

# Study of the Writers' Opinion on "Relationship of Handwriting with Different Factors"

Sahani Pooja<sup>1</sup>, Tyagi Renu<sup>2</sup>

<sup>1</sup>Assistant Professor; Department of Forensic science, School of Graduate studies; Jain University, Bengaluru; India  
sahanipooja34[at]gmail.com

<sup>2</sup>Assistant Professor, Department of Anthropology, University of Delhi; India  
renutyagiindia[at]gmail.com

**Abstract:** *Handwriting is most often used means of communication and information storage since centuries. It is specific language having a unique script which is written by an individual. Handwriting identification is based on studying the characteristics of nature of handwritten language which is highly significant in forensic intelligence purposes to establish the authorship of suspected handwriting samples. There are multiple factors which effects the development of handwriting since the formative stage of handwriting development. The objective of study was to study the respondents' opinion on association of handwriting with different factors. This study was done among the respondents from North-Indian and North-East Indian Population groups. Various extrinsic and intrinsic factors affecting the handwriting were taken into consideration for the study. The data of variation and similarity in the opinion were analyzed data using SPSS software. It was concluded that there is significant difference between the opinions of writers' with respect to the factors affecting handwriting.*

**Keywords:** Handwriting, script, extrinsic, intrinsic, forensic intelligence, SPSS

## 1. Introduction

Handwriting refers to a person's unique style of writing characters created with a writing instrument such as a pen or pencil. Handwriting is a complex neuromuscular subconscious & automatic task. Handwriting involves both visual-motor and cognitive skills. This subconscious task is an acquired skill and influenced by the mental picture of copybook form and writer's ability to imitate and learn. When an individual write she is conscious of the content of writing but not conscious of the allographs (letters) formed. The development of handwriting involves coordination of nervous system and accessory organs (arm, hand, fingers, feet and mouth). The development of handwriting is a gradual process which takes place in multiple stages. The very first stage is formative stages when a child learns the basic concepts of handwriting. The continuous changes in handwriting are more frequent till adolescent stage. During the adolescent stage the writer imitates the handwriting of her family members and peers, which leads to multipronged influence on her handwriting. Later in the mature stage the handwriting characteristics become consistent and fluent. With this course of years of handwriting development one's handwriting becomes automatic.

Handwriting being an acquired skill is greatly influenced and designed by the culture and environment of a writer and environment is the matrix from which this art is acquired and cultivated [Huber RA, Headrick A.M]. The factors affecting the handwriting can broadly be classified as the extrinsic and intrinsic factors. Extrinsic factors are not completely in the voluntary control of the writer. Some of the extrinsic variables include the national handwriting system, occupational influence, environmental influence, genetic factors (sex), physiological constraints, injury, aging, neurological disorders, and medical conditions like arthritis. Heredity and environment are the factors which may play functional role in development of handwriting

(Saini & Kapoor 2015). Studying the degree of similarity of handwriting of a pair of twins is significant for the verification of reliability of handwriting (Mohammed and Shamshuddin 2011).

The left-hemiplegic children with cerebral palsy whose left sides are dominant may be significantly less competent at handwriting than their right-dominant, healthy peers (Bumin et.al. 2009).

On the other hand the writer may exercise some control over the intrinsic factors. Some of the intrinsic factors are writing instrument, writing posture and imitation capability. The development of writing is complex because it is, in part, cultural dependent, and cultures differ with locales and undergo constant change. The evidence of this dependence is manifested in class, system, or national characteristics. Culture has an effective influence on handwriting and individuals originated from different cultures will be having different handwriting characteristics [Harrison, W.R.]. People may have difference in opinion for a particular question or statement depending on their age, sex, educational background and place of origin.

Handwriting identification is based on studying the characteristics of nature of handwritten language which is highly significant in forensic intelligence purposes to establish the authorship of suspected handwriting samples.

## 2. Methodology

A set of questions about general information like name, sex, age, DOB (date of birth), Indian-origin, caste, qualification, profession and schooling etc. are asked in the questionnaire. Moreover, some questions related to handwriting, like; relationship of handwriting with environment, age, mood, gender, time, handedness, use of chalk & slate, writing

instrument preferred, and pen holding style are asked in the questionnaire.

Overall, 160 samples; 80 North Indians samples (40 females & 40 males) and 80 North-east Indians (40 females & 40 males) were collected from the individuals under age group 18-40 years. Data was collected from different institutions of University of Delhi; mainly from Department of Anthropology.

The data was consolidated and analyzed through Chi-square method of SPSS software. The variables used in the analysis were the geographical group, factors affecting handwriting and the gender. The significant difference or no significant difference was concluded as the results for various factors.

### 3. Result and discussion

The opinions of respondents from both the population groups for factors affecting handwriting are represented in the following tables for all the five factors.

