

# Worry Assessment by Handwriting Analysis of Right-Handed and Left-Handed Individuals

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## ABSTRACT

Handwriting refers to a person's unique style of writing characters created by hand with a writing instrument such as a pen or pencil. Handwriting is an acquired skill and a complex-perpetual-motor task, sometimes referred to as a neuromuscular task. Because each person's handwriting is unique, it can be used to verify the writer of the document. Graphology is the study by which the personality of an individual can be determined with the help of handwriting. It will reveal his social skills, honesty, stability, confidence level and how he compares himself to others. Handwriting being a neuromuscular activity also has an impact with regard to handedness of the writer. It is hypothesized that the Left-Handed writers are much different than the Right-Handed writers with respect to their personalities. Therefore, this work aims to study the Worry assessment with respect to the handedness of the writer, based on certain characters of handwriting like: pen pressure, size of letters, slant of words, spacing between the words, shape of the words, page margins, etc. Fifty(50) samples each of Right-handed and Left-handed individuals between the age group of 18-30 years were analyzed to determine the personality traits of the individuals. The results were then compared depending on the handedness of writers.

**Keywords:** Worry assessment, personality, Graphology

## I. INTRODUCTION

Handwriting is a complex motor skill involving a combination of sensory, neurological, and physiological impulses. It results due to factors like visual perception, knowledge of form, pathways of central nervous system, anatomy and physiology of bones and muscles of arm<sup>[9]</sup><sup>[10]</sup>. On achieving the mastery on handwriting through practice, the writer tends to deviate from the copybook form of writing and begins to exclaim his own individual characteristics. Thus, writing becomes a pattern of subconscious habitual formation, which is repeated in every writings<sup>[9]</sup><sup>[10]</sup>. The way a person places the words on a page expresses his individuality. An expert can identify these relevant features of handwriting and the reasons of their occurrence thereby analyzing the personality of the writer.

The study of handwriting identification is a discriminatory process. The two fundamental fields of study pertaining to handwriting are - the study of handwriting as a neuromuscular activity, skill development and the effect of various internal and

external factors upon it. The second uses the knowledge acquired through the first, but is entirely independent of it, therefore, handwriting identification, fingerprint identification, firearms identification, blood grouping and DNA analysis are discriminatory processes.

Graphology is understanding of the 'human psyche' through brain impulses transmitted onto paper which create 'written expression' regardless if it is handwriting, printing, art, doodles, signatures or numerical. All these forms 'graphic expression' and reveal our 'personality and character'. Handwriting analysis that deals with personality traits may not be completely consistent with its findings, but it can be used to identify neurological conditions.

Handwriting depicts the personality of an individual. While deciding a case in Court of Law, *Mens Rea* i.e., the intention of the accused is taken into consideration and hence, when intention is to be determined, the personality of the person is counted on. Also, in cases of fraud and forgery, handwriting is major medium though which a suspect can be questioned. Hence, handwriting

analysis plays a very important and major role in case of criminal cases.

The behavioural pattern of the person is predicted from the psychological traits like size, slant, pressure, baseline, number of breaks, margins, and speed of writing and spacing between the words of handwriting. The attributes like line separation, slant, character shapes, etc., which are used by forensic document examiners, were used to quantitatively establish individuality by using machine learning approaches [15]. The holistic approach to handwriting analysis deems to have diagnostic value and is promising in providing guidelines for psychotherapy [3].

## II. MATERIALS AND METHODS

Handwriting samples of 50 Right-handed and 50 Left-handed individuals between the age group of 18-30 years were taken from the colleges of South Mumbai. The materials that were required to carry out the study were: pen, paper, magnifying glass, A4 Sheets, template, scale and a standard.

“Fig 1” shows Penn Scale Worry Questionnaire that was used for Worry Assessment. The scores were evaluated using the method given along with it. Handwriting analysis of Right-Handed and Left-Handed writers along with their worry assessment was carried out.

The PENN SCALE WORRY QUESTIONNAIRE is as give below -

**QUESTIONNAIRE**

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Rate each of the following statements on a scale of 1 to 5. Please do not leave any items blank.

