P. Willey,[1] Ph.D. and Tony Falsetti,[2] Ph.D.

Inaccuracy of Height Information on Driver's Licenses

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ABSTRACT: Height is an important variable in identification. In cases involving deceased individuals, height is measured directly on the corpse or estimated from the skeleton. This postmortem measurement or estimation is then compared with antemortem records, usually the driver's license. The accuracy of the license information, however, has been questioned. To assess the accuracy of driver's license information, volunteers' statures were measured, and then these figures were compared with those printed on the subjects' licenses. Even in our comparatively young, well-educated sample, the license height was significantly greater than the measured height. Some inaccuracies may be caused by failure to update license information when new licenses are issued, but some inaccuracies may be from personal deception. The implications of these results for forensic anthropology cases are discussed.

KEYWORDS: pathology and biology, physical anthropology, human identification, stature, self reporting

> Actually, one of the more disconcerting complications of stature in identification is the inexact nature of the living person's height. Most people believe themselves to be about an inch or so taller than they really are, especially if they are on the short side of average, and such height records regularly find their way into records. My own driver's license states my height one inch greater than it is, intentionally; if it did not, people would be looking for a slightly shorter person when I presented it as a means of identification. This sort of error must always be allowed for [*1*].

The accurate determination of height is important in forensic investigation and identification. In cases involving deceased individuals, height is measured on the corpse or estimated using the skeleton. This postmortem measurement or estimation is then compared with antemortem records. The comparability of the antemortem and postmortem figures is important in the identification process.

Antemortem height information may come from one of several sources. Height is usually recorded during the process of "booking" a suspect. Recording height in this process may be done directly from measurements or indirectly when photographs are taken with a scale in the background. Snow and Williams [*2*] have presented a case study of an individual whose various criminal bookings and medical records indicated his stature was between 62 and 67 in. (157.48 and 170.18 cm)—a range of 5 in. (12.7 cm)! In addition

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[1]Assistant professor of anthropology, California State University, Chico, CA.
[2]Research anthropologist, Department of Ecology and Evolution, State University of New York at Stony Brook, Stony Brook, NY.

to criminal and medical records, antemortem height information is also maintained as a part of military records. But probably the most readily available and widespread source of stature of civilians, however, is the driver's license (DL). This paper examines the inaccuracy of DL height.

There are several likely sources of DL inaccuracy. DL height is self-reported by the applicant to the licensing bureau, and rarely are measurements made by the bureau's agents, at least in the United States. Consequently, the accuracy of the information relies on the accuracy and veracity of the applicant, but self-reporting of stature, as well as of other variables, has been shown to be inexact. Studies in a variety of areas have shown that self-reported stature is inaccurate beyond and in a direction not expected through intra- and inter-observer measurement error. The inaccuracy of reported adult paternal stature has been noted in growth studies [*3–6*]. The inaccuracy of reported heights has been noted in a sample of women in the U.S. Air Force [*7*]. The inaccuracy of reported height has been established also in Danes applying for health insurance [*8*] and in other health-related studies [*9–11*]. And the inaccuracy of women's DL height has been examined [*12*].

Even if height is reported accurately when the license is issued first—usually at 16 years in most states—many drivers fail to update information that has become inaccurate when licenses are reissued. Reissue usually occurs every four years.

The purpose of this paper is to examine the accuracy of DL information by comparing the height printed on current DLs with the actual measured height. These figures are contrasted statistically to test for differences. Then, the implications of the discrepancies for forensic science cases are discussed.

Materials and Methods

Volunteers were solicited from introductory anthropology courses at the University of Tennessee—Knoxville (UT-K) during the winter, spring, and fall quarters of 1986 and the spring quarter of 1987, although anyone passing through the halls of the UT-K Anthropology Department was considered fair game and invited to participate. First, the subject completed a brief form that requested information on his or her age, sex, height, and weight. Next, the subject's DL was requested and its information was recorded by an investigator. The subject was asked to remove his shoes. The height was measured using an GPM anthropometer and the measurement recorded to 0.1 cm. Later, the DL height, which was in feet and inches, was converted to centimetres for statistical comparisons.

A total of 532 subjects participated in our study. Twenty of these, however, were excluded from this study because one or more of the variables were not available on the DL or because information was omitted from the brief form. Because of the small numbers of non-white volunteers, only whites were employed in this study. As a consequence of these reductions, the sample employed for this analysis consisted of 512 subjects. Table 1 presents the age and sex distribution of the sample. The location where the DLs were issued is presented in Table 2.

The data were entered on the UT-K Computer Center VAX system and statistical procedures were executed with the SPSS package [*13*] on the U.S. Army VAX system, including descriptive statistics and some tests for significance. Paired t-tests of the measured stature and DL stature were calculated and employed to test for directional differences. Binomial Z-tests were calculated to test for deviation from a random distribution of even and odd DL heights. An unbalanced analysis of covariance (ANCOVA) employed the difference between the DL height and measured height and analyzed the effects of age and sex on that difference.

