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Source: *Journal of the Royal Statistical Society*, Vol. 79, No. 3 (May, 1916), pp. 309-317

Published by: Wiley for the Royal Statistical Society

Stable URL: <http://www.jstor.org/stable/2340541>

Accessed: 27-06-2016 20:17 UTC

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NOTE AS TO ERROR OF STATEMENT OF AGES OF YOUNG CHILDREN
IN A CENSUS.

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[Read before the Royal Statistical Society, April 18, 1916,
Sir JERVOISE A. BAINES, C.S.I., Hon. Vice-President, in the Chair.]

ON December 15, 1914, I had the honour to bring before this Society a note as to errors of statement as to the duration of marriage in censal returns, and in the discussion which followed, Mr. Welton suggested the advisability of employing the method I used in testing the accuracy of the reporting the duration of marriage to test the accuracy with which children's ages are recorded in these returns, and the research which I now record is the outcome of that suggestion.

I have limited this study to children of less than five years of age, and, as a comprehensive sample of all such children, I selected those enumerated at the Census in the Registration District of Paisley, and in the County of Haddington. These two areas were selected, not for any observed peculiarity of population in them, but solely because of their population being of suitable dimensions. Paisley Registration District is a large and populous one; it contains the whole of the Town of Paisley, a considerable landward population, and, at the time of the Census, a small portion of the City of Glasgow. Its entire population at the Census was 91,038, of which 84,492 was burghal, and 6,546 extraburghal. The censal population of the County of Haddington was 43,254, of which 20,301 was burghal and 22,953 extraburghal.

The correctness of statement of age of the young children in these areas was checked by reference to the birth registers. It was accomplished thus:—All entries of children of under 5 in the enumeration books of those areas were transcribed on slips, as were also all entries in the Birth Registers covering a period of five years, and that is of all children born in these areas between April 2, 1906, and April 2, 1911. On the slips recording the censal statement of age that age was recorded, and on the slips taken from the Birth Registers the day of birth was recorded; in addition and wherever available

the names of the parents and the father's occupation was also recorded on both series of slips. When a child was not enumerated in the parents' house, the name of the householder, and the relationship of the child to him or her, was noted. When the transcription of the slips was complete, each set was put into alphabetic order, the two sets compared, and when recognition was established, the age found on the Census slip was recorded on the Birth Register slip. After that, by sorting and counting, tables showing date of birth and reported age were prepared. Doubtful recognitions were discarded, and only those which were reasonably sure were included in the tabulation. The slips taken from the Paisley Census and Registers were examined separately from those taken from the Haddington Census and Registers.

The tabulation from the slips was made by the actual date of birth, each line representing a single day, but it was so bulky that I have thought it sufficient to reproduce it in a condensed form, using the month of birth, instead of the day of birth, as the unit.

The total number of slips prepared, examined and counted was 31,893, of which 12,025 were taken from the Paisley Registers, 9,714 from the Paisley Census, 5,468 from the Haddington Registers, and 4,686 from the Haddington Census. Of the 9,714 children named on the Paisley Census slips, 8,177 were identified in the Birth Register slips, and of 4,686 recorded on the Haddington Census slips, 3,804 were similarly recognized. In the case of Paisley, the recognitions amounted to 84.2 per cent. of the total, and in the case of Haddington to 81.2 per cent. The total number of children included in the census of books of Paisley and of Haddington and whose dates of birth were in this way ascertained was 11,981.

The method was not equally successful at each of the younger ages, for it was found that the percentage recognized on the Birth Register slips—*i.e.*, whose date of birth was ascertained—was highest among infants of less than one year old, and decreased with each advancing year of age. Figures showing this point are collected in Table B and it may there be seen that while fully 90 per cent. of the children of less than one year old named in the census were successfully traced to the Birth registered, the corresponding percentage in the case of children of more than four but less than five years old was slightly under 78. The proportion of children of less than one unrecognized in the Birth Register slips was 9.3 per cent.; of those of more than one but less than two, 14.6 per cent.; of more than two but less than three, 17.6 per cent.; of more than three but less than four, 20.8 per cent., and of more than four but less than five, 22.1 per cent. From this, it follows that the age distribution of the children

whose ages were thus ascertained is not typical of the age distribution of young children in the general population, as the children whose ages were verified are relatively more numerous in the younger ages, and relatively less numerous in older ages, than is the case in the general population. Of the 11,981 traced from the Census to the Birth Registers, 2,646, or 22·08 per cent., were less than one year old, while 2,101, or 17·54 per cent., were more than four but less than five years old, but from this it is not safe to infer that children of those ages amount to 22·08 per cent. and 17·54 per cent. respectively in the general population, the probability being that children of under one constitute a percentage smaller than 22·08, and those of over four a percentage greater than 17·54, of children of under five.

