



Can you Guess Gender from Handwriting?

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The experiment was conducted to see if you can guess gender based on handwriting. We hypothesize that handwriting can accurately reflect on gender based on stereotypes that we assume the participants will follow. The stereotype is that the neater handwriting will be considered to be a girl, and that the messier handwriting will be considered to be a boy.

Prior to commencing our experiment, we first researched the different variables we thought would present themselves during our experiment portion. We found a university study on a similar topic to ours, and we used the data to help gauge our hypothesis (Bradley, 2015). The study explains that it is unlikely that you can guess gender from handwriting. In our experiment, we want to know if 13-14 year olds can correctly guess 13-14 year old biological gender based on their handwriting (and why they think that). Our experiment worked in two parts. The first part was to acquire as many students handwriting samples of the same phrase as possible, and the second part was to get the same students to fill out a form with a random selection of the handwriting samples, in which the participants had to guess whether or not the handwriting was written by a female or a male. We discovered that the extremely neat handwriting samples, with clear letter placement seemed to be thought of as female, and overtly messy, and harder to read samples seemed to be mostly thought of as male (“Evaluating Handwriting”), but there was no definite consensus on the majority of samples if they were neutral or not neat/messy enough to definitely be one or the other. We found that it was not very likely to be able to guess gender from handwriting, because everyone is different, the stereotype cannot apply to everyone.

INTRODUCTION

The ability to write is something that everyone has to learn growing up, criticism is given to ensure we foster good habits and clarity as we learn. However the stereotype of handwriting and gender may be founded by our educational society such as parents, friends and teachers. There have been invisible standards for both genders growing up. We were capable of completing the research safely while following the COVID-19 restrictions, since it’s a more survey-based project than a creation/invention-based project. By doing multiple different quizzes we gathered a lot of information that was important for our conclusions. The experiment taught us that the youth of today aren’t as likely to use gender stereotypes, unless it was leaning towards extremely messy/neat handwriting.

HYPOTHESIS

If people assume that messy handwriting corresponds with a male participant, and neat handwriting corresponds to a female participant, then we can guess that people will be able to correctly identify someone’s gender by their handwriting. If this is the case, it can further support that the current handwriting stereotype is accurate.

PURPOSE

We decided to choose this topic as a way to prove societal norms with scientific evidence. With the data we collected through this experiment, we can explain gender-based stereotypes better, and whether or not they are based on facts, or are rooted in sexism. Many children often get criticism for having messy handwriting, and this can affect them a lot by making them insecure or upset about a common thing like handwriting. We tried our best despite

our current limitations due to the COVID-19 crisis. We couldn’t do this experiment on a grander scale because of the physical distancing rules and we were limited to only our grade and the classes in our cohort. As part of our research before starting our experiment, we found an article stating that it wasn’t likely that you could guess gender from handwriting, as only 54% of participants correctly identified male from female handwriting samples (Schroeder, 2013).

FINE MOTOR SKILLS IN GIRLS AND BOYS

Fine motor skills are defined as “...involving the use of the smaller muscle of the hands”(“Fine Motor Skills”). During our research, we came across two sources of evidence that clearly stated that young girls compared to young boys develop superior fine motor skills at the same age. BabyCenter said, “...girls’ fine motor skills (holding a pencil, writing) improve first” (Ding, 2019) and another article from the University of Stavanger (Halsan, 2014) said, “The results of the study showed that girls performed better in self-help skills, fine motor skills and general movement skills.”

GRAPHOLOGY

The study of handwriting and its complexities is called ‘Graphology’ (Warren, 2018). It is important to state that graphology is a pseudo-science and therefore shouldn’t be used as a professional diagnostic tool for making proper assessments. It was an important topic to cover because there were people who claimed to be able to identify an individual’s personality based on their handwriting. We found this interesting because it showed us how graphologists are limited to only being able to recognize personality traits and not gender.



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EXPERIMENTAL VARIABLES

Independent Variable:

- The biological gender of the participants

Dependent Variable:

- The results of the forms, measured in percentage (percentage of individuals who correctly identified someone’s gender by their handwriting, and percentage of questions that were correctly identified as male/female)

Controlled Variables:

- The number of samples (20)
- The age of those that fill out the forms (13-14)
- The sentence that must be copied (The quick brown fox jumps over the lazy dog)
- The pencil being used to write the sentence (HB #2)
- What paper they are writing on
- How much space they have to write the sentence.