1 = Not at all typical of ME  
2 = Rarely typical of ME  
3 = Somewhat typical of ME  
4 = Often typical of Me  
5 = Very typical of ME

STATEMENTS

1. If I do not have enough time to do everything, I do not worry about it.
2. My worries overwhelm me.
3. I do not tend to worry about things.
4. Many situations make me worry.
5. I know I should not worry about things, but I just cannot help it
6. When I am under pressure I worry a lot.
7. I am always worrying about something.
8. I find it easy to dismiss worrisome thoughts.
9. As soon as I finish one task, I start to worry about everything else I have to do.
10. I never worry about anything.
11. When there is nothing more I can do about a concern, I do not worry about it anymore.
12. I have been a worrier all my life.
13. I notice that I have been worrying about things.
14. Once I start worrying, I cannot stop.
15. I worry all the time.
16. I worry about projects until they are all done.

Figure 1. Penn Scale Worry Questionnaire

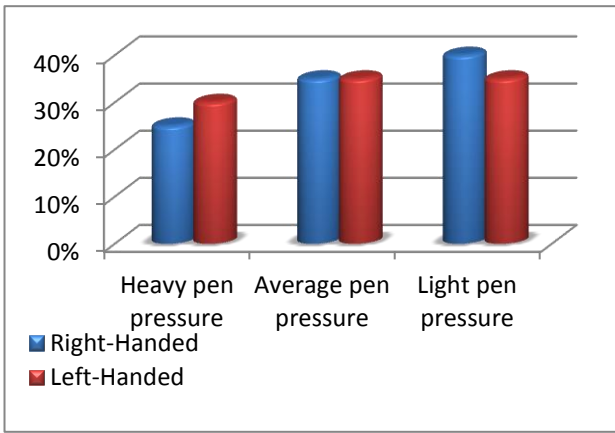
## Characteristics Analysed In Handwriting

The handwriting samples were analyzed for the following characters:

- a. **Pen pressure:** The force with which the writer writes on a paper is Pen Pressure. It is determined by checking the indentation on the back of the paper. Pen pressure may be heavy, average or light.
- b. **Size of words:** The space in a line covered by words helps in determination of their size. It is measured by using scale and can be large, average or small.
- c. **Slant of words:** Deviation seen in words with respect to the imaginary line drawn perpendicular to the base line while writing in a rhythm is slanting of words. This is determined with the help of magnifying glass. The words may be tilted either left or right, but there is also a possibility that the words may have no slant.
- d. **Spacing between the words:** The gap between two words in a line is spacing between the words. This is determined by normal observation. The spacing may be either wide or narrow.
- e. **Shape of letters:** The formation of letters in line determines the Shape of Letters. Certain alphabets like 'a', 't', 'd', etc., are studied to decide the shape. The shapes can be connected, rounded or pointed.
- f. **Page margins:** Space left before starting or ending the line while writing a line or paragraph is Page Margin. There may be either left margin or right margin. Some writers may write exactly in centre leaving equal left and right margin.

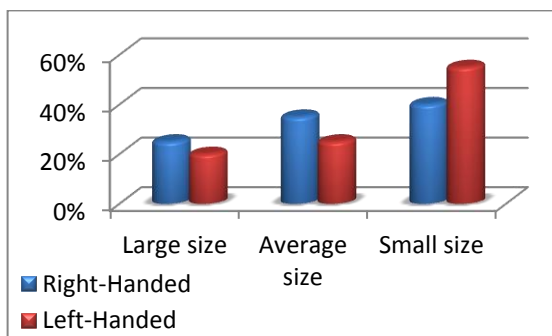
## III. RESULTS AND DISCUSSION

- a. **Pen Pressure-** among Right-handed writers, 40% of the population writes with Light pressure, 35% with Average pressure and 25% with Heavy pressure. Whereas in case of Left-handed writers, 35% of the population writes with either Light pressure or Average pressure and the remaining 30% with Heavy pressure. 25% of the Right-handed (RH) writers and 30% of the Left-handed (LH) writers have lots of vitality and energy, 35% of the RH writers and 35% of LH writers have enough energy to make it through the day and lastly, 40% of RH writers and 35% of LH writers try to avoid energy draining situations.



