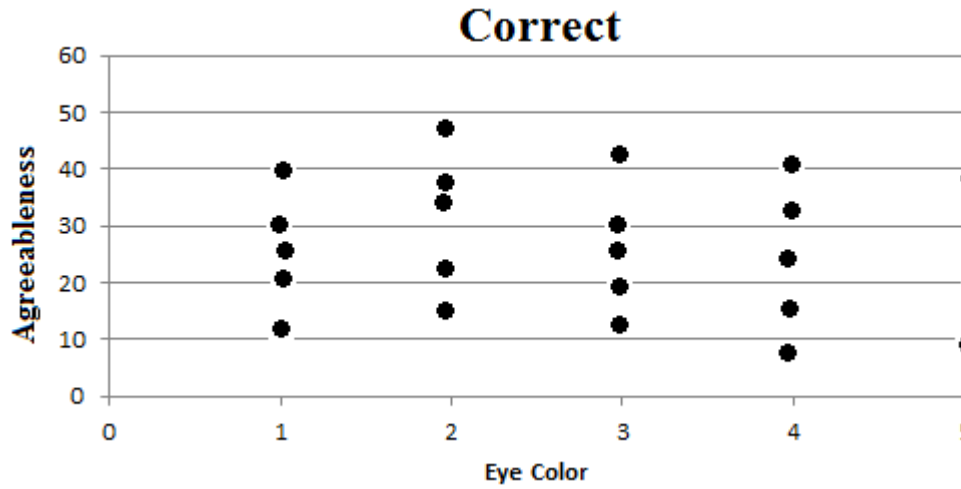


Figure 1. Predicted results if the hypothesis is correct. There is no correlation between eye color and agreeableness.

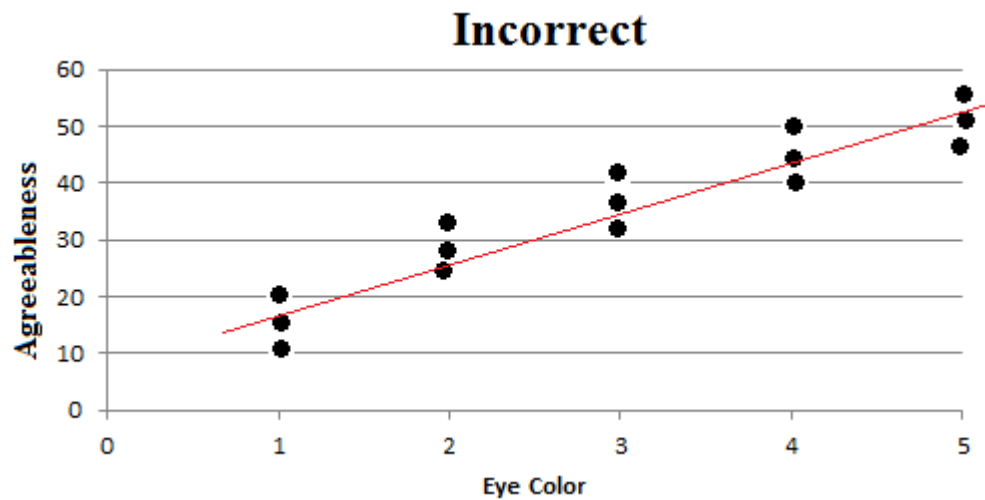


Figure 2. Predicted results if the hypothesis is incorrect. Lighter eye colors are less agreeable than darker eye colors. There are other possible data patterns that would also indicate incorrect results.

