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Sibship Size and Mental Illness

By JOHN BIRTCHNELL

Though there have been many investigations concerned with sibling order and mental illness there have been relatively few concerned with sibship size. The abundance of sibling order studies is probably due to the widely accepted belief that in such studies comparison with general population data is not necessary. Expected numbers within each birth rank are estimated by the Greenwood-Yule method, proposed in 1914, by which it is assumed that for any given size of sibship siblings should be evenly distributed among birth ranks. In the present population, in which family size has in recent years been decreasing, this assumption is clearly invalid, for the younger members of the larger families of earlier years are more likely to be included in a contemporary sample, the older members by now having died. Other factors influencing sibling position have been more fully discussed by Price and Hare (1969). Thus comparison with general population figures is necessary in sibling order studies, and a report on such a comparison will be published separately by the author.

The present study is concerned with the relatively neglected topic of sibship size. It is certainly as reasonable to consider size of sibship as an aetiological factor in mental illness as it is to consider sibling position. The experiences of an only child or one raised among few siblings are likely to differ markedly from those of one raised within a large sibship. Material and emotional needs would be more readily met in a small family, but the opportunities for group interaction and the development of mature social attitudes would be greater in a larger one. Furthermore, the personalities and attitudes of parents who choose or who are obliged to restrict the size of their families may differ from those of parents who have large families. Hare and Shaw (1965) have demonstrated too that for mothers, and to a lesser extent for fathers, rates of physical and mental ill-health increase with family size.

The neglect of sibship size studies may well be due to the more obvious need in such studies of suitable general population data for comparison. In the present study such data, obtained from a local population survey, will be included. The aims of the study are to discover (i) whether the sibship size distribution of psychiatric referrals differs from that of the general population and (ii) whether, within the psychiatric sample, the distribution varies among the diagnostic groups. The relationship between decade of birth and sibship size will be examined in both the patient and the control groups. As the age distribution differs from one diagnostic group to another it will be necessary to adjust the expected numbers in each sibship size in accordance with this distribution. The relationship between social class of parent and sibship size will also be examined. The work of Goldberg and Morrison (1963) would suggest that this factor may not vary greatly among diagnostic groups, and it may not therefore be necessary to make adjustment for it in sibship size comparisons.

Method

A psychiatric case-register for the North-Eastern Region of Scotland has been in operation in the Aberdeen Department of Mental Health since January, 1963 (Baldwin, Innes, Millar, Sharp and Dorricott, 1965). A very high proportion of patients referred to the regional psychiatric services are interviewed by trained staff, and social and family data are recorded on standard forms. All referrals are checked against previous records to avoid duplication. Some of the data are coded and stored on magnetic tape files for use on the University computer. All the items used in the present study were included in the stored data.

The psychiatric sample for the present study was derived from a computer search for all cases aged 20

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or over at the time of interview who were referred during the five-year period 1963–67. This comprised 6,795 patients, 2,861 men and 3,934 women. Of these, 4,205 had received some in-patient treatment during the subsequent three month period. The majority of long-stay in-patients have to date not been interviewed and are therefore not included in the sample.

For each patient the diagnosis was taken as the last one available in the record. If the case was closed this was the discharge diagnosis, otherwise it was the latest admission one. Diagnosis was coded according to the International Classification of Diseases, Seventh Revision. Each diagnostic group used in the study included a predetermined set of disease classifications.

The social class of parent was based upon the General Register Office Classification of Occupations, 1960.

The general population sample was obtained by sending a postal questionnaire to a systematic random sample of subjects aged 20 and over from seven general practices in the North-Eastern Region of Scotland. Four of the practices were in the City of Aberdeen, two were from small towns to the north, and one was from a coastal village to the south. Questionnaires were sent to 4,000 subjects, and replies were received from 3,425 of these (85·6 per cent).

All siblings, whether currently living or dead, and whether natural, step, foster or adoptive, have been included. Miscarriages, still-births or siblings living only for a short time have not. As the minimum age for the sample is twenty it is likely that the vast majority of the sibships were complete at the time of survey.

Results

Table I presents the relationship between year of birth and size of sibship of patients. Significantly greater proportions of younger patients are derived from sibships of one, two and three, and significantly greater proportions of older patients are derived from sibships of five or more, the trend becoming more marked as sibship size increases. The expected numbers for each size of sibship were based upon the distribution by year of birth of the total patient group. Thus a marked and highly significant relationship exists between year of birth and sibship size.

Table II presents a similar analysis of the general population sample. It will be seen that the percentages of subjects derived from each size of sibship are strikingly similar to those in the patient group. The relationship between year of birth and sibship size follows the same pattern and is equally significant.

