

A PRELIMINARY STUDY: FORENSIC EXAMINATION OF EFFECT OF ALCOHOL ON HANDWRITING CHARACTERISTICS

¹Kavita Yadav, ²Anu Singla, ³Saba Rashid

¹M. Sc., ²Associate Professor, ³ PhD Scholar

¹Dr. A. P. J Abdul Kalam Institute of Forensic Science and Criminology,

¹Bundelkhand University, Jhansi, India

Abstract: Handwriting can be construed as the arrangement of letters, characters or designs using writing implement according to a coherent style which is worked out to communicate with another person. **Background-** The direction of this course is to ascertain whether previous conclusions on reported effects of alcohol on handwriting are authentic and to confirm the predictability of looking at specific implements of alcohol on the script of an individual. A research was planned to ascertain if there would be modifications in the writing of 50 males after boozing. Handwriting samples were collected before the participants had ingested liquor and further after the consuming period had concluded. Deterioration in the handwriting was delineated. **Result:** The results revealed that the handwriting parameters such as word lengths, height of upper and lower case letters, height of an ascending letter, the height of a descending letter, spacing between words, number of angularity, a number of tremors, and a number of tapered ends are all substantially increased under the effect of alcohol. **Conclusion:** It was likewise ascertained that the symbolic interrelationship between the variation of handwriting parameters such as the height of upper and lower case letters, number of angularity, a number of tapered ends and the amount of alcohol.

IndexTerms - Handwriting characteristics, Signature, Alcohol.

I. INTRODUCTION

Handwriting is a striking portrayal of an entity's behavior that gravitates to be susceptible to extraneous considerations. Drugs and hallucinogens of all types, as well as liquor, drop their effect on the neuromuscular system [1]. Alcohol is the most prevalent drug of squandering all over the realm and it is associated with diverse kinds of lawlessness like a drink and drive cases, homicide etc. The implements of alcohol may fluctuate; there are certainties about a couple of issues. Factors which can initiate variations in the individual's handwriting are: the writing's degree of progress, variations precipitated by writing with the "hand operated", liquor, drugs, stress; alteration of handwriting as a proceeding of personal forces such as age, weariness, sink or destruction of eyesight, amputation of fingers or hand [2].

Occasionally, document examiners are challenged with handwritings written by an individual who is under the sway of liquor. Indeed, alcohol can lead to detectable effects upon a person's handwriting [3-5] and a sloppy state may ensue after alcohol consumption, which suggests questions of credibility in practice as Hilton implied. On the alternative view, if a person combines alcohol with drugs like triazolam, he may write anonymous or non-anonymous threatening notes and later deny authorship [6].

Studies on subjects have implied that the implements are not the same for each individual. In general, however, the writing becomes grander and less well-formed and coordinated. The mode of construction and relative proportions remain the same, but the latter can be toned down by the augmentation and exaggeration. The writing of fanatics and alcoholics will be influenced by significant accumulations of the drugs (Ellen D. 1997) [7].

Handwriting is comparatively secure; a reform in the writing can be emblematic of the agitation or drunkenness of the writer. Therefore in the suggested research, a comparative study has been carried off the writing characteristics which vary under the influence of alcohol.

II. MATERIALS AND METHODOLOGY

A-4 sheets, graphic plate (Protractor), A hand magnifying lens, breath alcohol concentration analyzer, Stop watch, Transparent measuring scale, Alcohol (whiskey), transparent graph sheet etc.



Fig.1 Material Use



Fig.2 Breath Alcohol Analyzer

Participants were singled out among the fellows at the liquor store. Prior to the sample drawing, a compliance form was permeated by the participants and expiration breath alcohol content was restrained from breath alcohol concentration (BAC) equipment in permitting individuals. Subsequently, sober handwriting samples were seized on A4 sheets and a short Performa of demographic information was filled out by the participants. An all of 50 males participants were covered in the course that halted all walks of the experiment, were assessed. The volunteers had no diagnosed health complications and were social drinkers with no record of liquor abuse. The recorded text accepted for the standard was the signature of an entity.

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. The participants consumed 180ml. of ethyl alcohol. The excerpt of the type of liquor taken was at the discretion of each volunteer. They were further briefed to serve a breath analysis after 10 min they held drinking. Prior to assessing, the conduct of subtlety was executed conforming to the stipulated procedure and the volunteers were guided to rinse their mouth with water. The writing samples collected in the state of drunkenness were seized under the same conditions as alluded to above.

For the statistical evaluation of the data retrieved, the qualitative values were translated into the extensive readings, like tremors are quantified by calculating the number of observations in the samples wherever it was displayed. All the statistical analyses were carried out by employing the Statistical Package for Social Sciences (SPSS 20) version. Analysis of variance (ANOVA), for the comparison of means of 3 or more groups and Pearson correlation was employed to determine the accord between the two meets.