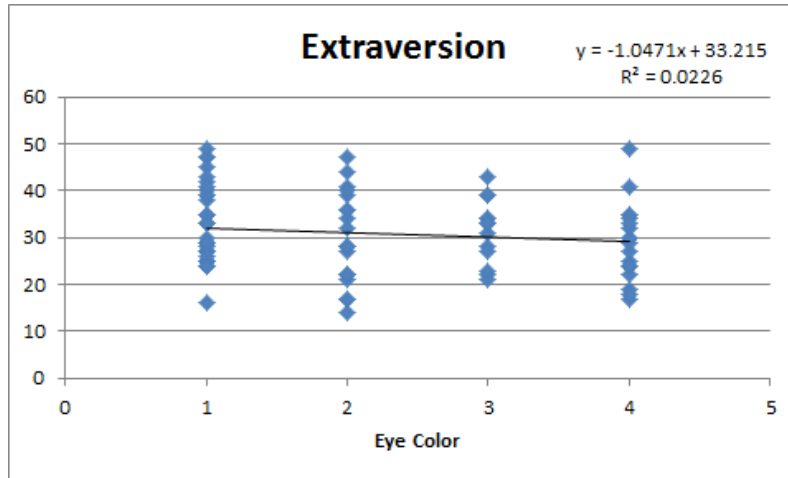


Figure 3. Plot of extraversion score against eye color with best fit regression line $R^2 = 0.0226$.

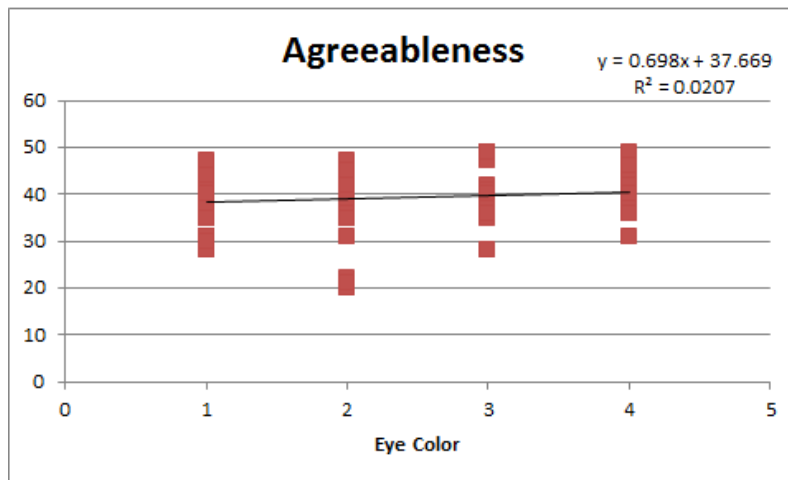


Figure 4. Plot of agreeableness score against eye color with best fit regression line $R^2 = 0.0207$.

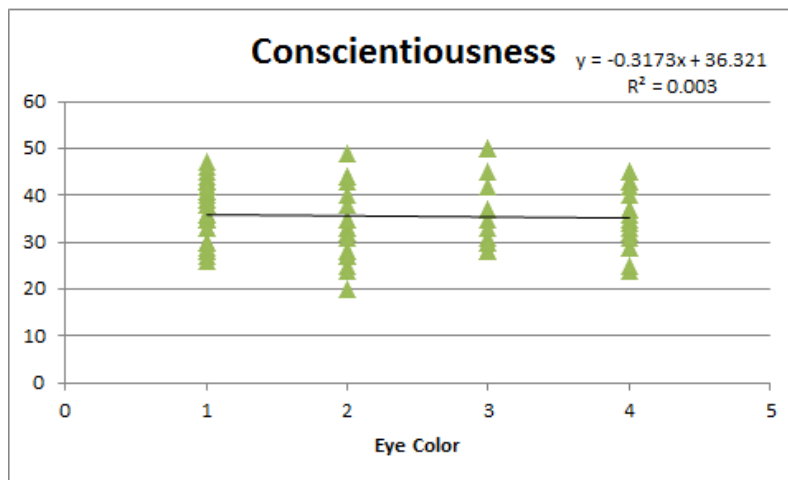


Figure 5. Plot of conscientiousness score against eye color with best fit regression line $R^2 = 0.003$.