Table III presents the relationship between social class of patient's parents and size of sibship. Significantly greater proportions of patients from higher social classes are derived from sibships of one, two and three, and signifi-

Table I

Sibship size by year of birth (psychiatric patients)

Year of birth	Total born during this period	Size of sibship not known	Number of only children	Number from sibships of two	Number from sibships of three	Number from sibships of four	Number from sibships of five	Number from sibships of six	Number from sibships of seven	Number from sibships of eight or more
1940–49	871	35	94 (11·2%)	188 (22·5%)	193 (23·1%)	140 (16·7%)	74 (8·9%)	61 (7·3%)	32 (3·8%)	54 (6·5%)
1930–39	1,537	70	124 (8·5%)	239 (16·3%)	258 (17·6%)	203 (13·8%)	170 (11·6%)	153 (10·4%)	106 (7·2%)	214 (14·6%)
1920–29	1,614	49	116 (7·4%)	209 (13·4%)	254 (16·2%)	231 (14·8%)	207 (13·2%)	161 (10·3%)	131 (8·4%)	256 (16·4%)
1910–19	1,134	32	66 (6·0%)	118 (10·7%)	164 (14·9%)	135 (12·3%)	158 (14·3%)	119 (10·8%)	92 (8·3%)	250 (22·7%)
Before 1910 ..	1,639	85	62 (4·0%)	118 (7·6%)	151 (9·7%)	204 (13·1%)	207 (13·1%)	197 (12·7%)	169 (10·9%)	446 (28·7%)
Total	6,795	271	462 (7·1%)	872 (13·4%)	1020 (15·6%)	913 (14·0%)	816 (12·5%)	691 (10·6%)	530 (8·1%)	1,220 (18·7%)
$\Sigma\frac{(O-E)^2}{E}$ ..	—	—	47·2978	105·7578	68·9790	8·4326	14·3527	15·1593	35·2212	177·3087
($d.f.^{p} = 4$) ..	—	—	<·001	<·001	<·001	N.S.	<·01	<·01	<·001	<·001

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TABLE II

Sibship size by year of birth (General population sample)

Year of birth	Total born during this period	Sibship size not known	Number of only children	Number from sibships of two	Number from sibships of three	Number from sibships of four	Number from sibships of five	Number from sibships of six	Number from sibships of seven	Number from sibships of eight or more
1940–49	594	4	62 (10·5%)	154 (26·1%)	113 (19·2%)	95 (16·1%)	53 (9·0%)	33 (5·6%)	30 (5·1%)	50 (8·5%)
1930–39 ..	681	2	54 (8·0%)	120 (17·7%)	140 (20·6%)	91 (13·4%)	82 (12·1%)	65 (9·6%)	42 (6·2%)	85 (12·5%)
1920–29	704	1	46 (6·5%)	96 (13·7%)	115 (16·4%)	113 (16·1%)	87 (12·4%)	65 (9·2%)	42 (6·0%)	139 (19·8%)
1910–19 ..	651	3	34 (5·2%)	62 (9·6%)	83 (12·8%)	85 (13·1%)	68 (10·5%)	88 (13·6%)	71 (11·0%)	157 (24·2%)
Before 1910 ..	782	3	33 (4·2%)	49 (6·3%)	74 (9·5%)	86 (11·0%)	69 (8·9%)	103 (13·2%)	93 (11·9%)	272 (34·9%)
Year of birth not known ..	13	0	1	1	2	0	1	1	1	6
Total	3,425	13	230 (6·7%)	482 (14·1%)	527 (15·4%)	470 (13·8%)	360 (10·6%)	355 (10·4%)	279 (8·2%)	709 (20·8%)
$\Sigma\frac{(O-E)^2}{E}$ ..	—	—	24·0977	109·6577	38·2585	9·4969	7·1802	26·7208	33·8693	144·1358
(d.f. $\overset{P}{=}$ 4)	—	—	<·001	<·001	<·001	N.S.	N.S.	<·001	<·001	<·001

