

Frequency of Signature Styles in San Diego County

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Signatures may be classified into 3 basic structural types: text-based (each allograph can be read clearly), mixed (at least 2 allographs are legible), and stylized (1 or no allograph is legible). The relative frequency of these signature types in the San Diego (USA) population was determined by sampling 1,500 signatures from Juror Summons forms. Of interest to this study were the relationships between type of signature, gender, and ethnicity. This survey disclosed that females more commonly wrote text-based signatures than mixed or stylized types, whereas males more commonly wrote in a mixed or stylized form than in a text-based form. The difference between the genders with respect to the extent of signature stylisation was highly significant (Chi-square = 138.1, $p < 0.0005$). No remarkable differences were found between the frequencies of the 3 signature types in the Hispanic versus the non-Hispanic populations of signers. When the signature types within each of the ethnic groups were compared according to gender, no differences were found between the Hispanic and non-Hispanic males, and only a small (questionable) difference was found between the Hispanic and non-Hispanic female writers.

Introduction

Signatures have been accepted as a form of personal identification for thousands of years. The strategies that individuals adopt to create their signature forms are numerous, and in some cases more than one style is performed. A formal style may be executed for important documents such as a will and a less formal style executed for more common signing circumstances such as checks or receipts for packages.

This study describes the frequency of signature styles in the county of San Diego, California, based on a 1,500-signature sample. The county has a population of just under 3,000,000 people. Of this population, whites make up 73% and Hispanics or Latinos 25% (quickfacts.census.gov). The 1990 census found that more than 85% of San Diego County's Latino population is Mexican or Mexican-American (signonsandiego.com).

Many of the Hispanics or Latinos living in San Diego have close familial ties to Mexico. The Mexican education system might, therefore, be expected to have some influence on the Hispanic/Latino population. In the 1970s, cursive handwriting was no longer taught in

Mexico. Instead, hand printing was taught from kindergarten level. This generation of writers did not, therefore, learn to write cursively. Many of these individuals developed stylized signatures called *firmas*. The *firma* is a highly individualistic signature which develops and becomes more complex as its writer matures. More recently, the Mexican government reverted to teaching cursive handwriting in schools (Carmona 2005).

Production of *firmas* may influence the relative frequency of stylized signature forms in the Hispanic as compared to the non-Hispanic population of writers. Because some children copy the signature characteristics of their parents, it may be expected that even if individuals from Hispanic parents were taught cursive handwriting (either after the reversion of the Mexican handwriting system or as students in American schools), a disproportionate representation of stylized signatures may be present.

Other studies conducted on Hispanic writers in the United States have been reported. Those studies, however, focused more on the class characteristics of writers rather than exploring difference in signature structures (Muehlberger 1989; Oleksow 1994; Spilman, 1990).

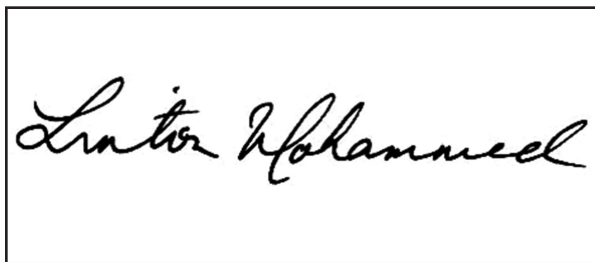


Figure 1. Example of a text-based signature. Note that nearly all of the allographs can be interpreted.

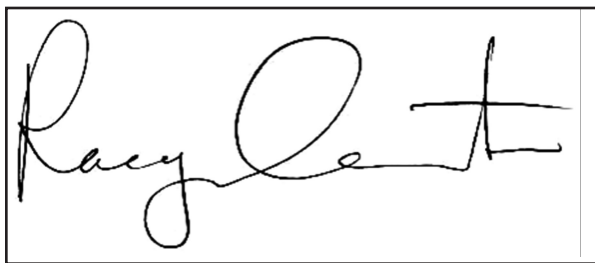


Figure 2. Example of a mixed style signature. More than 2 allographs can be interpreted.