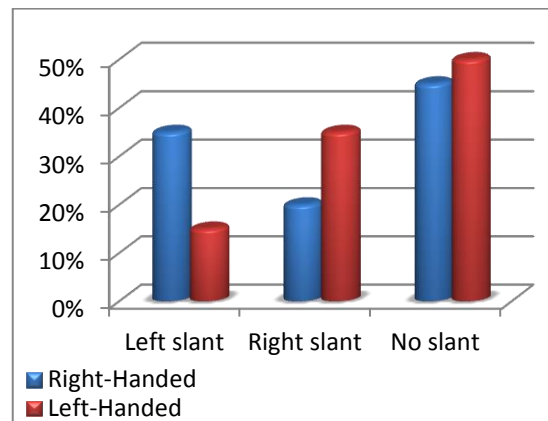
**Figure 2.** Chart showing comparison of Pen Pressure among Right-handed and Left-handed writers

**b. Size of the Words-** During analysis of the handwriting samples, it was seen that, 40% of the Right-handed writers write words of small size, 35% with average size and 25% with large size. But, in the case of Left-handed writers, 55% of the population, write words of small size, 25% with average size and 20% with words of large size.



**Figure 3.** Chart showing comparison of Size of Letters among Right-handed and Left-handed writers

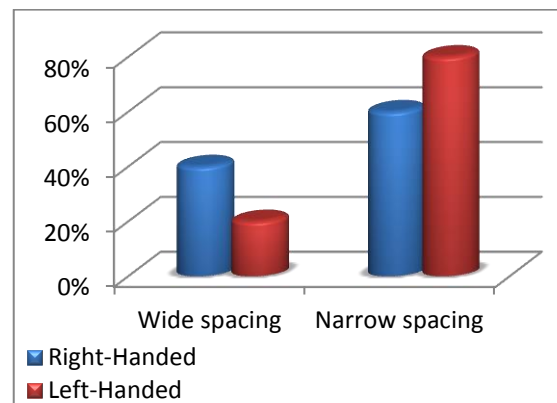
**c. Slant of Words-** 45% of the Right-handed writers write with no slant, while 35% and 25% write with Left slant and Right slant, respectively. Amongst Left-handed writers, half of the population i.e., 50% writers write with no slant, whereas 35% with Right slant and very small portion of 15% with Left slant. 35% of the Right-handed (RH) writers and 15% of the Left-handed (LH) writers are quiet, reclusive and usually think before acting, 20% of RH writers 35% of LH writers are assertive, confident and sometimes insensitive and finally, 45% of RH writers and 50% of LH writers are reliable, consistent but often very reserved and constrained.



**Figure 4.** Chart showing comparison of Slant of Words among Right-handed and Left-handed writers

**d. Spacing between the Words-** Among the Right-handed writers, 60% of the population writes with narrow space between the words while 40% write with wide space. Correspondingly, 80% of the Left-handed writers write with narrow space between the words while merely 20% of the population writes with wide space. 40% of the Right-handed (RH) writers and 20% of the Left-handed (LH) writers enjoy freedom and don't like to be overwhelmed or crowded and 60% of RH writers and 80% of LH writers can't stand to be alone, tend to crowd people and be intrusive.

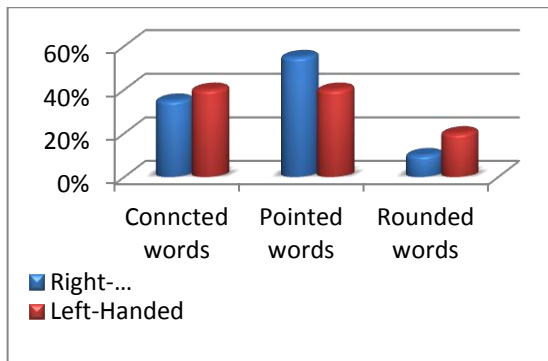
**e.**



**Figure 5.** Chart showing comparison of Spacing between the words among Right-handed and Left-handed writers

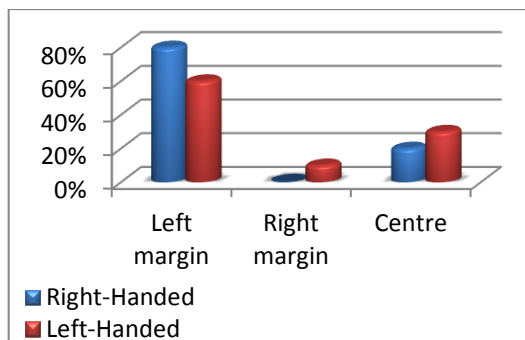
**f. Shapes of Letters-** 55% of Right-handed writers have pointed letters, 35% have connected letters and only 10% have rounded letters in their handwriting. Similarly, among Left-handed population, 40% have pointed letters and, other 40% have connected letters while 20% have rounded letters in their handwriting. 35% of the Right-handed (RH) writers and 40% of the Left-handed (LH) writers are logical, systematic

