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Birth Order and Maternal Age of Psychiatric In-patients

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Introduction

Light may be thrown on the aetiology of human abnormalities by studying the position in birth order occupied by affected individuals and the age of the mother at the time of their birth. There should be no shift from average population values in either of these respects in the case of conditions directly and solely due to an abnormal gene, though there may be such a shift in conditions due to chromosomal abnormalities, such as mongolism (Down's syndrome). If, however, the question of a chromosomal anomaly does not arise, then departure from normality in birth order and maternal age suggest that environmental factors are involved in the causation of the condition.

It has long been realized that inappropriate application of the method may lead to finding a false deviation from the expectation, or may, on the other hand, result in failure to demonstrate the deviation when it is actually present. For example, Pearson (1907), neglecting to take the varying sizes of the families into consideration, concluded that the first born were more likely to be affected by certain diseases, such as tuberculosis, than the later born. Greenwood and Yule (1914) criticized Pearson's conclusion and proposed a method of analysis of birth order by computing an expected frequency distribution of birth rank on the assumption that, within sibships of a given size, every possible birth rank should contain equal numbers of affected individuals.

Penrose (1934) pointed out that the Greenwood-Yule method is not suitable for analysis of data when there are gaps left for siblings of unknown type. Therefore, for obtaining precisely accurate expectation from the original data, he suggested a modified method which is illustrated in the table below.

Case No. 1 shows how gaps are left for unknown individuals, such as miscarriages, etc. In No. 2 the mother had other children by different fathers; the half-sibs are purposely not recorded. Twins occupy the same birth rank (the 6th) in No. 3. The total expectation in No. 4 is two, as there are two affected individuals. Penrose also showed how to distinguish between the aetiological significance of birth order and maternal age.

McKeown and Record (1956) show that when the Greenwood-Yule method is applied to incomplete sibships an apparent over-representation of later born may be introduced. In cases of incomplete sibships, they suggest a modified method in which they consider only those sibs born within the period from which the propositi are selected. However, the results obtained by this modified method are not so good as those obtained by a comparison of the affected individuals with a suitable control population. Though the modified method does not produce an artificial association, it may fail to demonstrate an association which is actually present. They suggest that in studying conditions manifested at or soon after birth, comparison of an affected with a control series

Example Case No.	Order of Birth (Expectation)						
	1st	2nd	3rd	4th	5th	6th	7th
1	0·200	0·200	0·200	0·200	—	0·200	—
2	—	—	—	—	—	—	1·000
3	0·167	—	0·167	0·167	0·167	0·333	—
4	—	—	0·500	0·500	0·500	0·500	—

is the most satisfactory method; that the Greenwood-Yule method can be applied to conditions not manifested until a considerable period after birth, when sibships are complete. McKeown and Record conclude that the analysis of birth order and maternal age may show some profitable lines for further investigation, if clinical and pathological findings are considered together.

Slater (1958) proposes a numerical expression for designating birth order: an individual's ordinal position may conveniently be designated by the figure $(m-1)/(n-1)$, when he comes mth in order in a sibship of n individuals; this expression varies in value between limits of 0 and 1, with the expected mean of 0·5. Applying this method to 389 male homosexuals seen at the out-patient or in-patient departments of the Bethlem Royal and Maudsley Hospitals, Slater (1962) shows how the mean birth order, the variance, and the standard error of the mean can be calculated ($0{\cdot}5823 \pm 0{\cdot}0231$); the expected theoretical variance can also be calculated, as the average theoretical contribution of each single observation to the total variance is $(n+1)/12(n-1)$. He also finds a late mean maternal age of those male homosexuals whose maternal ages are distributed between those of the general population and Down's syndrome according to Penrose (1961). Slater considers that the findings support a hypothesis of heterogeneity in the aetiology of male homosexuality, and suggests that a chromosomal anomaly, such as might be associated with late maternal age, may play a part in causation.

In an ensuing correspondence, Russell Davis (1962) points out that Slater's method of analysis of birth order, though suited to his purpose, is not so well suited for studying an environmental theory of homosexuality. In order to study the psychological aspects of an individual's place in the family, he classifies individuals, excluding only children, as first in birth order, last, second (except those also last), penultimate (except those also second) or middle (the remainder). Using Slater's material on male homosexuals, he shows there is an excess of last-born cases over the expected and a relative deficiency of second or middle ones. He considers the observed pattern may be reasonably explained if closeness of the relationship with the mother is taken as a causative factor in male homosexuals. However, further analysis of the data reveals that the excess of last born is mainly due to cases from larger families, and this cannot be explained by his hypothesis but seems to favour Slater's hypothesis.

The Present Study: Material and Methods

The present paper reports a study of birth order and maternal age of all adult psychiatric patients hospitalized at the Maudsley Hospital, London, for any mental disorder.

During a two year period of 1961–1962, a total of 1,620 patients (759 males and 861 females) were discharged from the Adult Wards of the Hospital. By excluding those readmitted patients who appeared more than once with the same diagnostic code numbers (International Classification of Diseases), or who were classified as non-psychiatric cases other than epilepsy, or whose case notes were not available, there remained a total of 1,435 patients (679 males and 756 females) whose medical records were studied. Birth order was known in 1,298 (604 males and 694 females) and maternal age at the time of the patient's birth was known in 1,082 (501 males and 581 females).