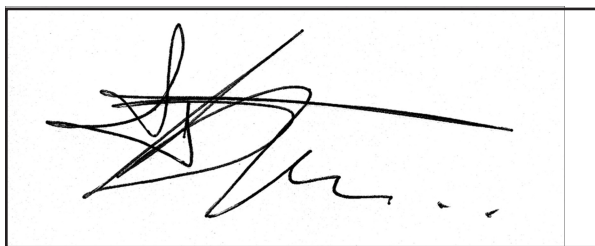


Figure 3. Example of a stylized signature. No allographs can be interpreted.

This study aimed to explore whether there exists differences in signature types in the population between not only Hispanics and non-Hispanics but also males and females. Ultimately, the results will be relevant to exploring not only the possible sources of different types of signing behaviors, but will further focus research on topics such as methods of disguising different signature types and whether signature styles influence the difficulty that individuals have in simulating the forms.

Method

The Juror Summons forms used as the source of the signatures examined were mailed to eligible jurors in San Diego County. Each prospective juror was required to be over 18 years of age. Individuals were drawn randomly from the List of Voters and Department of Motor Vehicles records in San Diego. The forms were signed and returned to the Jury Commissioner's office. Printed information on the form included the juror's name and address. The prospective jurors wrote information on the backs of the forms as to why they were unable to serve at the requested time if they wished to be excused from service.

Fifteen hundred Juror Summons forms, signed and returned in April 2007, were examined at the offices of the Jury Commissioner, Superior Court, San Diego. The signatures were visually examined without the aid of magnification. For protection of privacy reasons and as per agreement with the Jury Commissioner, no copies or photographs were made of any of the Juror Summons forms or signatures examined.

The signatures were classified into 3 types: text-based, mixed, and stylized. Text-based signatures were defined as signatures where each allograph of the name was clearly written (Figure 1).

A mixed signature was defined as 1 in which 2 or more allographs could be read within the signature (Figure 2).

A stylized signature was defined as a signature in which there were no discernable allograph formations (Figure 3).

Information was recorded as to the sex and ethnicity of the signatories. Ethnicity was determined as non-Hispanic (Caucasian, African-American) and Hispanic. These determinations were made by the type of name (Anglicized or Hispanic) and, in some cases, information recorded by the juror on the form. The limitations associated with determining ethnicity on

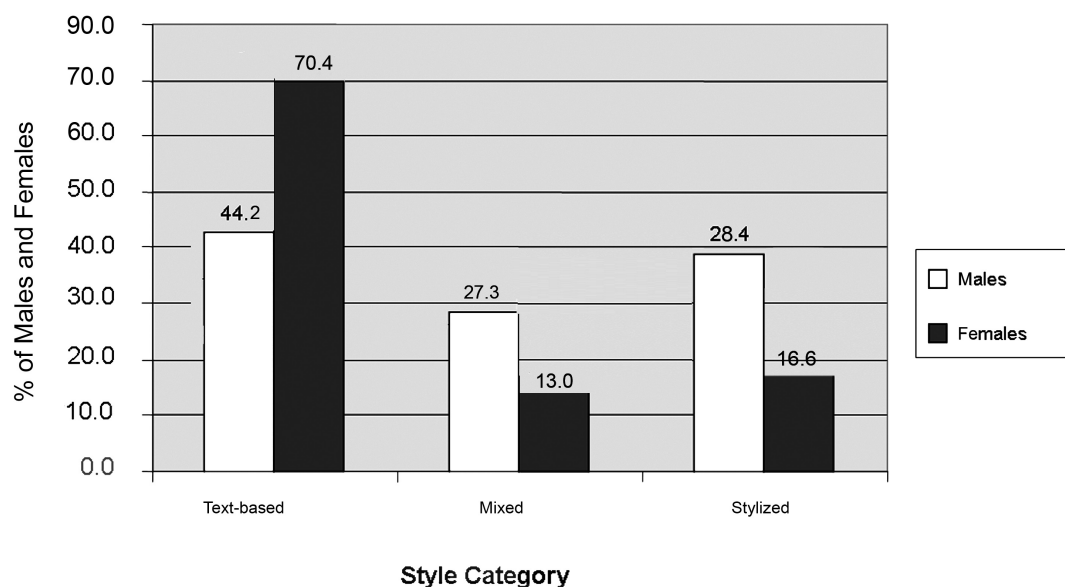


Figure 4. The percentage of male and female writers whose signatures fall within the different style categories.

the basis of names are clear—married Hispanic females may have Anglicized first names and surnames; married non-Hispanic females may have Hispanic surnames; Hispanic males may have Anglicized names.