and make decisions carefully, 55% of RH writers and 40% of LH writers are aggressive, intense, very intelligent and curious and lastly, 10% of RH writers and 20% of LH writers are creative and artistic. 25% of the Right-handed (RH) writers and 20% of the Left-handed (LH) writers are outgoing, people-oriented, outspoken and love attention, 35% of RH writers and 25% of LH writers are well-adjusted and acceptable and finally, 40% of RH writers and 55% of LH writers are shy/withdrawn, studious, concentrated and meticulous.



**Figure 6.** Chart showing comparison of Shape of Letters among Right-handed and Left-handed writers

**g. Page Margins-** in the Right-handed writers, 80% of the population leave Left page margin while writing and 20% population write in the Centre. But, among the Left-handed population, 60% leave Left page margin, 30% write in the Centre and 10% leave Right page margin while writing. 80% of the Right-handed (RH) writers and 60% of the Left-handed (LH) writers tend to live in the past and have a hard time letting go of things, 20% of RH writers and 30% of LH writers are well-organized and stable, and make clear decisions and lastly, 10% of LH writers fear the unknown and constantly worry about the future.



**Figure 7.** Chart showing comparison of Page Margins among Right-handed and Left-handed writers

## WORRY ASSESSMENT

The scoring of PSWQ is done with respect to the response given to the particular statement (Figure 1). The response is given from the scale of 1-5 ranging from 'Not at all typical of me to' to 'Very typical of me'. Response depends upon whether the statement is worded positively or negatively. Total score of the scale ranges from 16-80.

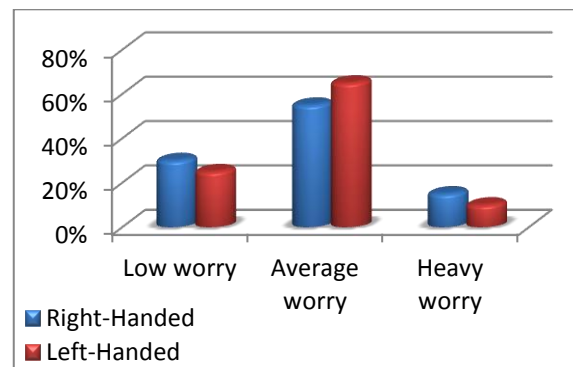
Statement numbers- 1, 3,8,10 and 11 are scored reversely because of negative wording.

Statement numbers- 2, 4,5,6,7,9,12,13,14,15 and 16 are scored normally.

Total scale range of Worry Assessment is as follows:  
16-39 – Low Worry; 40-59 – Moderate Worry; 60-80 – High Worry

## INTERPRETATION

30% of the Right-handed writers and 25% of the Left-handed writers fall under Low Worry range. 55% of the Right-handed writers and 65% of the Left-handed writers fall under Average Worry range. 15% of the Right-handed writers and 10% of the Left-handed writers fall under High Worry range.



**Figure 8.** Chart showing comparison of Worry Assessment among Right-handed and Left-handed writers

## IV. CONCLUSION

'Handwriting Analysis of Right-Handed and Left-Handed Writers Along With Their Worry Assessment' was carried out and the characteristics of the Right-Handed and Left-Handed writers were studied in order to understand their personality. All these characteristics

of the Right-handed writers were compared with the characteristics of the Left-handed writers.

It was found that certain characters like slant of words, spacing between the words, shape of letters and page margin showed significant difference between the right-handed and left-handed writers. However, characters like pen pressure, size of words and Worry Assessment did not show any significant difference although, more accurate results can be obtained if the study population is increased. Thus, it can be concluded that the personality traits of the Right-Handed and Left-Handed writers does not reveal much difference's. Also, the belief that the Left-Handed writers are much different than the Right-Handed writers is proved to be false.

## V. ACKNOWLEDGEMENTS

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