III. RESULTS AND DISCUSSION

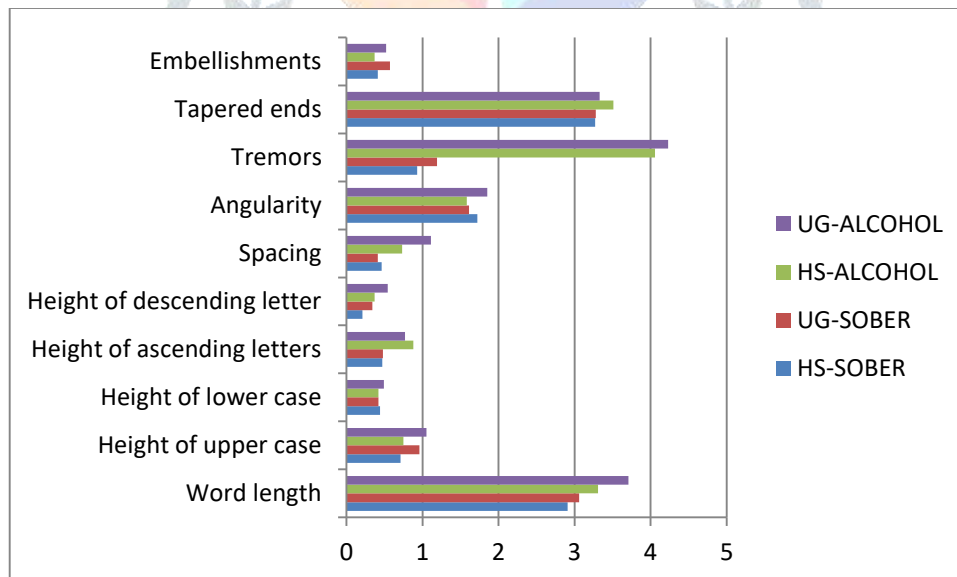
The handwriting parameters such as word length, the height of an upper case, the height of a lower case, the height of ascending and descending letter, spacing between letters, number of angularity, number of tremor, tapered ends and embellishments were all examined for the interpretation of the proceeds. The participants were segregated into two sections i.e. intermediate or below and graduates or above. The data was again statistically evaluated for the minimal value, maximum value, mean and standard deviation as shown in “Table 3.1”.

Table 3.1: Changes in Handwriting to both Alcohol Consumption and Educational Level

	High school and below				University degree and above				Alcohol	Education
	N= 29				N= 21					
	Min.	Max.	Mean	S.D	Min.	Max.	Mean	S.D	F; P	F; P
Word length										
Sober	1.2	6.5	2.90	1.28	1.6	5.5	3.06	1.09	(115.93; p<0.0005)	(31.56; p<0.0005)
With alcohol	1.6	7.0	3.31	1.25	2.5	6.2	3.71	1.17		
Height of upper case										
Sober	0.2	1.2	0.71	0.22	0.5	1.9	0.96	0.44	(145.93; p<0.0005)	(57.97; p<0.0005)
With alcohol	0.3	1.3	0.75	0.24	0.6	1.8	1.05	0.34		
Height of lower case										
Sober	0.2	0.7	0.44	0.10	0.2	0.7	0.42	0.11	(147.90; p<0.0005)	(60.63; p<0.0005)
With alcohol	0.2	0.8	0.42	0.12	0.2	1.6	0.49	0.28		
Height of ascending letters										
Sober	0.0	1.5	0.47	0.40	0.0	0.9	0.48	0.32	(143.07; p<0.0005)	(57.96; p<0.0005)
With alcohol	0.0	1.9	0.88	0.67	0.0	1.8	0.77	0.58		

Height of descending letter	0.0 0.0	0.9 1.6	0.21 0.37	0.31 0.55	0.0 0.0	1.2 1.6	0.34 0.54	0.44 0.68	(149.31; p<0.0005)	(61.71; p<0.0005)
Sober With alcohol										
Spacing	0.1 0.2	0.8 1.2	0.46 0.73	0.17 0.24	0.1 0.6	0.8 8.0	0.41 1.11	0.17 1.59	(144.76; p<0.0005)	(59.37; p<0.0005)
Sober With alcohol										
Angularity	1.0 0.0	4.0 4.0	1.72 1.58	0.79 0.82	0.0 0.0	3.0 4.0	1.61 1.85	0.86 1.01	(131.29; p<0.0005)	(42.37; p<0.0005)
Sober With alcohol										
Tremors	0.0 2.0	3.0 7.0	.93 4.06	1.03 1.36	1.0 2.0	3.0 7.0	1.19 4.23	1.03 1.22	(126.67; p<0.0005)	(53.96; p<0.0005)
Sober With alcohol										
Tapered ends	0.0 0.0	10.0 8.0	3.27 3.51	2.11 1.68	2.0 1.0	6.0 7.0	3.28 3.33	1.34 1.65	(109.49; p<0.0005)	(26.89; p<0.0005)
Sober With alcohol										
Embellishments	0.0 0.0	1.0 1.0	0.41 0.37	0.50 0.49	0.0 0.0	1.0 1.0	0.57 0.52	0.50 0.52	(148.06; p<0.0005)	(51.31; p<0.0005)
Sober With alcohol										

Repeated measures ANOVA was implemented to correlate the group means for sober, with alcohol, intermediate and below, university degree and above. In the “Bar chart 3.1”, changes in the mean values of handwriting to both alcohol consumption and educational level are represented.