Of the 1,500 signatures examined, 62 were excluded, as the sex of the writer could not be determined from the signature or information on the form.

The raw information extracted from the remaining 1,438 signatures was coded and placed into an Excel spreadsheet. Analysis of the coded data from the spreadsheet was conducted to determine if there was any relation between signature style, males and females (with and without considering ethnicity), and between signature style and ethnicity in general.

Statistical analyses were performed using the Chi-square test for nominal data which is appropriate for deciding if the proportions of cases within various categories are different between subject groups.

Results

Figure 4 shows the relative percentages of signature types for all the males and females studied. Females were found to more commonly write a

text-based signature than a mixed or stylized form, whereas males were more likely to use a mixed or stylized signature than a text-based signature. The difference between genders is highly statistically significant (Chi-square = 138.1, $p < 0.0005$).

Males and females showed no significant preference statistically for either mixed or stylized signatures (Chi-square = 1.6, $p = 0.266$).

The same percentage (44%) of Hispanic and non-Hispanic males used a text-based signature with small, non-statistically significant differences between ethnic groups for mixed compared to stylized signatures (Chi-square = 1.5, $p = 0.225$) [Figure 5].

As stated above, no statistically significant difference was found for an overall female preference between mixed or stylized signature styles. However, Hispanic females were more likely than non-Hispanic females to produce a mixed or stylized signature (Figure 6). It should be noted that although the difference is statistically significant, the magnitude of the difference is not large (Chi-square = 7.4, $p = 0.006$).

Conclusion

Little evidence suggests that *firma* behavior has influenced the stylization of signatures

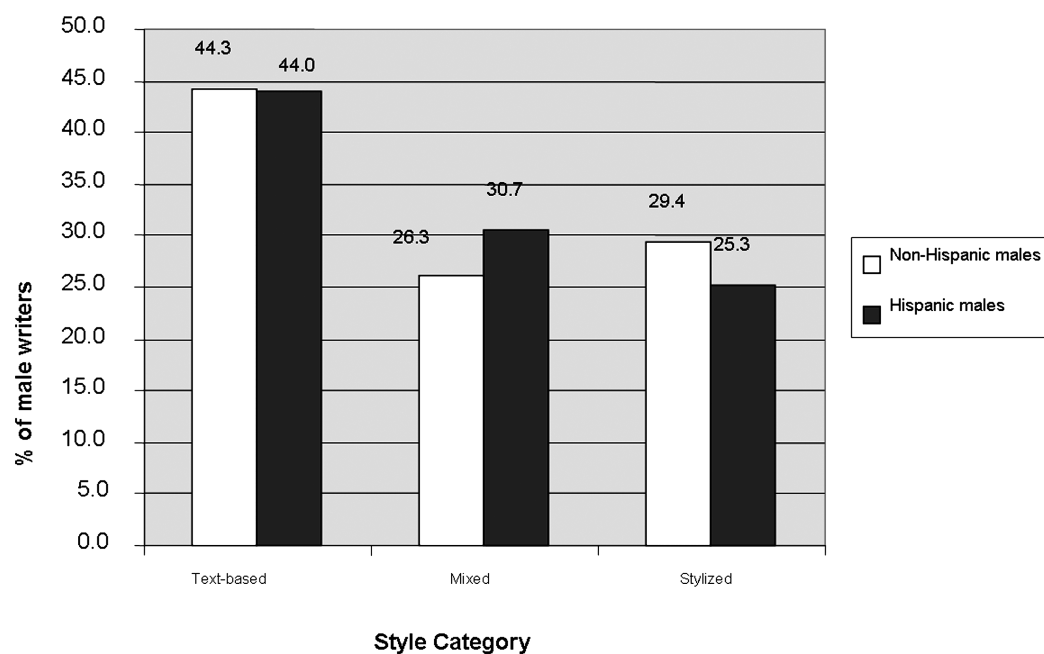


Figure 5. The percentage of male non-Hispanic and Hispanic writers whose signatures fall within the difference style categories.