METHOD

PART A:

Our method was to first give quiz 1 to about 80 students. Quiz 1 consisted of a couple of rudimentary questions, along with a box in which they were to copy the phrase “A quick brown fox jumps over the lazy dog.” After the students completed the quiz we randomly picked 20 samples from the acquired pool of handwriting samples by random. Next, we scanned and entered the photos into a Google Form with only male and female as options beneath each photo. Each question had a right and wrong answer, as we knew what the gender of the participants handwriting sample was. Finally, around 45 students answered the form.

PART B:

Then we used this website calligrapher.ai and acquired 20 random handwriting samples. Next, we created a new google form with those 20 samples, with the options of female or male. This time there was no right or wrong answer, as an AI had generated the handwriting. We gave out this form to 45 students.

Finally using the information gathered with both Google Forms, we created a conclusion based on which handwriting sample was guessed as which gender. We categorized them using a list of criteria. This is the list of criteria we used: Cursive/Print & Illegible/Legible.

PART 1 RESULTS

Each star represents a participant, with there being 23 total stars. The vertical scale on the left represents how many questions each participant got correct (guessing the correct gender of the handwriting sample). Whether they got the question right due to pure luck, or genuine investigation is not clear through this specific chart. As you can see, the participants had a range of 8-13 correct answers. The average number of right answers for a participant was 10.91, the median was 11, and the mode (the blue stars) was also 11. If you look at the red line, you can see the trend line, representing how many questions the greatest number of people got right. As you can see, 11 correct questions is just above a 50/50 chance (which a person choosing randomly could have guessed correctly).

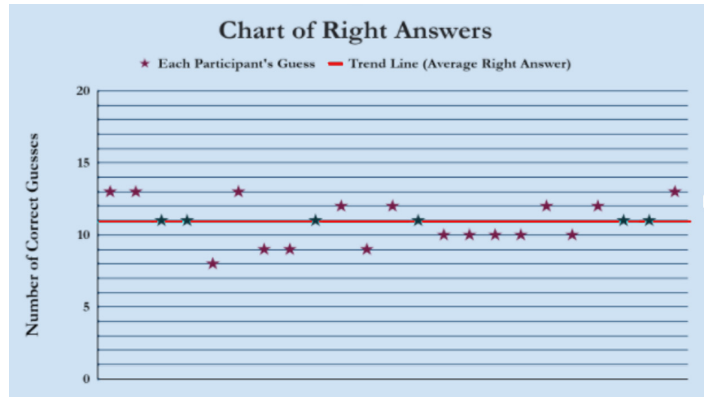


Figure 1: Graph of right answers comparing the participants guess to the trend line (average right answer) purple stars represent guesses, blue stars represent the mode

Figure 2, Bar graph of percentage of correctness per question for male and female

Each bar here represents one question, and the colour of the bar represents what the right answer was (blue for a male being the correct answer, and pink for a female being the correct answer).

PART 2 RESULTS:

DISCUSSION:

Our results show that it is very difficult to guess gender based solely on handwriting. The majority of participants guessed that cursive handwriting was female and messier, harder to read handwriting was male. For handwriting samples that were average or not extremely messy, or not extremely neat, there was a near 50/50 split for either gender. This means that anyone could guess at random and get similar results to our study. We think that it’s because everyone is different, and oftentimes, boys may have neat handwriting, and girls may have messy handwriting. There was a case in which a handwriting sample was thought to be female, but the participant who wrote the sample was in fact male. This was a stereotype that we thought would happen more often, but it didn’t happen nearly as frequently. We assumed most people would follow the stereotype that females will write neater than males, and although we were proven correct, it didn’t work for the majority of the handwriting samples.