The method appears simple and straightforward, and I anticipated little difficulty in its application, but in that I was to some extent disappointed, for in frequent instances there was ground for considerable and reasonable doubt. This arose through several causes. One frequent source of doubt was the use of fancy or pet names in the Census. In the Birth Registers, where the entries are made under the supervision of the registrar, the names of the children were properly recorded, but in the Census this was not always so. For instance, Elizabeths were frequently called Lizzie; Roberts, Bobbie; Catherines, Kate; and Margarets, Peggie. Such changes as these—and there were many others—interfered with the proper alphabetical order, and were the cause of some difficulty and confusion, and perhaps of some error mostly in the direction of non-recognition.

Not only did the use of pet names in many cases interfere with the recognition of the child, but it also did so in the recognition of the parents, for it was frequently found that the parents were described in the Census by Christian names different to those appearing in the Birth Registers.

A similar source of error occurred in connection with the description of the fathers' occupation—men describing themselves differently when entering births in the registers and when filling up census schedules. At one stage of the investigation, I made some endeavour to investigate this point, and to find out what proportion of men described themselves similarly in the two records, what proportion did not do so, and if possible to prepare some general statement about it, but I found such double description to be so frequent, and the varieties of it so numerous, that the task would be extremely heavy, and I had to relinquish the attempt.

One class of children in which this recognition was difficult was composed of illegitimate children, for these frequently, probably in

the majority of cases, were not enumerated along with both parents, but were enumerated in the houses of grandparents, or in those of persons of no near relationship. In the latter case these children were generally described in the Census returns as boarders. However, the mere fact that the child was recorded in a Birth Register as illegitimate and was enumerated either as a grandchild or as a boarder of a householder proved in itself to be evidence which helped recognition. I have kept no special note of the relative frequency of recognition among legitimate and illegitimate children, but I feel safe in asserting that in the case of the latter it was less than in the case of the former.

Two other sources of possible error are worthy of comment, the one being faulty transcription, and the other possible confusion of months with years in the case of children of less than one year old, the ages of such children being recorded at the Census in months while those of elder children being recorded in years. Errors from these causes were not numerous. In a considerable number of instances I suspected transcription errors on the slips and referred back to the original entries in the Birth Registers and Census books, but rarely found the slips wrong. The small number of errors which might be ascribed to confusing months and years is made evident by a scrutiny of Table D, for it can there be seen that out of 233 children of one month old only 5 were described as one year old, out of 225 children of two months old, only 3 were described as two years old, out of 249 children of three months old, only 1 was described as three years old, and out of 224 children of four months old, only 1 was described as four years old. In all, only 10 possible instances of such error were found among 931 children of from one to four months old.

It was the existence of these sources of difficulty and error in recognition which made me decide to reject rather than include cases in which there was any doubt, feeling that it was better to have a smaller sample of good recognitions than a larger and less perfect sample.

Before stating the results of the study, let me briefly describe what is the most evident indication of error in the reported ages of children in censal returns. It consists of an almost constant—constant when large populations are dealt with—excess of children stated to be two years old over that of children stated to be one year old. Such excess may be seen in Table C, which states the numbers of children of ages under five recorded at the last two censuses in England and Wales, and in Scotland, and at the last Census of the Cities of Edinburgh and Glasgow. In each of these six instances,

and they are not exceptional, children of more than one, but less than two were less numerous than those of over two but less than three, or of over three but less than four.

A general analysis of the results of the study is shown in tables and from them the following conclusions may be drawn :—

(1) That there is a considerable amount of mis-statement of age in the case of young children. The ages of 11,981 children were tested by reference to the Birth Registers, and in 11,083, or 92.5 per cent., the age stated in the Census was found to be correct, while in 898, or 7.5 per cent., it was found to be incorrect.

(2) Errors of statement of age are more frequently errors of overstatement than of understatement. Of the 898 incorrectly reported ages, 789 were erroneous because overstated, and 109 because understated. In the majority of instances, the error did not exceed one year. In only 47 of the 898 instances were the errors more than one year. In 770 the age was overstated by one year ; in 81 understated by one year, in 19, overstated by more than one year ; and in 28, understated by more than one year.