TABLE 1—*Age and sex distribution of the sample.*

	Females	Males	Total
Sample size	244	268	512
Age, years			
Mean	22.68	22.52	22.60
Variance	44.64	35.94	40.01
Minimum	17	17	17
Maximum	55	55	55
Range	38	38	38

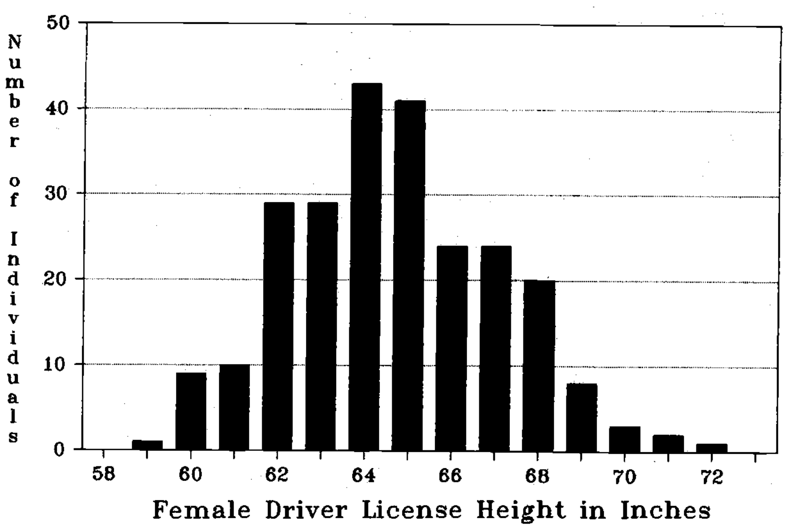

FIG. 1—*Female driver's license heights, in inches. Although there is a tendency for overrepresentation of even digits, the deviation is not statistically significant.*

Results

Descriptive statistics for the DL and measured heights and the difference between the DL and measured heights are presented in Table 3. Note in both sexes that the DL stature is greater than the measured stature on the average, but this difference is greater in males (1.321 cm) than in females (0.574 cm).

While the overall mean difference of 0.965 cm (0.38 in.) may seem negligible, the distribution around the mean is impressive. One standard deviation (68% of the distribution) of the difference encompasses subjects from those whose measured height exceeds their DL height by 3.99 cm (1.57 in.) to those whose DL height was 2.06 cm (0.81 in.) less than their measured height. Even more impressive are the extremes of the range. One young man, who said he was issued his DL in Kansas when he was 14 years old and had not updated the DL information, understated his height on his DL by 26.6 cm (more than 10 in.). At the other end of the range, another person overreported his height on his DL by 14.7 cm (about 5.79 in.).

These distortions are also apparent in the distribution of DL heights examined alone. When DL heights are plotted, there is a tendency for the heights to be even numbers rather than odd numbers (Figs. 1 and 2). The overabundance of even numbers for males is especially pronounced at 5 ft, 8 in. (172.72 cm), 5 ft, 10 in. (177.8 cm), 6 ft, 0 in. (182.88 cm), and 6 ft, 2 in. (187.96 cm) when contrasted to the adjacent, odd-numbered

TABLE 2—*States, territory, or province where the driver's licenses were issued.*

State	Number	Frequency, %
Arkansas	1	0.2
Alaska	2	0.4
Connecticut	2	0.2
Florida	5	1.0
Georgia	1	0.2
Illinois	2	0.4
Indiana	2	0.2
Kansas	3	0.6
Kentucky	2	0.4
Louisiana	2	0.4
Michigan	1	0.2
Minnesota	3	0.6
Missouri	1	0.2
North Carolina	6	1.2
New Jersey	1	0.2
New Mexico	1	0.2
New York	1	0.2
Ohio	7	1.4
Quebec	1	0.2
Puerto Rico	1	0.2
South Carolina	1	0.2
Tennessee	456	89.1
Virginia	11	2.2
Wisconsin	1	0.2
Total	512	

TABLE 3—*Descriptive statistics of differences, in centimetres, between the driver's license height and the measured height.*

	Females	Males	Total
Sample size	244	268	512
Driver license height			
Mean	164.36	179.57	172.32
Standard deviation	6.17	7.15	10.13
Minimum	150	152	150
Maximum	183	201	201
Measured height			
Mean	163.79	178.25	171.36
Standard deviation	5.84	6.78	9.62
Minimum	146	155	146
Maximum	182	199	199
Difference (DL—measured height)			
Mean	0.574	1.321	0.965
Standard deviation	2.47	3.42	3.02
Minimum	−11	−27	−27
Maximum	10	15	15

