

PalArch's Journal of Archaeology  
of Egypt / Egyptology

FORENSIC EXAMINATION OF THE HANDWRITING CHARACTERISTICS  
OF ALCOHOLICS

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**Manjugouda R Patil, Dr.Channappa.F.Mulimani: FORENSIC EXAMINATION OF THE HANDWRITING CHARACTERISTICS OF ALCOHOLICS -- Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(9). ISSN 1567-214x**

**Keywords: Questioned documents, Handwriting, Alcohol, Identification.**

**ABSTRACT**

A forensic document examination normally consists of the comparison of naturally written questioned and request text to determine if they are of common authorship. Many times it is claimed that a particular document was not signed by the alleged person or if the signature was obtained, the person does not know of it because of intoxication. In these circumstances, two issues are to be decided i.e whether the person signed the document or not and if he has signed, was he under the influence of intoxication at that time. The first issue can be decided in a normal manner by the examination and comparison of the disputed and the known signatures of the person concerned to find out if the signature is in the handwriting of the same person. But the second issue is complicated and needs an exhaustive and thorough study. The variation in the handwriting may also depend on the level of education. As we all know that handwriting is arranged mentally and performed neuro-muscularly, it is affected by alcohol consumption and the consumption of drugs. The parameters of handwriting which reveals pronounced distinguish are word length, the height and width of an upper case, the height and width of a lower case, the height of ascending and descending letter, spacing between letters, number of tremor were all substantially increased. It is statistically confirmed that the transition in handwriting characteristics is due to the prompt of alcohol

## 1. Introduction

A forensic document examination normally consists of the comparison of naturally written questioned and request text to determine if they are of common authorship. Occasionally, a Forensic Document Examiner receives a case in which he or she observes distortion in either the disputed text or the request exemplar. Some causes of distortion in the writing can be a temporary or permanent health problem, missed medication, writing position, chemical or alcohol abuse or disguise. A conclusion as to authorship of hand printing and numerals is based on the writer's combination of habits or characteristics within the set of writing. Hand printing contains the individuality necessary to allow for the identification or elimination of a writer. The absence of elements such as connecting strokes does not prohibit a thorough analysis of other important characteristics. An identification or elimination is based on a combination of habits within the individual's writing or hand printing. Because of this basic premise, it is obvious that the databases listing class characteristics based on the construction of a feature provide limited assistance in the examination. Determining a writer's natural variation of each feature within the combination of his or her writing habits provides individualization of the hand printing. When one considers the infinite number of variations of one feature in combination with the infinite number of variations of the other features in the same set of writing, the determination of authorship is truly based on the individualizing characteristics within the set of writing. The requirements for a hand printing examination include known exemplars that are comparable to the disputed text, adequate in amount, and timely or contemporaneous. Many times it is claimed that a particular document was not signed by the alleged person or if the signature was obtained, the person does not know of it because of intoxication. In these circumstances, two issues are to be decided i.e whether the person signed the document or not and if he has signed, was he under the influence of intoxication at that time. The first issue can be decided in a normal manner by the examination and comparison of the disputed and the known signatures of the person concerned to find out if the signature is in the handwriting of the same person. But the second issue is complicated and needs an exhaustive and thorough study. In writing, we usually employ our finger, hands, forearms in combination, our eyes and our mental faculties. So, identification of handwriting is an applied science, mainly consisting of physiology (the science of organs), optics (the science of sight) and psychology (the science of mind). The most popular intoxicant throughout the world is alcohol. The study of its effects on writing organs and faculties will assist in the solution of our present problems. These same symptoms are, more or less, consistent with and can be observed in other intoxicants. As far back as 1961 Gesell<sup>1</sup> commented on the need for research on the effects of drugs on handwriting and proposed a research protocol. Purtell<sup>2</sup> noted that the handwriting of narcotic addicts shows little deterioration during periods of drug intoxication. Hirsch et al.<sup>3</sup> found that subjects under the influence of five hallucinogenic drugs including LSD demonstrated considerable individual variation in their handwritings. More errors, irregularities and carelessness

were observed in their writings. The effect of alcohol on handwriting has been studied by many workers. Baker<sup>4</sup> pointed out the well-known fact that persons under the influence of alcohol show uncontrolled muscle movements and tremor in their writing. Rabin and Blair<sup>5</sup> concluded that subjects wrote larger and were less accurate in copying a test paragraph after consuming alcohol. Their research also revealed that those under the influence of alcohol tended to write more slowly than their sober counterparts. Reporting on a study in 1972, Osborn<sup>6</sup> concluded that gross base misalignment, increased variation and poorly executed letterforms were evidence of questioned signatures having been written under the influence of alcohol. Todd<sup>7</sup> described handwriting as the product of many finely conditioned motor and psychic activities which as such are more rapidly affected by alcohol intoxication than some of the more overt movements or activities of the individual. Hilton<sup>8</sup> extensively documented the influence of alcohol intoxication on handwriting. Such changes as larger letterforms, increased lateral spacing, decreased legibility, and poor alignment was seen. These changes were correlated with specific blood levels. Anderson's<sup>9</sup> study also determined the effects of various blood alcohol concentrations on handwriting and generally corroborated Hilton's earlier work.

