

Forensic Examination of Handwriting Attributes under the Influence of Different Intoxicants

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Abstract

Handwriting is an acquired knowledge and learned neuromuscular activity, composed of letters, words or designs. Intoxication of certain drugs affects the neuromuscular system which causes variation in handwriting. In the present research work a total of 25 individual's handwriting samples including both men and women were collected. Effect of intoxication of alcohol, tobacco, marijuana and their combinations on handwriting was examined. Handwriting samples were collected twice before and after the consumption of intoxicants. Deterioration in the handwriting was examined both qualitatively and quantitatively. The handwriting parameters such as pictorial effects, spacing between letters, words and lines, alignment, size, proportion and tremors were analyzed. The volunteers who were habitual drinkers showed slighter variations in their handwriting under the influence of alcohol. The results revealed that alcohol alone can cause gross changes in the handwriting and signature, whereas tobacco and marijuana cause less effect than alcohol. It may be concluded that variations in the handwriting characteristics under the influence of intoxicants help to distinguish between the writing of drunken and sober person.

Keywords: Handwriting • Signature • Intoxication • Alcohol • Tobacco • Marijuana

Introduction

Handwriting is a cerebro vascular activity written by a person as per directions of the brain regardless of whether the writing is done with the arm, hand, fingers or toes [1,2]. It is attained in early childhood and then remains constant throughout the life [3]. It can be variably influenced under intoxicants as they affect the neuro-muscular system [4]. They reduce the control on the writing apparatus, obstruct the concentration and may cause oblivion. The writing is tremulous, alignments distort, size and proportion may change and the pictorial effect may appear clumsy [5]. These results vary from person to person. Occasionally document examiners encounter hand-writings written by an individual who is under the influence of any alcohol or drug. Indeed, alcohol can cause observable effects on a person's handwriting which raises questions of authenticity on the document. Besides, if a person combines alcohol with either tobacco or drugs like marijuana he/she may write any document and subsequently deny authorship [6]. Therefore in the suggested research a study has been carried out to determine the effect of drugs on the handwriting of an individual.

Materials and Methods

In the present research work, an attempt has been made to study the effects of alcohol, tobacco and marijuana on handwriting of an individual. A total of 25 participants were included who were regular consumers of alcohol, tobacco and marijuana for the study. A short questionnaire of personal and demographic details including their consent was filled prior to sampling. Handwriting and signature samples before and after intoxication were collected on an A4 size performa. The standard text stated "the quick brown fox jumps over the lazy dog. The quick onyx goblin jumps over the lazy dwarf" was used for handwriting samples.

The present study encountered three types of intoxication such alcohol with tobacco, only alcohol and marijuana with tobacco. Adequate illumination was retained in sober and intoxicated state while giving handwriting samples. They were completely conscious when sober signatures and handwriting samples were taken. After 1-2 hours of consumption of the intoxicant, signature and handwriting samples were taken again. The samples taken before intoxication were termed as 'sober sample' and those taken after intoxication were termed as 'intoxicated sample'. Both handwriting as well as signature samples were compared with each other qualitatively as well as quantitatively. For the quantitative evaluation of the samples the software SPSS (Statistical Package

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for Social Sciences) was employed as a statistical tool and correlation was calculated. For qualitative analysis, handwriting and signature attributes such as pictorial effect, spacing between letters, words and lines, alignment, line quality and tremors were examined. Statistical evaluation was achieved and correlation was applied at 0.05 level of significance.

The handwriting parameters such as pictorial effects, spacing between letters, words and lines, alignment, size, proportion and tremors were analyzed. The volunteers who were habitual drinkers showed slighter variations in their handwriting under the influence of alcohol. The results revealed that alcohol alone can cause gross changes in the handwriting and signature, whereas tobacco and marijuana cause less effect than alcohol.

It may be concluded that variations in the handwriting characteristics under the influence of intoxicants help to distinguish between the writing of drunken and sober person.

