AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 121:385–386 (2003)

News and Views

Testing a Method: Paleodemography and Proportional Fitting

Mary Jackes

Department of Anthropology, University of Alberta, Edmonton, Alberta, Canada

Konigsberg and Frankenberg (2002, p. 297), in "reviewing some recent developments in paleodemography over the past decade," criticize a graph I included in a general discussion on the problems of age estimation of adult human skeletons (Jackes, 2000, Fig. 15.7). In their opinion, I was mistaken when using 17 age categories to demonstrate the differences between known-age distributions and those estimated from skeletal age indicators by a method termed "iterative proportional fitting procedure" (IPFP). The immediate issue is that the number of age groups is constrained by the number of morphological stages, a disadvantage of IPFP. Konigsberg and Frankenberg (2002), along with others in North America and in Europe, are examining various methods for redistributing frequency distributions of morphological stages in order to estimate adult ages. For each suggested method, we need empirical evidence of success or failure over multiple tests. In my analyses, iteration based on probabilities derived from Los Angeles forensic cases did not provide adequate age estimates for pubic symphyses in the known-age collection at the Institute of Anthropology, University of Coimbra. We need to know whether that result is upheld when the analysis is run on a reduced number of age categories.

The editors of the book containing my paper (Jackes, 2000) requested that authors simplify their contributions for a student readership. Thus, I may have oversimplified the matter, but a further test will show that the point made remains valid.

Figure 1, in which age categories are collapsed into five broad age groups, illustrates that the estimated age distribution generated by iteration does not reflect the distribution of the actual ages of the Coimbra known-age sample. The Coimbra sample (Table 1) is made up of 103 male pubes, distributed among the six Suchey pubic morphological stages by Santos (1996).

The estimated ages of the Coimbra male pubes, distributed over five age classes, stabilized at 0.01 tolerance at 98 iterations. Reference sample probabilities were derived from the data of Suchey and Katz (1997), as given in Table 2: the Los Angeles sample consists of 737 male pubes studied by Suchey and Katz (1997), distributed among six pubic symphysis stages.

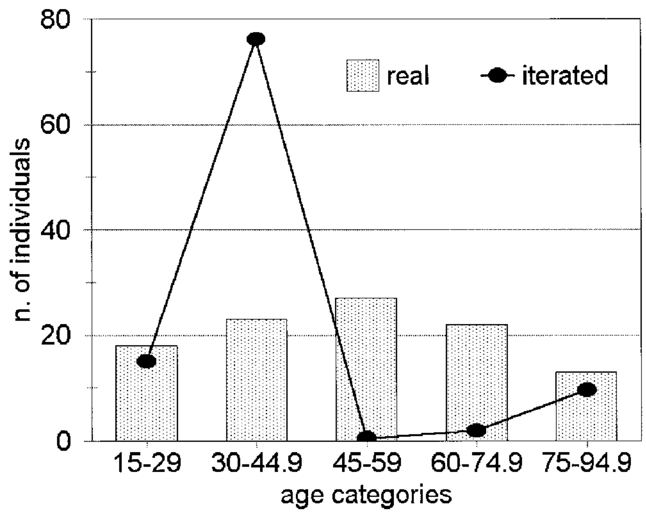

Fig. 1. Real age distribution of Coimbra male pubes compared with age distribution estimated by iteration.

TABLE 1. Coimbra male pubes

Age	Real ages	Estimated ages
15–29.9	18	15.00
30–44.9	23	76.15
45–59.9	27	0.41
60–74.9	22	1.88
75–94.9	13	9.57
Total	103	103.00
Mean age	51	40.0

TABLE 2. Los angeles male pubes (mean age at death, 41 years)

	Pubic stages						
Age	1	2	3	4	5	6	Total
15–29.9	119	72	30	36	13	1	271
30–44.9	0	8	12	83	62	4	169
45–59.9	0	1	1	31	103	33	169
60–74.9	0	0	0	3	51	46	100
75–94.9	0	0	0	0	12	16	28
Total	119	81	43	153	241	100	737

Figure 2 shows that simply collapsing a large number of age categories into five broader age units does not give the same results as iteration using

Correspondence to: Mary Jackes, Department of Anthropology, University of Alberta, Edmonton, Alberta T6G 2H4, Canada. E-mail: mjackes@ualberta.ca

Received 26 July 2002; accepted 2 August 2002.