#### **METHODS AND METHODOLOGY**

For the research experiment, 180 male participants between the ages of 20 to 50, served as volunteer subjects. All subjects consumed 180ml of ethyl alcohol. The drinking was done in a social setting. The participants had no diagnosed health problems and were moderate "social" drinkers. Only skill writers are included i.e. education level up to High school (10+2), University degree and above. The standard text stated *'This global scientist found a layer of rock in which it was indicated that much life on Earth had suddenly vanished. He'd learned that any hole in the fossil record meant scientists simply had yet to provide evidence. The global scientists agreed to carry out a proper analysis of the same as soon as possible. THE RAT THE CAT THE DOG CHASED KILLED ATE THE MALT'*. Similar conditions such as a notepad, a standard A4-sized, unlined piece of paper and a medium ballpoint pen were retained in a sober and intoxicated state. Handwriting samples were taken before and after the consumption of alcohol. Along with the samples collected, the specimen writings are also collected. All the statistical analyses were carried out by employing the Statistical Package for Social Sciences (SPSS 20) version. The test was carried out with the help of a stereomicroscope, direct and oblique angle lighting and a video spectral comparator (VSC 2000). Measurements were taken with the help of digital caliper, statistics using Pearson correlation and paired t-test was carried out. The analysis is done based on class characteristics and individual characteristics. All handwriting specimens taken were assessed using a multiple-choice checklist (Table 1).

Table 1. Checklist used for the methodical assessment of handwriting change under the influence of drugs.

Sl.No	Characteristics	Valued Characters
i	Word length	scientists, evidence, possible, CHASED, MALT, 96n02j4U.
ii	Height of upper case character bodies	'H' of He'd, 'T' of The, 'K' of Killed, 'M' of Malt
iii	Width of upper case character bodies	
iv	Height of lower case character bodies	'e' of proper, 'o' of hole, 'm' of same
v	Width of lower case character bodies	
vi	Height of ascending letter character bodies	'd' of Evidence, 'l' of layer, 't' of indicated
vii	Height of descending letter character bodies	'g' of global, 'p' of provide, 'y' of analysis
viii	Spacing between words	'(global & scientist)', (CAT & THE)
ix	Number of Tremors	Count

## 2. RESULTS

The demographic characteristics of volunteers are given in Table 2. The handwriting parameters such as word length, the height and width of an upper case, the height and width of a lower case, the height of ascending and descending letter, spacing between letters, number of tremor etc were all examined. The data was again statistically evaluated for the minimal value, maximum value, mean and standard deviation as shown in Table 3. The paired t-test was applied to Table 3 for the comparing the changes in handwriting after the consumption of alcohol. The handwriting parameters such as word length, the height and width of an upper case, the height and width of a lower case, the height of ascending and descending letter, spacing between letters, number of tremor were all substantially increased.

Table 2. Demographic of volunteers.

Education	High School (10+2)	University degree
Number of participants	37	143
Percentage	20.55	79.45

Table 3. Changes in handwriting after the consumption of alcohol.

Variable	Education	Condition	Mean	S.D.	Minimum	Maximum	p value
Word length	High School (10+2)	Sober	23.61	5.47	11.83	37.53	0.0001
		With Alcohol	24.66	6.01	13.16	40.37	
	University degree	Sober	23.29	5.25	11.64	37.84	0.001
		With Alcohol	23.76	5.51	12.24	40.56	
Height of upper case	High School (10+2)	Sober	4.57	0.7	2.91	5.49	0.0001
		With Alcohol	4.74	0.6	3.2	5.53	
	University degree	Sober	5.12	0.78	2.93	7.39	0.0001
		With Alcohol	5.23	0.76	3.28	7.69	
Width of upper case	High School (10+2)	Sober	3.97	0.76	2.5	5.65	0.0001
		With Alcohol	4.14	0.73	2.31	5.82	