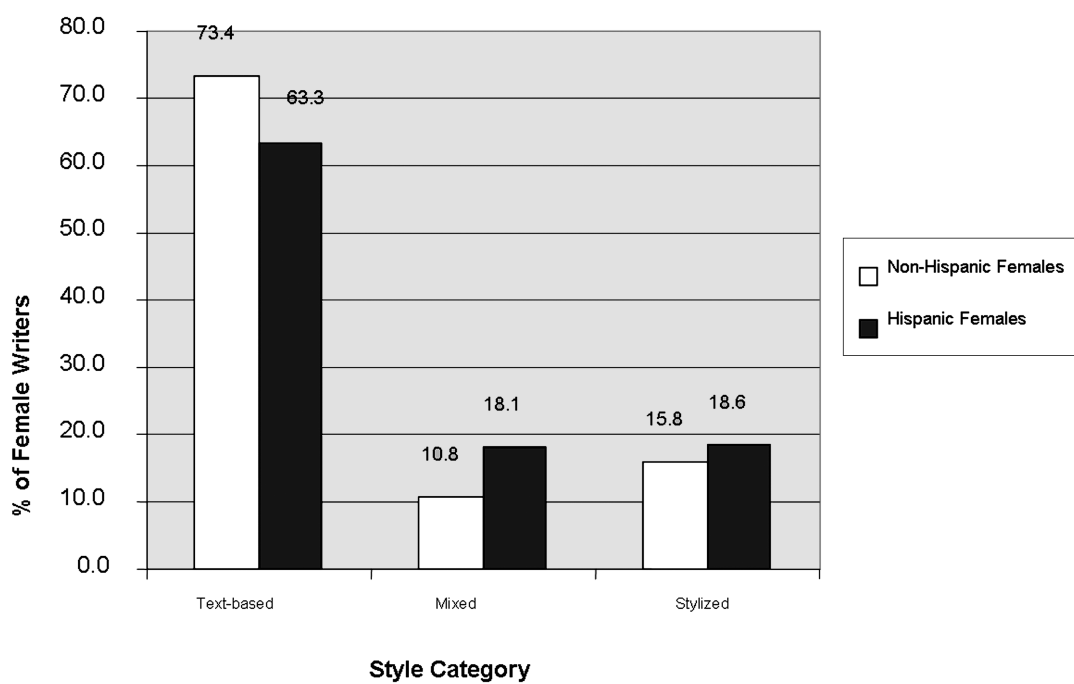


Figure 6. The percentage of female non-Hispanic and Hispanic writers whose signatures fall within the difference style categories.

in the Hispanic population of writers in San Diego County, despite the writing population's proximity and relationships to the Mexican population of writers. The only difference regarding ethnicity was found to be small and was between Hispanic females who more commonly produced mixed or stylized signatures when compared to the non-Hispanic females. Given that the female group was the most likely candidate to attract classification errors (due to the name changes associated with marriage), this particular effect must be treated with considerable caution. Another caution is that the age of the writers could not be determined from the Juror Summons forms (although the writers would all be over 18 years). Research conducted with more demographic information may disclose some insight as to whether there is a particular age group that exhibits greater influence which might be attributed to *firma* behavior.

Statistically significant differences were found between females and males. Females more commonly wrote text-based signatures than mixed or stylized forms, and males more commonly wrote mixed or stylized forms than text-based forms. The source of these gender differences cannot be determined from this study. Information regarding the education level, the writers' frequency of signing behavior, and other factors may provide clues as to the explanation for this difference.

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