MINOR ANOMALIES

During our research, we came across 2 minor anomalies that could affect our experiment. The first was students that were right-handed vs those who were left-handed. Left-handed individuals often do not get to properly learn how to write with their left hand, since right-handed individuals dominate the majority of the population. This puts left-handed individuals at a disadvantage because they have less opportunities compared to right-handed individuals to use their dominant hand every day. The next anomaly we came across was the participants’ mood and emotion. According to a study done by the University of Haifa, there are slight indications in your handwriting that can reveal the participants mood or gen-

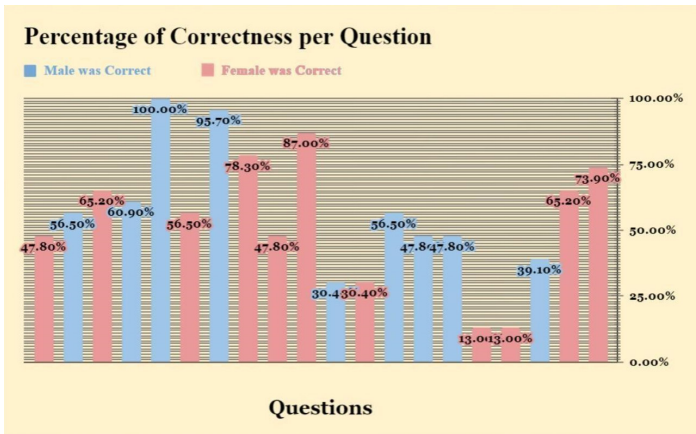


Figure 2: Bar graph of percentage of correctness per question for male and female