TABLE III

Sibship size by social class of parent

Social class of parent	Total with parent in this social class group	Sibship size not known	Number of only children	Number from sibships of two	Number from sibships of three	Number from sibships of four	Number from sibships of five	Number from sibships of six	Number from sibships of seven	Number from sibships of eight or more
I	152	8	16 (11·1%)	33 (22·9%)	43 (29·9%)	29 (20·1%)	10 (6·9%)	3 (2·1%)	2 (1·4%)	8 (5·6%)
II	1,516	57	121 (8·3%)	239 (16·4%)	231 (15·8%)	213 (14·6%)	186 (12·7%)	140 (9·6%)	104 (7·1%)	225 (15·4%)
III	2,188	92	139 (6·6%)	295 (14·1%)	360 (17·2%)	313 (14·9%)	236 (11·3%)	217 (10·4%)	147 (7·0%)	389 (18·6%)
IV..	1,704	54	90 (5·5%)	173 (10·5%)	203 (12·3%)	221 (13·4%)	220 (13·3%)	197 (11·9%)	169 (10·2%)	377 (22·8%)
V	684	16	23 (3·4%)	58 (8·7%)	103 (15·4%)	86 (12·9%)	99 (14·8%)	89 (13·3%)	65 (9·7%)	145 (21·7%)
Not known ..	551	44	73 (14·4%)	74 (14·6%)	80 (15·8%)	51 (10·1%)	65 (12·8%)	45 (8·9%)	43 (8·5%)	76 (15·0%)
Total	6,795	271	462 (7·1%)	872 (13·4%)	1,020 (15·6%)	913 (14·0%)	816 (12·5%)	691 (10·6%)	530 (8·1%)	1,220 (18·7%)
$\Sigma\frac{(O-E)^2}{\quad}$ ..	—	—	24·5007	44·2172	35·0578	5·9885	10·0001	18·4840	24·3154	39·1502
(d.f. $\overset{P}{=}$ 4) ..	—	—	<·001	<·001	<·001	N.S.	<·05	<·001	<·001	<·001

cantly greater proportions of those from lower classes are derived from sibships of six or more. The relationship between social class and sibship size is also therefore marked and highly significant. A similar finding was obtained in the general population group.

Table IV demonstrates the distribution by social class of parent for each diagnostic group. There is remarkable similarity between the diagnostic groups in this respect, and within each social class group the diagnostic distribution does not differ significantly from that in the total patient group.

The distribution by year of birth has also been estimated. As would be expected, there is considerable variation, and within each year of

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TABLE IV

Diagnosis by social class of parent

Social class of parent	Depression	Neurosis other than depressive	Psychosis other than depressive	Alcoholism	Personality disorder	Organic and dementia	Other	Total	$\frac{\Sigma(O-E)^2}{E}$	P (d.f. = 6)
I	52 (2·1%)	26 (3·3%)	21 (3·0%)	9 (1·9%)	23 (3·5%)	9 (2·0%)	12 (1·9%)	152 (2·4%)	9·5618	N.S.
II	620 (24·7%)	166 (20·8%)	185 (26·1%)	122 (25·2%)	149 (22·9%)	121 (26·7%)	153 (23·7%)	1,516 (24·3%)	6·9691	N.S.
III	869 (34·7%)	296 (37·1%)	213 (30·1%)	173 (35·7%)	246 (37·8%)	152 (33·6%)	239 (37·1%)	2,188 (35·0%)	8·6255	N.S.
IV	693 (27·6%)	218 (27·4%)	211 (29·8%)	131 (27·1%)	152 (23·4%)	133 (29·4%)	166 (25·7%)	1,704 (27·3%)	6·6782	N.S.
V	273 (10·9%)	91 (11·4%)	78 (11·0%)	49 (10·1%)	80 (12·3%)	38 (8·4%)	75 (11·6%)	684 (11·0%)	4·5483	N.S.
Not known ..	192	54	63	32	71	60	79	551	—	—
Total	2,699	851	771	516	721	513	724	6,795	—	—

birth group the diagnostic distribution differs very considerably from the expected, based upon the distribution within the total patient group.

It is clear, therefore, that in order to compare diagnostic groups in respect of size of sibship, expected numbers for each size of sibship should be calculated by applying the percentages in Table I to the numbers within each year of birth group, excluding of course patients whose sibship size is not known. As social class of parent does not appear to vary with diagnosis, it is unlikely to have an effect and has not been taken into account.

Table V presents the observed numbers from each size of sibship for each diagnostic group, together with the expected numbers estimated on the basis of the age distribution within each diagnostic group. For each size of sibship the diagnostic distribution does not differ significantly from the expected. There is a suggestion that neurotics tend to originate more from sibships of five or less. Within this diagnostic group the sibship size distribution differs from the expected at the ·05 level of significance. For the remaining diagnostic groups the distribution by sibship size corresponds closely to the expected.