(3) Errors of understatement are more frequent in the younger months of each year of age, and those of overstatement in the older months. An inspection of Table D makes this quite evident. This study includes 707 children of less than 3 months old, and the ages of only 12, or 1.7 per cent., of them, are found to be overstated, while of 769 children of more than 9 but less than 12 months old, the ages of 100, or 13.0 per cent. were overstated. Similarly the ages of only 1.1 per cent. of children of over 12 but under 15 months old are overstated, while those of 24.3 per cent., of children of over 21 but under 24 months old were so overstated. Of children of 2 to 2½ years old the ages of 2.0 per cent., and those of 3 to 3½ years old, 0.9 per cent. were found to be overstated, while these percentages in the case of children 2½ to 3, and 3½ to 4, were 21.6 and 18.6 respectively. The percentage of understatement of age among children aged 1 to 1½, 2 to 2½ and 3 to 3½ were 0.7, 1.7 and 2.2, while those of children of 1½ to 2, 2½ to 3, and 3½ to 4, were 0.4, 0.1 and 1.0.

(4) Children reported at the Census as under one year old numbered 2,646. This included 20 children whose ages were ascertained to be more than one year, but excluded 154 whose ages while being under one were reported as over one. The 11,981 children contained 2,780 whose true age was under one year, and thus the Census number is found to be 134, or 4.82 per cent., too small.

(5) Children reported as being more than one, but less than two years old numbered 2,473. This included 142 children whose true ages were less than one year, and 27 whose true ages were more than

two, but excluded 244 whose true ages were more than one. Of the 11,981 children, 2,548 were in fact of this age, and as only 2,473 were so reported, there is a shortage of 75, or 2.94 per cent.

(6) Children reported in the Census as being more than two but less than three numbered 2,444. They included 236 who had not attained the age of two, and 32 who were more than three, but excluded 251 who though otherwise reported were of this age. Of the 11,981 children included in the study, 2,427 were of this age, and the reported number being 2,444, there was an excess of 17, or 0.70 per cent.

(7) Children reported as more than three but less than four years old numbered 2,317. This figure includes 236 children of less than three, and 30 of more than four, but excludes 205 of this age. Of the 11,981 children the number whose true age was more than three but less than four was 2,256, and the reported number being 2,317, there was an excess of 61, or 2.70 per cent.

(8) Children reported to be more than four but less than five numbered 2,101. This includes 175 whose true age was less than four, but excludes 44 who, while being of this age, were reported as being of younger age. The study being limited by age five, the returns do not show either how many children of more than five years old were reported at the Census as five years old, or how many children of this age were erroneously reported as of older age. Of the 11,981 children, 1,970 were in fact of this age, and the reported number is 131, or 8.65 per cent., in excess. The absence of information regarding the children reported as being over five detracts from the utility of this comparison, because a considerable number of children of this age would be reported as over five, and their inclusion in the study would no doubt have largely balanced this excess.

(9) Putting the foregoing together, and excluding reference to age four to five, the position may be summarized thus :—The number of children of less than one year old is too small by 134, or 4.8 per cent. ; and that of children of more than one but less than two by 75, or 2.9 per cent. ; while that of children of more than two but less than three is too large by 17, or 0.7 per cent. ; and that of children of more than three but less than four by 61, or 2.70 per cent. Or using rounder numbers, it may be stated that the number of children found in a Census to be less than one year old is too small by approximately 5 per cent., and the number of more than one but less than two years old to be too small by approximately 3 per cent., while the reported number of children of more than two but less than three is approximately correct.

The foregoing conclusions are in agreement with what is generally found in censal reports. In these reports the deficit of children of

less than one year old is not evident for the reason that under ordinary circumstances there is a very considerably larger number of children of under one than of over one but under two, and such excess is sufficiently large to mask the deficit due to the error of overstated age, but with children of one year old this is not so, for the excess of them over those of two years of age is not sufficient to mask the deficit due to this error, and the consequence is the conspicuous deficit of one year old children in those reports.