Bar chart 3.1: Changes in Mean Values of Handwriting to both Alcohol Consumption and Educational Level

The handwriting parameters such as word length, height of upper case, height of ascending and descending letter, spacing between letters, number of tremor and tapered ends were all substantially increased whereas the handwriting parameters such as height of lower case, number of angularity and number of embellishments were all significantly diminished under the influence of alcohol as illustrated in “Table 3.2”.

Table 3.2: Change of Handwriting Parameters under the Influence of Alcohol

S. No.	Variable	Change in variable
1.	Word length	Increase
2.	Height of upper case	Increase
3.	Height of lower case	Decrease
4.	Height of ascending letter	Increase
5.	Height of descending letter	Increase
6.	Spacing between the letters	Increase
7.	Number of angularity	Decrease
8.	Number of tremors	Increase
9.	Number of tapered ends	Increase
10.	Number of embellishments	Decrease

Except for the striking upsurge of the word length and tremors by intermediate participants (Table 3.1), no meaningful variations could be discovered corresponding to academic qualifications between intermediates and university graduates.

Markedly, a positive correlation could be discovered between the writing characteristics sober and individuals under the implement of alcohol change, such as word length, the height of lower case letters, the height of ascending and descending letters, number of angularity, number of tapered ends and number of embellishments. A negative correlation could have complied within one of the handwriting parameter i.e. tremors as shown in “Table 3.3”.

Table 3.3: Correlation between Handwriting Parameters of Individuals in Sober and Intoxicated State

S. No.	Variable	R	P
1.	Word length	0.876	0.0005
2.	Height of upper case	0.666	0.007
3.	Height of lower case	0.699	0.0005
4.	Height of ascending letter	0.779	0.0005
5.	Height of descending letter	0.947	0.0005
6.	Spacing between the letters	0.048	0.741
7.	Number of angularity	0.718	0.0005
8.	Number of tremors	-0.020	0.892
9.	Number of tapered ends	0.697	0.0005
10.	Number of embellishments	0.923	0.0005

r: test value, P: significance of test.

As for the interrelationship between handwriting characters, the height of descending letter has corresponded with the word length enlargement, a number of tremors and number of tapered ends. A negative association was discovered in the height of upper case with the height of ascending letters as shown in “Table 3.4”.

Table 3.4: Correlation between Handwriting Parameters of Individuals in Intoxicated State

S. No.	Variable	R	P
1.	Height of descending letter - Word length	0.312*	0.027
2.	Number of tremors - Height of descending letter	0.508**	0.0005
3.	Number of tapered ends - Height of descending letter	0.365**	0.009
4.	Word length – Tapered ends	0.551**	0.0005
5.	Height of upper case - Height of ascending letter	-0.388**	0.005

*correlation is significant at 0.05 (2-tailed) **correlation is significant at 0.01 (2- tailed)

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 [8].

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 [9].

In the course of the study on “The pathology of Handwriting as a Result of Drug Abuse- A Case Study”, Bancila, V., highlights the effect of looking at the damaged handwriting which reveals in drug abuse. The handwriting of a drug consumer represents certain peculiarities which are appropriate to be noticed and analyzed by particular authorities (Forensic experts, Psychiatrists) participated in the investigation of both the Convicted and Therapeutic field. Handwriting analysis can grow into the consequences explain the attributes of damaged handwriting due to drug abuse after analyzing several signatures of a 24-year-old subject [1].

In the study of “Alcohol: It’s Effect on Handwriting”, Galbraith, N. Studies directed to ascertain if there would be variations in the handwriting of 35 men and women after they had been drinking. Handwriting samples were drawn before the participants had swallowed any alcohol and then after the drinking period had completed. Deterioration of the handwriting was devised. Based on this examination, the handwriting could not be employed in any state to resolve precisely the blood alcohol concentration of a writer [4].

IV. CONCLUSION

Recently many cases have been accounted for where the forensic document examiner has to stipulate whether a specific chronicle was signed by the alleged individual or not, or if the signature was secured when the person was in the state of drunkenness. On the whole, it can be concluded that there is a compelling change in the writing of an individual under the implement of alcohol. The parameters of handwriting which reveals pronounced distinguish are word length, the spacing between the letters and number of tremors. These parameters were found to be enhanced in the participants under the effect of alcohol. It is statistically confirmed that the transition in handwriting characteristics is due to the prompt of alcohol and not because of their academic qualifications. Even though, the variation in handwriting may be because of the level of education. The characteristic, tremors establish a negative correlation in the handwriting sample of sober and intoxicated state. Therefore, the number of tremors is precisely commensurate to the concentration of alcohol. This is one of the most eloquent parameters to determine whether the individual was in a sober or intoxicated state of mind.

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