DISCUSSION

In almost all investigations of family size, the mean family size rather than the numbers derived from families of various sizes has been the subject of study—in many cases because of the relatively small size of the sample. This method has its limitations, since certain family sizes, in particular the family of one, may be worthy of special consideration. In studies which adopt this method a correction proposed by Greenwood and Yule in 1914, has usually been made, this takes into account the fact that in a sample of 'marked' individuals, i.e. those possessing a certain characteristic, such as psychiatric illness, there will be an over-representation of larger families. In the present study this correction is not required as all comparisons are made between numbers of individuals.

Gregory (1958), in a reconstruction of the sibships of Malzberg's 549 patients with dementia praecox and 498 patients with manic-depressive psychosis, observed the mean size of sibship to be 3·55 and 4·05 respectively. This difference was not significant. Similar reconstruction of the sibships of Norton's 2,500 predominantly neurotic patients and 500 physically ill controls also showed no significant differences. Wahl (1954) observed that the average family size of 392 schizophrenics was 4·1, ranging from 3·2 for simple schizophrenics to 4·9 for hebephrenics; it was not stated whether these were corrected sizes—if they were not they will, of course, be too high. He quoted an estimated average family size of 2·2 for the whole of the United States for comparison; the estimate included only families who had children. Smart (1963) compared the family size distribution of 242 alcoholics with the reported distribution for Ontario in 1931; he found that sibships of 5 and over were

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over-represented ($p < \cdot 05$). In none of these studies was there any consideration of the age distribution of the patient and control groups. Berg, Fearnley, Paterson, Pollock and Vallance (1967) compared 799 Scottish Approved School boys between the ages of 12 and 16 with 37,587 Scottish boys aged 11 in 1947. The mean family sizes of the two groups were 4·03 and 3·75 respectively. Stein (1960) found no association between family size and the proportion of persons consulting their general practitioners at least once during a year. Hare and Shaw (1965), in a study of the health of 499 families, recorded lower rates of ill-health in the children of larger families. They considered that this may have been due to the fact that information was derived from interviews with the mothers. The amount of attention a mother can devote to any one child and the number of episodes she may recall would diminish with the size of the family.

The only child is difficult to classify: it clearly is a category of family size, but in a number of birth order studies has been included among the first borns. Strong feelings are often expressed about only children, and they are generally believed to be over-protected and over-indulged. Brill (1922) considered 'only children' to be a 'bad disease' and believed that it would be better for the individual and for the race if there were no such children. Adler (1928) maintained that they are inevitably spoilt and in search of support at all times. Wexberg (1930) asserted that only children 'whether as children or as adults constitute a large percentage of a psychiatrist's patients'. There is little objective support for these claims. Vogel and Lauterbach (1963) observed that 15 per cent of 79 psychiatrically disturbed soldiers, compared with 2 per cent of 117 matched controls were only children. Ingham (1949) found no excess of only children in 138 neurotic university students compared with a matched control group. Glueck and Glueck (1950), comparing 500 delinquent boys and an equal number of matched controls, discovered that fewer delinquents were only children.

The present study shows that the distribution of sibship sizes among psychiatric referrals and general population controls is strikingly similar. Though the two groups are not precisely matched for age, in both a similar relationship exists between sibship size distribution and decade of birth; in particular the incidence of only children in the two groups corresponds closely. It is unlikely therefore that proneness to mental illness bears any significant relationship to size of sibship. Within the psychiatric sample, when allowance is made for variation in age distribution, the observed and expected numbers in each size of sibship correspond in all diagnostic groups, with the possible exception of the neurotics. In these, there is a just significant tendency for more to originate from sibships of five or less and less to originate from the large sibships. It is unlikely therefore, that size of sibship is a significant determinant of diagnosis.

In the psychiatric sample a definite relationship is demonstrated between family size and social class of parent. Parents of higher social class tend to have smaller families than those of lower social class. Social class of parent is unknown for 8·1 per cent of patients, but it is unlikely that this would seriously affect this highly significant trend. In fact the same trend is apparent in the general population group. There was no significant diagnostic variation between the social class of parent groups. It was not necessary, therefore, to consider social class of parent in the estimation of expected number of patients in the various sibship sizes.

Summary

1. This study is based on a sample of 6,795 psychiatric referrals to the North-Eastern Region of Scotland and of 3,425 subjects from the general population.

2. In both the psychiatric and the control sample a marked and significant relationship was demonstrated between year of birth and family size.

3. In the psychiatric sample an equally marked and significant relationship was demonstrated between social class of parent and family size.

4. The family size distributions of the psychiatric and control samples were strikingly

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similar, suggesting that there is no relationship between mental illness and family size.

5. When allowance was made for differences in age distribution among diagnostic groups the diagnostic distribution within each family size group did not differ from the expected.

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