**Table 1:** Opinion of respondents for environment affecting handwriting

Geographical group		Yes N (%)	No N (%)
Female	North Indian	31(77.5)	9(22.5)
	North-East Indian	26(65.0)	14(35.0)
	Total	57(71.2)	23(28.8)
Male	North Indian	25(62.5)	15(37.5)
	North-East Indian	25(62.5)	15(37.5)
	Total	50(62.5)	30(37.5)
Total	North Indian	56(70.0)	24(30.0)
	North-East Indian	51(63.8)	29(36.2)
	Total	107(66.9)	53(33.1)

Table 1 depicts that percentage of respondents who agree that environment affects handwriting is reported higher among NI population group (70%) than NEI group (63.8%). Moreover, majority of NEI & NI populations are reported of agreeing the fact that environment affects handwriting.

**Table 2:** Opinion of respondents for handwriting keeps changing over time

Geographical group		Yes N (%)	No N (%)
Female	North Indian	28(70.0)	12(30.0)
	North-East Indian	19(47.5)	21(52.5)
	Total	47(58.8)	33(41.2)
Male	North Indian	29(72.5)	11(27.5)
	North-East Indian	23(57.5)	17(42.5)
	Total	52(65.0)	28(35.0)
Total	North Indian	57(71.2)	23(28.8)
	North-East Indian	42(52.5)	38(47.5)
	Total	99(61.9)	61(38.1)

Table 2 depicts that percentage of respondents who agree that handwriting keeps changing over time is reported higher among NI population group (71.2%) than NEI group (52.5%). Moreover, majority of NEI & NI populations are reported of agreeing the fact that handwriting keep changing over time.

**Table 3:** Opinion of respondents for handwriting changing with mood

Geographical group		Yes	No
Female	North Indian	34(85.0)	6(15.0)
	North-East Indian	27(67.5)	13(32.5)
	Total	61(76.2)	19(23.8)
Male	North Indian	30(75.0)	10(25.0)
	North-East Indian	32(80.0)	8(20.0)
	Total	62(77.5)	18(22.5)
Total	North Indian	64(80.0)	16(20.0)
	North-East Indian	59(73.8)	21(26.2)
	Total	123(76.9)	37(23.1)

Table 3 depicts that percentage of respondents who agree that handwriting changes over time is reported higher among NI population group (80%) than NEI group (73.8%). Moreover, majority of NEI & NI populations are reported of agreeing the fact that handwriting changes with mood.

**Table 4:** Opinion of respondents for handwriting varies with age

Geographical group		Yes	No
Female	North Indian	35(87.5)	5(12.5)
	North-East Indian	29(72.5)	11(27.5)
	Total	64(80.0)	16(20.0)
Male	North Indian	33(82.5)	7(17.5)
	North-East Indian	30(75.0)	10(25.0)
	Total	63(78.8)	17(21.2)
Total	North Indian	68(85.0)	12(15.0)
	North-East Indian	59(73.8)	21(26.2)
	Total	127(79.4)	33(20.6)

Table 4 depicts that percentage of respondents who agree that handwriting varies with age is reported higher among NI population group (85%) than NEI group (73.8%). Moreover, majority of NEI & NI populations are reported of agreeing the fact that handwriting vary with age.

**Table 5:** Opinion of respondents for "handwriting varies with gender"

Geographical group		Yes	No
Female	North Indian	19(47.5)	21(52.5)
	North-East Indian	14(35.0)	26(65.0)
	Total	33(41.2)	47(58.8)
Male	North Indian	29(72.5)	11(27.5)
	North-East Indian	24(60.0)	16(40.0)
	Total	53(66.2)	27(33.8)
Total	North Indian	48(60.0)	32(40.0)
	North-East Indian	38(47.5)	42(52.5)
	Total	86(53.8)	74(46.2)

Table 5 depicts that percentage of respondents who agree that handwriting varies with age is higher among NI population group (60%) than NEI group (47.5%). Moreover, majority of NI populations are reported of agreeing the fact that handwriting vary with gender whereas majority of NEI reported not agreeing this fact.

### 4. Conclusion

The writers belonging to different geographical regions of a country may have significant difference in the opinion with respect to various extrinsic and intrinsic factors affecting handwriting. In the present study the although majority of

respondents belonging to North-Indian and North-east Indian population groups agree with the fact that environment, mood, time and gender affects the handwriting but the percentage of people agreeing the fact is varying significantly in both the population group. Age which is an extrinsic factor affecting the handwriting is disagreed by majority of North-east Indian respondents as the factor affecting handwriting whereas majority of North-Indian respondents agreed for the same. Therefore, highly significant difference in the opinion is observed for the age as a factor.

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### Ethics approval and consent to participate

A consent form was provided to respondents. Those who were willing to give their responses sample signed the particular document with the date.

### Competing interest

The authors declare that they do not have any competing interest.

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### Authors' contribution

PS designed the research proposal in which was approved by RT and HOD of Department of Anthropology, University of Delhi. PS collected responses from the university students and research scholars. PS and RT analyzed the observations with SPSS software to conclude the results.

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## Author Profile

Corresponding author **Pooja Sahani** is currently serving as the Assistant Professor in Department of Forensic science, School of Graduate Studies, Jain University, Bengaluru, India.

**Dr. RenuTyagi** is currently serving as the visiting faculty is Department of Anthropology, University of Delhi.