DOI 10.1002/ajpa.10203

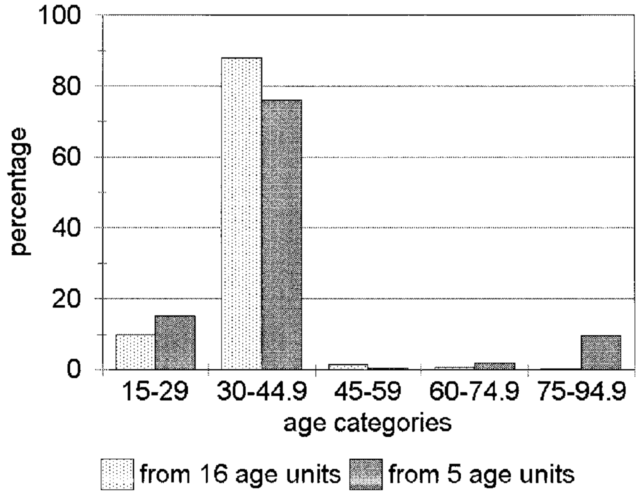

Fig. 2. Estimated age distribution of Coimbra males pubes calculated for 5 age categories, and for 16 age categories collapsed into 5.

only five age units: nevertheless, the major features of the distribution are the same. Although the Coimbra data comprise 17 categories (standard demographic 5-year units) age 15 and above, the Los Angeles data provide only 16, and the iteration reported here was based on these 16. A floating point error makes it impossible to iterate 17 ages for six stages at the 0.01 tolerance being used for this demonstration: stability is reached for 16 age categories at 300 iterations.

For the particular method in question here, this test fails to provide an age distribution which approximates the real age distribution. The next step is to consider whether this is simply a failure of one of several methods of estimating the age distribution of a target sample, or whether there are deeper issues: 1) the difference in the real age distribution of the Los Angeles and Coimbra samples (e.g., 36.8% of the LA sample is in the under-30 age category) may still be influencing the outcome in some indirect way; and 2) population differences, derived from genetic or life factors, or some incalculable mixture of the two, could be the root cause. Perhaps a mixture of both issues should be considered, but the real interest, to my mind, lies in research into issue 2 and the basic question of whether we can use Los Angeles late twentieth century forensic case male pubes to provide probabilities for estimating ages of late nineteenth/early twentieth century Portuguese male pubes.

For whatever reason, the method illustrated here does not allow us to provide a true estimate of the mean age of the Coimbra male sample. My original point (Jackes, 2000, p. 435) was made in response to the suggestion of Bocquet-Appel and Masset (1996, p. 582), that the average of the age distribution of adult human skeletons from an archaeological skeletal sample can be estimated with accuracy from an iteration of this type, remains valid. The test presented here has once again shown that iterative proportional fitting will not provide an accurate estimate of mean adult age at death for an archaeological sample.

LITERATURE CITED

Bocquet-Appel JP, Masset C. 1996. Paleodemography: expectancy and false hope. Am J Phys Anthropol 99:571–583.

Jackes MK. 2000. Building the bases for paleodemographic analysis: adult age determination. In: Katzenberg MA, Saunders SR, editors. Biological anthropology of the human skeleton. New York: Wiley-Liss. p 417–466.

Konigsberg LW, Frankenberg SR. 2002. Deconstructing death in paleodemography. Am J Phys Anthropol 117:297–309.

Santos AL. 1996. How old is this pelvis? A comparison of age at death estimation using the auricular surface of the *ilium* and *os pubis*. In: Pwiti G, Soper R, editors. Aspects of African archaeology. Papers from the 10th Congress of the PanAfrican Association for Prehistory and Related Studies. Harare: University of Zimbabwe. p 29–36.

Suchey JM, Katz D. 1997. Applications of pubic age determination in a forensic setting. In: Reichs KJ, editor. Forensic osteology: advances in the identification of human remains. Springfield, IL: Charles C. Thomas. p 204–236.