	University degree	Sober	4.46	0.91	2.29	6.98	0.006
		With Alcohol	4.53	0.9	2.5	6.62	
Height of lower case	High School (10+2)	Sober	2.67	0.4	2.08	3.53	0.0001
		With Alcohol	2.76	0.38	2.13	3.4	
	University degree	Sober	2.61	0.42	2.01	3.67	0.01
		With Alcohol	2.63	0.4	2.01	3.98	
Width of lower case	High School (10+2)	Sober	3.1	0.47	2.31	4.2	0.006
		With Alcohol	3.15	0.44	2.4	4.25	
	University degree	Sober	2.99	0.45	1.93	4.25	0.03
		With Alcohol	3.04	0.48	2.39	5.84	
Height of ascending letter	High School (10+2)	Sober	5.4	0.77	4.05	6.55	0.0004
		With Alcohol	5.65	0.72	4.21	6.87	
	University degree	Sober	5.04	0.74	3.73	6.97	0.008
		With Alcohol	5.13	0.77	3.71	7.12	
Height of descending letter	High School (10+2)	Sober	5.55	0.73	4.34	6.69	0.0001
		With Alcohol	5.71	0.64	4.48	6.85	
	University degree	Sober	5.35	0.65	4.21	6.99	0.004
		With Alcohol	5.42	0.64	4.26	6.92	
Spacing between words	High School (10+2)	Sober	4.42	0.65	2.51	5.23	0.0005
		With Alcohol	5.18	0.67	2.76	5.67	
	University degree	Sober	4.63	0.71	2.93	5.39	0.0005
		With Alcohol	5.37	0.72	3.09	6.18	
Number of Tremors	High School (10+2)	Sober	3.38	0.28	0.0	7.00	0.002
		With Alcohol	3.97	0.29	0.0	9.00	
	University degree	Sober	3.46	0.19	0.0	8.00	0.0005
		With Alcohol	4.14	0.18	0.0	10.00	

### 3. DISCUSSION

Comparison of handwriting is a special task and it needs experience, scientific approach, patience and hard work. The comparison of anything is always subjective but in the case of handwriting, it should be mentioned specifically because every person thinks about handwriting differently and see it in different aspects. Handwriting is a very complex psychomotor ability that constitutes a dynamic interplay of several motor subsystems including the arm-elbow system, the wrist system and the finger system. The handwritings of normal drinkers and alcoholics undergo the same kinds of progressive changes under the influence: enlargement, carelessness, illegibility and disintegration. The difference between the two groups is the type of abnormal handwriting characteristic of the alcoholic, namely the tense writing done during the state of ill-feeling accompanying withdrawal or a period of abstinence. This withdrawal writing is similar to the deteriorated handwriting found in persons suffering from other types of illness: a lack of fluency and regularity, angular forms, atactic movements, tremor and, in some cases, reduced writing size. One might say that the intoxicated and withdrawal writings are opposite types of abnormal writing: one represents the loss of control due to relaxation, the

other loss of control due to tension. In the examination of Handwriting of the Alcoholic, Beck, J. a distinctive handwriting changes noticed in alcoholics, specifically individuals in the subsequent stages of the malady. In extension to the two handwriting states of non-alcoholic drinkers (normal/sober and intoxicated), the alcoholic writer has a third state, writing done after of Alcohol withdrawal. Withdrawal is a state of tension culminating in handwriting identified by the infringement, tremor. This type of abnormal handwriting creates particular dilemmas.<sup>10</sup> In the research on Handwriting Changes under the Effect of Alcohol by Asicioglu, F., and Turan, N. an overall of 73 members, who perform all steps of the experiment, were observed. Handwriting sample was collected before and after the consumption of Alcohol. The result declared that handwriting parameters such as a word length, height of upper and lowercase letters, a height of ascending letters, a height of descending letters, a spacing between, the number of angles, the number of tremors, and the number of tapered ends are all substantially enhanced under the implements of alcohol.<sup>11</sup>

#### **4. CONCLUSION**

The variation in the handwriting may also depend on the level of education. As we all know that handwriting is arranged mentally and performed neuro muscularly, it is affected by alcohol consumption and the consumption of drugs. The effect of alcohol occurs first in the frontal lobe, which removes the superego control, and then in the cerebellum. This causes emotional, behavioural, psycho neuro-motor and cognitive changes, such as euphoria, logorrhea, an increase in self-confidence, emotional exaggeration, tremor, obvious unskillful movements, a lack of synergic movements, difficulties in pupil accommodation, ataxic movements depending upon the level of alcohol and drugs. In case of consumption of drugs or alcohol, there are some writing characteristics of an individual writer is change. It can be concluded that there is a compelling change in the writing of an individual under the influence of alcohol. The parameters of handwriting which reveals pronounced distinguish are word length, the height and width of an upper case, the height and width of a lower case, the height of ascending and descending letter, spacing between letters, number of tremor were all substantially increased. It is statistically confirmed that the transition in handwriting characteristics is due to the prompt of alcohol.

#### **5. ACKNOWLEDGEMENTS**

I would like to thank to all the participants for their precious time for the purpose of the study. I would also like to acknowledge all the friends and family of my co-author for their support.

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