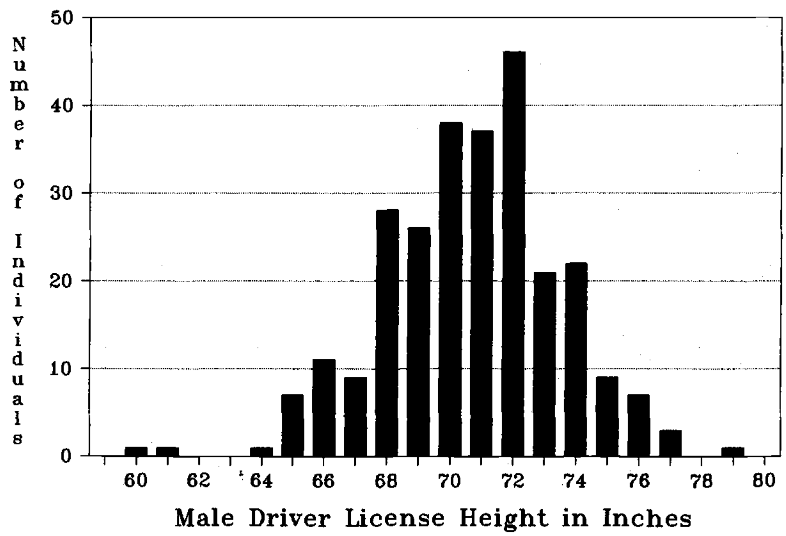

FIG. 2—*Male driver's license heights, in inches. The overrepresentation of even digits is statistically significant.*

heights. When using a binomial Z-test to examine the distribution of even and odd numbers, there is a statistically significant difference for both sexes combined ($Z = 2.210$, $F(Z) = 0.95$, $P < 0.05$). This level of significance is contributed largely by the males ($Z = 2.44, F(Z) = 0.98, P < 0.02$), while the female distribution by itself is not significant ($Z = 0.640$, $F(Z) = 0.50$, $P > 0.50$).

Paired t-tests contrasting the individual's DL and measured heights are presented in Table 4. It is apparent that the differences observed in the descriptive statistics are significant.

Statistically significant differences are also found when an ANCOVA is calculated. Using the difference between the DL and measured statures as the dependent variable, and age and sex as the independent variables, the overall model is statistically significant ($F = 3.94$, $DF = 2, 509$, $P < 0.02$). Age does not contribute significantly to the model ($F = 0.00$, $DF = 1$, $P > 0.98$), although sex does ($F = 7.89$, $DF = 1$, $P < 0.006$). These results indicate that the sexes are misrepresenting their actual stature in a statistically significantly different manner. Based on the descriptive statistics and the ANCOVA, the males are misrepresenting their stature to a greater degree than the females.

TABLE 4—*Paired* t-*tests contrasting individuals' driver's licenses and measured heights.*

	Females	Males
Sample size	244	268
Degrees of freedom	243	267
t-value	3.634	6.321
Probability	0.001	0.001

Discussion

Although our sample consisted largely of young, middle-class college students—who presumably are more accurate in reporting and updating their DL information than older, less educated people—there is still a significant trend to overstate height on their DLs. There are some indications, because we employed volunteers, that even among college students our assessment is conservative. There may have been many other potential volunteers who did not participate to avoid embarrassment. As a consequence of our young, volunteer, college student sample, our assessment of DL inaccuracies is probably conservative.

But for those people who chose to participate, there appear to be four principal sources for these errors in DL information.

First, it is likely that some subjects purposefully distorted their DL information and were aware of the distortion. To see if volunteers were aware of distortions, we asked them to record their present height without looking at their DL and before being measured. Comparing their responses and our measurements using a paired *t*-test, we found statistically significant differences between the reported and measured heights (females: $T = 7.61$, $DF = 243$, $P < 0.001$; males: $T = 15.21$, $DF = 267$, $P < 0.001$). These differences are in the same directions as the measured versus DL differences. So these results indicate that at least on the statistical level, the subjects had not *purposefully* distorted their DL information, but they actually believed the DL information to be correct.

Second, at least some of the differences are caused by cultural preferences. There is doubtlessly a cultural preference for most people to be taller than they actually are. Some volunteers, for instance, considered their height to include fashionable shoes with 2-in. (5.08-cm) heels.

Third, although we did not request such information, some subjects mentioned that the height on their DL was out-of-date. Some added that although they had been reissued licenses and had had opportunities to correct erroneous information, they had not bothered to make the corrections. Failure to update DL information may have had a pronounced influence on the inaccuracies.

Fourth, there are some indications that many males rounded up their DL height (Figs. 1 and 2). It appears that 5 ft, 10 in. and 6 ft, 0 in. are especially desirable heights, based on the lumping in those figures in our sample. This rounding is presumably toward a preferred height.

Conclusions

Using this fairly young, well-educated sample from the Southeast, there are a number of important considerations which should be kept in mind when comparing stature estimations from postmortem remains with antemortem records. On a statistical level, the DL is greater than the actual measured height, although the range of differences is great in both directions. Further, males tend to distort their stature more than females and tend to round their height to even digits—particularly to 5 ft, 10 in. and 6 ft—more than females. These tendencies and variations must be considered when employing DL information in forensic science identification. The DL stature, as with all self-reported data, must be viewed with the realization that distortions may be present.

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Address requests for reprints or additional information to
Dr. P. Willey
Anthropology Department
311 Butte Hall
California State University
Chico, CA 95929-0400