Unfortunately the limitation of this study to children of under five prevents my suggesting any method of adjustment of censal figures to correct for erroneous statement of age. That there should be a transfer from the numbers from those reported as aged one to the number of those reported as aged less than one is obvious, and a similar though smaller transfer from the number reported as aged two to that aged one, but the limit of the study prevents any opinion as to how such an adjustment of figures should be compensated. The figure for age two is probably nearly correct and deduction should not be made from it, and consequently it would be from older ages that the deduction would fall to be made, but from which is not shown.

TABLE A.—*Showing numbers of children whose ages were tested by reference to Birth Registers.*

		Ages as stated in Census Returns.					
		0.	1.	2.	3.	4.	0-4.
Ages as found by reference to Birth Registers.	0	2,626	142	7	3	2	2,780
	1	13	2,304	229	2	0	2,548
	2	2	13	2,176	231	5	2,427
	3	4	8	25	2,051	168	2,256
	4	1	6	7	30	1,926	1,970
	0-4	2,646	2,473	2,444	2,317	2,101	11,981
Not traced in Birth Registers		270	422	523	608	596	2,419
Total traced and untraced		2,916	2,895	2,967	2,925	2,697	14,400

TABLE B.—*Number of children recorded in Census and traced to Birth Registers.*

Stated age.	Recorded in Census.	Traced in Birth Registers.	Not traced in Birth Registers.	Percentage traced.	Percentage untraced.
0-1	2,916	2,646	270	90·7	9·3
1-2	2,895	2,473	422	85·4	14·6
2-3	2,967	2,444	523	82·4	17·6
3-4	2,925	2,317	608	79·2	20·8
4-5	2,697	2,101	596	77·9	22·1
0-5	14,400	11,981	2,419	83·2	16·8

TABLE C.—*Numbers of young children enumerated in England and Wales and in Scotland at the Censuses of 1901 and 1911.*

Age.	England and Wales.		Scotland.		Edinburgh.	Glasgow.
	1901.	1911.	1901.	1911.	1911.	1911.
0-1	796,807	781,728	114,685	108,381	5,804	18,449
1-2	727,795	742,818	104,573	103,218	5,691	17,258
2-3	735,410	789,295	106,112	109,503	5,945	18,113
3-4	730,127	777,351	104,634	107,016	5,809	17,629
4-5	726,569	763,191	103,029	104,627	5,763	16,696
0-5	3,716,708	3,854,383	533,033	532,745	29,012	88,145

TABLE D.—*General Analysis showing true and stated ages of 11,981 children.*

True age in months.	Stated age—Census—in years.				
	0.	1.	2.	3.	4.
0	248	1	—	—	—
1	226	5	1	1	—
2	221	1	3	—	—
3	240	8	—	1	—
4	216	5	2	—	1
5	199	6	1	—	—
6	202	3	—	—	—
7	186	7	—	—	—
8	219	8	—	—	—
9	229	11	—	1	—
10	241	20	—	—	—
11	199	67	—	—	1

TABLE D.—*General Analysis—contd.*

True age in months.	Stated age—Census—in years.				
	0.	1.	2.	3.	4.
12	1	243	1	—	—
13	1	209	2	—	—
14	3	196	4	—	—
15	1	208	4	—	—
16	—	171	1	—	—
17	2	184	6	—	—
18	1	198	8	1	—
19	1	179	15	—	—
20	—	195	20	1	—
21	—	195	28	—	—
22	2	175	51	—	—
23	1	151	89	—	—
24	1	4	211	1	1
25	—	3	164	3	—
26	—	2	178	6	—
27	—	—	218	9	—
28	—	1	177	6	—
29	—	—	161	11	—
30	1	1	172	6	—
31	—	1	172	13	—
32	—	—	182	30	1
33	—	—	185	26	1
34	—	1	191	42	1
35	—	—	165	78	1
36	—	—	4	210	1
37	—	4	2	169	1
38	—	1	2	189	3
39	1	—	6	173	7
40	—	—	2	177	5
41	2	—	—	165	3
42	—	—	3	161	8
43	1	1	—	175	15
44	—	1	1	156	15
45	—	—	1	164	25
46	—	1	2	186	35
47	—	—	2	126	50
48	—	2	—	5	168
49	—	—	1	3	162
50	—	—	1	6	160
51	—	2	1	2	162
52	—	1	—	2	183
53	1	—	—	6	163
54	—	—	1	1	155
55	—	—	—	—	146
56	—	—	2	3	135
57	—	1	—	1	180
58	—	—	—	—	179
59	—	—	1	1	133
	2,646	2,473	2,444	2,317	2,101