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Frequency of Selected Hand Printing Characteristics Occurring within a National Population: The *New International Version Bible Across America*©

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Statistical analyses of data gathered for the hand-printing characteristics of a large national population of writers has yet to be undertaken in the field of document examination. Previous, smaller studies documented the frequency of characteristics (e.g. skill, writing systems, style, and letter formations), but have not been updated for nearly twenty years. This research project examines hand-printing characteristics, specifically letter formations, to discover data which can be analyzed to establish frequency of their occurrence.

The source for this project is the *New International Version Bible Across America*© published by Zondervan. This version contains the writing of more than 31,000 individuals representing all fifty American states and abroad. Data for this study are based on a sample set of 500 people. The characteristics studied included various formations of "a," "n," and "r." This research will be compared with previous findings from other studies, the most recent of which occurred in 1992 and will include recommendations for future study regarding the distinctiveness of hand-printing characteristics.

Introduction

The purpose of this study is to gather data from a large, diverse group of writers and provide analysis regarding frequency of hand-printing characteristics. This analysis might be useful for casework where hand-printing characteristics are at issue. Additionally, this study seeks to expand upon previous work that is now over twenty years old and was based upon small populations.

The Bible is a religious text that is referred to as Scripture. It is composed of 66 segments which are referred to as books. Each book is divided into chapters and chapters are sub-divided into numbered verses. The *New International Version* published by Zondervan is one of the many versions of the Bible.

The source of data for this study is the *New International Version Bible Across America*© *(NIVBAA)* published by Zondervan. In 2008, the Zondervan team collected handwritten Scripture verses from a population of over 31,000 authors who reside throughout every state in the US. The team visited ninety US cities in forty states. There were also writers from Canada, Central and South America, Africa, Asia, Australia, and Europe. The project used over 4400 sheets of 11″ x 17″ Domtar™ brand paper. Each writer was instructed to write two copies of a verse of Scripture. The team assigned verses according to the next in sequence in the Bible. The contributors used Staples® brand XENO™ ballpoint pens which were provided by the Zondervan team to ensure consistency in ink type and color for final publication. People of all ages who were proficient in written English contributed to the project.

Methods and Materials

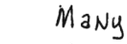
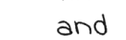
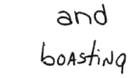
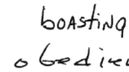
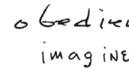
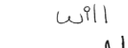
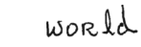
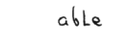
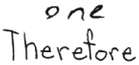
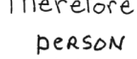
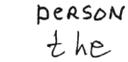
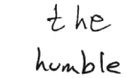
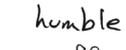
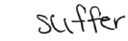
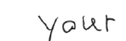
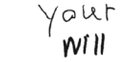
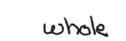
This study examined 505 verses from the books of Ephesians, 1 Timothy, 1 Peter, 1 John, 2 John,

and 3 John. These books were chosen because they represent a broad geographic sampling of writers.

This study focused on the variations of selected characteristics in small letters, based on the previous works of Livingston, Muehlberger et al, Huber, and Horton. The letters were chosen to be consistent with previous work done by these authors. The choice of letter forms was based upon this author's casework experience as a forensic document examiner.

The selected letter forms were counted by the author. If the letter form was not present in a given verse, then the total number of writers would necessarily decrease. An example would be, the small letter "b," created like the numeral 6, with a continuous vertical down stroke and a counter-clockwise bowl. Since the letter "b" is not in Ephesians 1:2, the total number of samples decreases by one from 505 to 504. The characteristic only need occur once in a verse to be included in this study.

There are several limitations associated with this study. Many of the verses do not contain all letter forms. Additionally, the background of the writers is unknown, including age, writing system, or the location where they learned to write. Some of the characteristics might be stylistic expressions created for this event, but fall outside the writer's normal range of variation. The author did not examine the original writings collected by Zondervan, therefore some of the characteristics were not apparent. (One of the original compilations was auctioned for charity and is in the sole possession of the anonymous bidder and the other is in Zondervan's archive.) A writer with variations in letter forms could be included multiple times. For example, a writer expressing both the letter "u" with and without a completion down stroke would be included in two categories.

Letter Characteristic or Formation	Example	Frequency of Current Study	Frequency of Previous Studies if Applicable
Capital letters where small letters normally occur		10.9%	
All capital letters		3.4%	
"a" (capped)		7.4%	3.5%
"A" (capital, where it should be small)		6.8%	
"b" (written as a 6)		5.9%	
"e" (greek, in small position)		0.8%	<5%
"E" (capital, where it should be small)		5.0%	
"I" (circle diacritic)		1.2%	
"l" (cursive)		1.1%	
"L" (capital, where it should be small)		28.7%	
"n" (discoverable lift)		0.6%	0.5%
"o" (beginning & ending at 2-4 o'clock position)		0.4%	
"o" (beginning & ending at 5-7 o'clock position)		1.8%	
"r" (discoverable lift)		1.0%	0.5%
"R" (capital, where it should be small)		7.8%	
"t" (vertical staff downward, right)		17.4%	6.5%
"u" (no downstroke)		28.7%	
"u" (two stroke)		0.9%	
"u" (with loop)		1.5%	
"w" (center higher)		1.1%	
"w" (center loop)		2.1%	
"4" (with closed top)*		14.0%	
"7" (bar)**		6.8%	18%

* only 57 writers were used as a basis for "4".
** only 44 writers were used as a basis for "7".

Results

Based upon the examination, the following data was compiled.

Discussion

This data provides new information that might assist forensic document examiners as they evaluate the significance of letter characteristics in casework. It was interesting to note the differences compared to the previous studies, for example the small "t" occuring nearly 3 times more and the "7" with a bar less than half the time of Livingston's previous study. There were also interesting similarities, for example, the "r" and "n" with the discoverable lifts still occurring at a comparable frequency to Livingston's study.

This project was only the beginning and a small fraction of what could be a much larger project. Future projects could encompass many more letter forms, numerals, and variations. The number of writers examined could be expanded. Geographical variation studies could also be undertaken. Correlation studies could also be done to determine if specific formations relate to one another.

This source has an abundance of information for future research projects for the forensic document field or for the examiner who wants to simply scrutinize many different writing samples.

Reference Material

Eldridge, M. A., Nimmo-Smith, I., Wing, A. M., and Totty, R. N., (1984) The Variability of Selected Features in Cursive Handwriting: Categorical Measures. *Journal of the Forensic Science Society, 24*. 179-219.

Huber, Roy A., (1990) *The Uniqueness of Writing.* Presented to the American Society of Questioned Document Examiners.

Horton, Richard A., (1992) *A Study of the Occurrence of Certain Handwriting Characteristics in a Random Population*. Presented to the American Society of Questioned Document Examiners.

Livingston, Orville. (1963). Frequency of Certain Characteristics in Handwriting, Pen-Printing of Two Hundred People. *Journal of Forensic Sciences, 8, 2.* 250-259.

Muehlberger, R. J., Newman, K. W., Regent, James, and Wichmann, J. G., (1976) A Statistical Examination of Selected Handwriting Characteristics. *Journal of Forensic Sciences, 22.* 206-215.