Results

The handwriting attributes such as pictorial effect, spacing between letters, words and lines, alignment, line quality, embellishment and tremors were statistically examined by using minimum value, maximum value, mean and standard deviation (Table 1).

| S. No. | Attributes | Minimum value | Maximum value | Mean | Standard deviation |
|--------|-------------------------|---------------|---------------|------|--------------------|
| 1 | Pictorial effect | | | | |
| | Sober | 1 | 4 | 2.4 | 1.2 |
| | Intoxicated | 1 | 5 | 3.3 | 1.2 |
| 2 | Spacing between letters | | | | |
| | Sober | 0.1 | 0.3 | 0.13 | 0.05 |
| | Intoxicated | 0.1 | 0.5 | 0.19 | 0.1 |
| 3 | Spacing between words | | | | |
| | Sober | 0.2 | 1.3 | 0.63 | 0.27 |
| | Intoxicated | 0.3 | 1.8 | 0.82 | 0.38 |
| 4 | Spacing between lines | | | | |
| | Sober | 0.5 | 2 | 0.91 | 0.39 |
| | Intoxicated | 0.6 | 2.4 | 1.1 | 0.44 |
| 5 | Alignment | | | | |
| | Sober | 1 | 4 | 2.32 | 1.02 |
| | Intoxicated | 1 | 4 | 3.56 | 1 |
| 6 | Line quality | | | | |
| | Sober | 1 | 2 | 1.16 | 0.37 |
| | Intoxicated | 1 | 2 | 1.84 | 0.37 |
| 8 | Tremor | | | | |
| | Sober | 1.5 | 2 | 1.98 | 0.1 |
| | Intoxicated | 1 | 2 | 1.2 | 0.4 |

Table 1. Mean and standard deviation of handwriting attributes.

Markedly a positive correlation was discovered between the sober and intoxicated samples handwriting attributes such as pictorial effect, alignment, spacing between words and lines, spacing

between letters and words, line quality and a negative correlation was found in embellishment and spacing between letters as shown in Table 2.

| S. No. | Attributes | Correlation 'r' |
|--------|---|-----------------|
| 1 | Sober pictorial effect-intoxicated pictorial effect | 0.454 |
| 2 | Sober pictorial effect-intoxicated alignment | 0.426 |
| 3 | Sober Spacing between words-intoxicated spacing between lines | 0.478 |

| | | |
|---|---|-------|
| 4 | Sober spacing between letters-intoxicated spacing between words | 0.478 |
| 5 | Sober line quality-intoxicated spacing between words | 0.4 |
| 6 | Sober embellishment-intoxicated spacing between letters | -0.42 |
| 7 | Sober embellishment-intoxicated embellishment | 0.408 |

Table 2. Correlation between handwriting parameters at 0.05 levels.

Discussion

The present study substantiates previous findings in the literature as suggested by Foley RG and Miller stated the effects of alcohol and marijuana usage on handwriting sample of 12 individuals under the effect of alcohol, marijuana and their combination. It was found that smoking marijuana in moderate amounts had lesser effects on handwriting whereas gross changes were observed after the consumption of alcohol whereas in the contemporary study drastic deterioration of the handwriting attributes was devised after consumption of alcohol alone [6]. In the course of the study on handwriting changes under the effect of alcohol Asicioglu F and Turan N. ascertains if there would be variations in the handwriting of 73 participants. The results revealed that the parameters such as word length, alignment, tremor, angularity significantly increases under the effect of alcohol while on the contrary the research revealed that pictorial effect, word length, size and proportion substantially inflated. It may be concluded that variations in the handwriting characteristics under the influence of intoxicants help to distinguish between the writing of drunken and sober person.

Conclusion

On the whole it can be concluded that variations in the handwriting of the individual's intoxicated with alcohol, tobacco and marijuana was analyzed. It is concluded that alcohol alone causes gross changes

in handwriting and signature whereas tobacco and marijuana cause least effects on the same. Handwriting attributes such as slant, tremors and pictorial effect showed maximum changes in the intoxicated handwriting and helps to distinguish between the writing of drunken and sober person. In the present research work, an attempt has been made to study the effects of alcohol, tobacco and marijuana on handwriting of an individual.

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