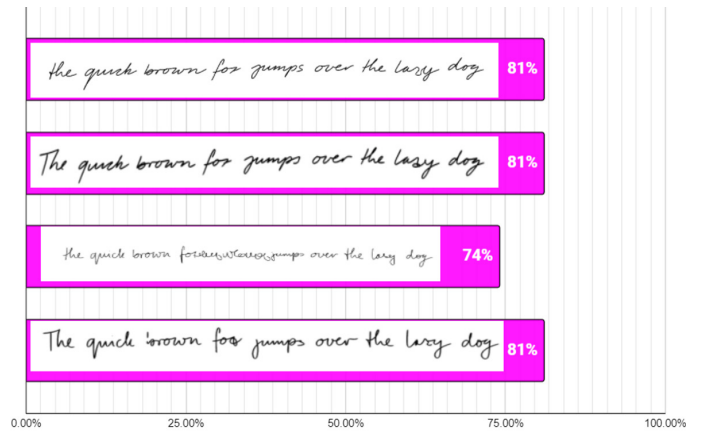


Figure 3: Female, Cursive & Illegible (4) Average Percentage: 79.25%

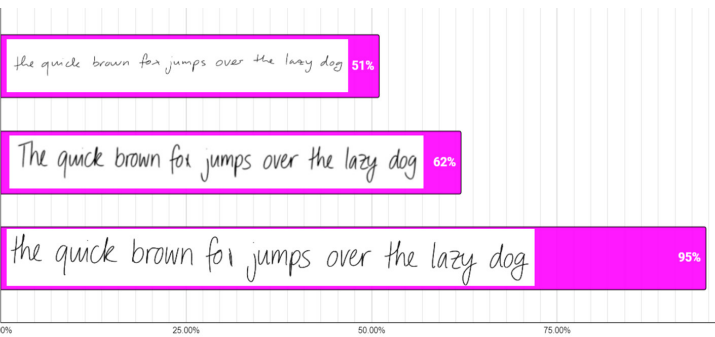


Figure 4: Female, Print & Illegible (3) Average Percentage: 69.3%

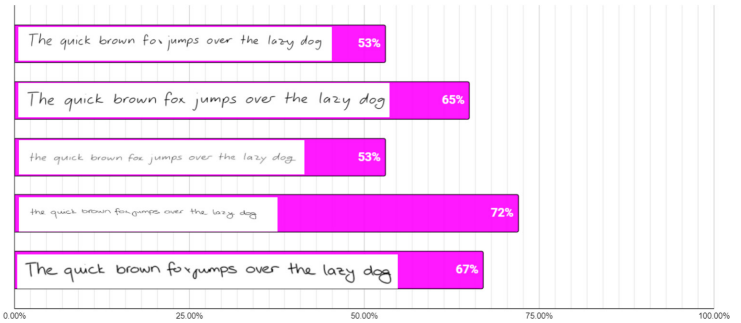


Figure 5: Female, Print & Legible (5) Average Percentage: 62%

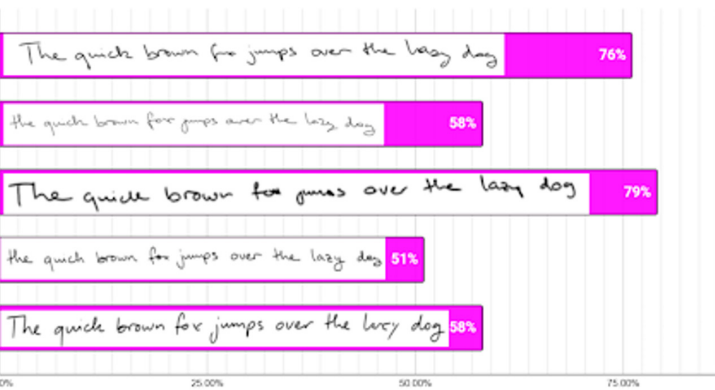


Figure 6: Male, Print & Illegible (5) Average Percentage: 64%

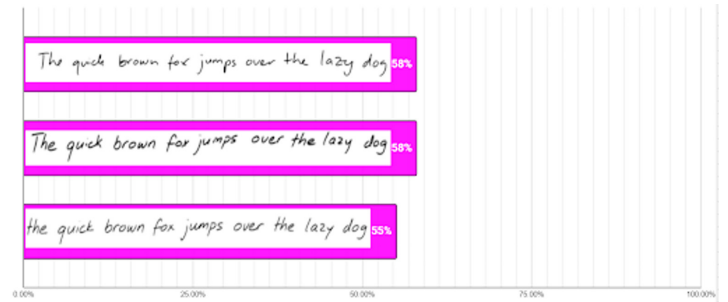


Figure 7: Male, Print & Legible (3) Average Percentage: 57%



eral feelings (Siegel-Itzkovich, 2018). “It was also found that participants in a negative mood showed quicker writing and narrower width of letters than those in a positive or neutral mood.” Knowing this, we kept in mind that there may be a slight difference in someone’s handwriting when they’re in a negative mood or in a positive mood.

CONCLUSION

After further research we think scientifically it is unlikely to guess gender based solely off of handwriting. We found that many of our quizzes could have resulted in similar outcomes, had the participants been guessing at random. This proved, since many of our samples weren’t in agreement, that it is not very likely to be able to guess gender from handwriting, meaning our hypothesis was wrong. Even if the participants guessed the “neater” handwriting was female, and the “messier” handwriting was male, it simply didn’t happen often enough to definitively say that you can guess gender from handwriting. From doing this experiment, we learned that everyone is different and unique. This can teach others that stereotypes don’t have to be a defining feature of individuals.

If we could do this again, we would have gotten more varied samples of handwriting from individuals of different ages who have volunteered to participate in the experiment. As we stated in Minor Anomalies, there are two major things that could affect one’s handwriting; Whether they are left-handed or right handed, and mood or emotions. A left-handed person in 8th grade (13-14 years old) may not have fully developed hand writing skills seeing as for more than half of their lives they were taught to write with their right hand. Meaning if the handwriting samples were from people of different ages that anomaly would apply differently to older people and would appear more clearly for younger people. Having participants volunteer rather than asking them to do it with no warning might have made the participants writing the samples more happy and more comfortable, rather than confused and possibly irritated. Mood or emotions was one of the minor anomalies we found, based on the research we have, we know if someone has a positive or neutral attitude they will most likely work harder to have neater writing., meaning if everyone had neater handwriting than normal, maybe more people would guess the samples are female, (since most of the neater samples were guessed to be female), which could possibly change the outcome of the experiment.

Now we wonder if there are other defining features of individuals that you can guess gender from such as: Can you guess gender from a signature?

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ABOUT THE AUTHOR - EMILY LI

Hi! My name is Emily Li, and I go to Sir Robert Borden HS. I really enjoyed writing this paper because it really challenged me to work harder, and to push myself further. My co-author and I had a lot of challenges due to our circumstances, but I think we succeeded despite our limited resources. I want to thank our science teacher who encouraged us to do try our school science fair, and he gave a lot of advice throughout the entire writing process. Thanks to Hannah Gregory, my co-author for working so hard on this project!



ABOUT THE AUTHOR - HANNAH GREGORY

Hannah Gregory is a teen from Ontario. She is just starting high school and hopes to pursue a career in STEM in the future.