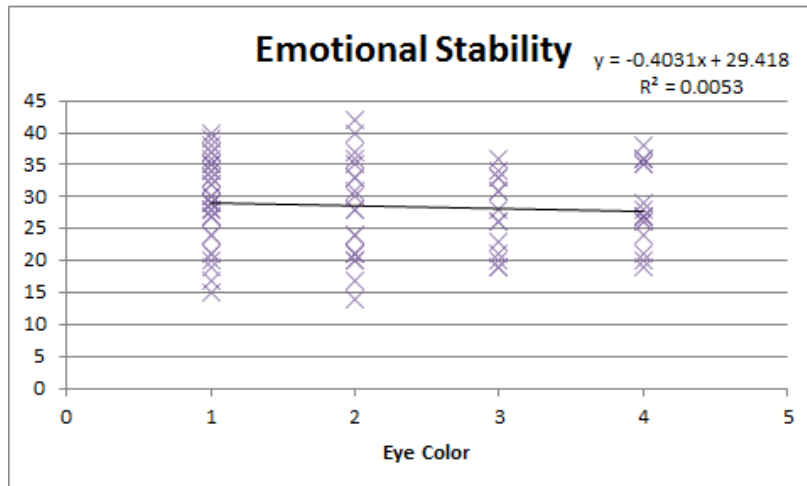


Figure 6. Plot of emotional stability score against eye color with best fit regression line $R^2 = 0.0053$.

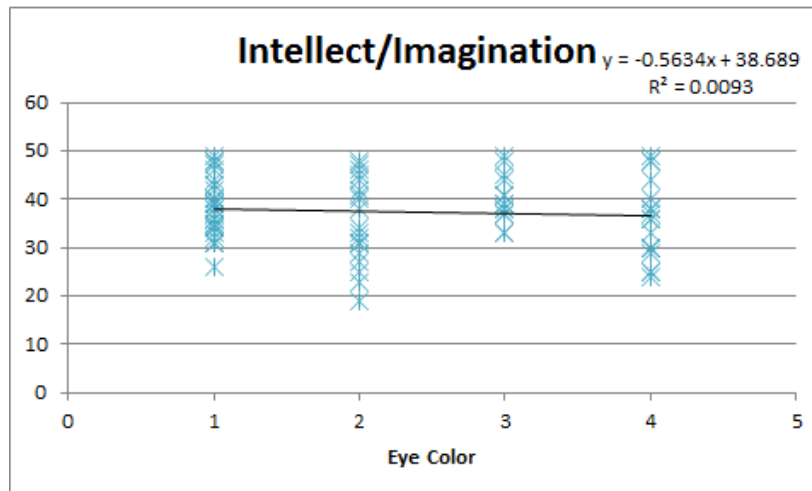


Figure 7. Plot of intellect/imagination score against eye color with best fit regression line $R^2 = 0.0093$.

Table 1. Average score and p-value for IPIP trait and eye color

	Eye Color	White (n=89)	Non-white (n=12)	All (n=101)
Extraversion	1	32.50	X	32.50
	2	29.75	X	29.75
	3	31.43	X	31.43
	4	28.84	29.00	28.90
	5	X	42.00	42.00
	p-value	.399	.045*	.127
Agreeableness	1	38.92	X	38.92
	2	37.30	X	37.30
	3	40.57	X	40.57
	4	40.68	37.10	39.45
	5	X	35.00	35.00
	p-value	.227	.727	.460
Conscientiousness	1	36.86	X	36.86
	2	33.15	X	33.15
	3	36.00	X	36.00
	4	35.63	36.80	36.03
	5	X	37.50	37.50
	p-value	.277	.915	.416
Emotional Stability	1	29.47	X	29.47
	2	27.75	X	27.75
	3	27.14	X	27.14
	4	28.63	31.1	29.48
	5	X	27.00	27.00
	p-value	.651	.533	.716
Intellect/Imagination	1	38.56	X	38.56
	2	35.30	X	35.30
	3	40.14	X	40.14
	4	35.68	36.7	36.03
	5	X	44.00	44.00
	p-value	.100	.369	.142

REFERENCES

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