For calculation of birth order, abortions and miscarriages were disregarded because such information was very incomplete, but stillbirths were included. Patients who were one of a pair of twins were allotted as one-half to the birth order of the first-born of the pair, one-half to the birth order of the second born. In the case of half-siblings, only those sibs from the maternal side were considered.

As the present study is based on medical records, Penrose's method for obtaining precise expectations from the original data is not suitable. The Greenwood-Yule method can be applied to the material, since the cases were all from the Adult Wards, where sibships can generally be assumed to be complete. The same principle can also be applied to Slater's method. Theoretically, the results obtained by Greenwood-Yule and Slater's method should be the

same, but it will be interesting to see whether this is really the case in the present material analysed by these two methods: the former, comparing with the theoretical expectation calculated from the material; the latter, comparing with the theoretical expected mean of 0·5. In addition to the above two methods, Russell Davis' test has also been used.

Maternal age has been compared with Penrose's figure (1961), based on the Registrar General's returns for the general population, 1939 births, England and Wales, for which the mean maternal age was 28·5 in 632,408 persons. This is the earliest year for which information is available. From the hospital triennial report, 1961–1963, we may note that approximately 21 per cent of in-patients were born since 1937. The possibility cannot be excluded that the shift of nearly one year in mean maternal age, shown in the material as a whole, may be related to secular changes in maternal age in the general population, about which nothing is known.

Results

Birth Order and Maternal Age

(a) Division by sex: Tables I and II show the distribution of birth order of 604 males and 694 females respectively. The results calculated according to the Greenwood-Yule and Slater methods are shown in Tables III and IV respectively.

It is noted that there is no deviation from the expected frequency distribution of birth rank calculated by Greenwood-Yule reconstruction of sibships or from the theoretical expected mean birth order of 0·5, and that p values of deviation are practically the same in both methods. Although males tend to be later-born than females, there is no significant difference between their mean birth orders (p, between ·3 and ·2).

Table V shows mean maternal age which, in both sexes, is significantly older than that of the general population and there is no difference between males and females.

(b) Division by diagnosis: all diagnostic code numbers given at discharge to each patient were taken into account; therefore some cases have been counted more than once. Here, only Slater's method was used, since not only were the results obtained by the Greenwood-Yule and Slater methods practically the same, but also a deviation of the mean birth order from either side of the expected mean could be seen by inspection. Calculations have not been made where the number of males or females in a diagnostic class was less than 20.

Table I

Birth Order of 604 Males

Sibship Size	Place in Sibship													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	57													
2	74½	64½												
3	31½	43½	31											
4	8½	27½	26	27										
5	11	15	13	15	18									
6	7	4	10	11½	5½	8								
7	7	5	1½	5½	—	9½	4½							
8	2	1	5	3	5	5	3	5						
9	2	1	—	1	—	1	3	2	1					
10	2	1	—	1	—	—	—	1	—	—				
11	1	—	—	2	2	1	1	1	1	—	—			
12	1	—	—	1	—	1	—	1	—	—	—	—		
13	—	—	—	—	—	—	1	—	—	—	—	—	—	
14	—	2	—	—	—	—	—	—	—	—	—	—	—	1

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TABLE II

Birth Order of 694 Females

Sibship Size	Place in Sibship															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17
1	65															
2	91	68														
3	42	44	31													
4	22	32	31½	26½												
5	11	10	13½	16½	16											
6	7	9	15	9	8	5										
7	5	3	5	4	5	3	7									
8	8	1	1	2½	6½	6	5	4								
9	—	—	3	3	1	1	5	1	1							
10	2	1	1	1	1	2	2	2	2½	3½						
11	1	—	—	1	1	—	1	1	1	—	1					
12	—	—	—	—	—	1	—	—	1	1	—	1				
13	1	—	1	1	—	—	—	1	—	—	—	2	1			
14	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
16	1	—	—	—	—	—	—	—	—	—	1	—	—	1	—	
17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—

TABLE III

Comparison of the Observed and Expected Distribution of Birth Rank by the Greenwood-Yule Method

	N	Mean Family Size	S(O−E)²/E	p
Male	604	2·8	9·96 (8 d.f.)	·3−·2
Female	694	2·8	10·59 (9 d.f.)	·4−·3
Total	1298	2·8	4·92 (9 d.f.)	·9−·8

TABLE IV

Mean Birth Order and Standard Error Calculated from Theoretical Variance by Slater's Method (from Sibships of 2 or more)

	N	Mean Family Size	Mean Birth Order ± S.E.	p (Deviation from 0·50)
Male	547	4·3	0·5166 ± 0·0173	·4−·3
Female	629	4·2	0·4908 ± 0·0161	·3−·2
Total	1176	4·3	0·5028 ± 0·0118	·9−·8

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TABLE V

Mean Maternal Age

	N	Mean ± S.E.	p (Deviation from 28·5)	p (Difference between the sexes)
Male	501	29·5 ± 0·29	<·001	·4—·3
Female	581	29·2 ± 0·25	·010—·005	
Total	1082	29·3 ± 0·19	less than ·001	

It is noted from Table VI that there is no deviation from the expected mean birth order of 0·5 in any diagnostic group. Although males tend to be later born than females in schizophrenia, affective disorders and neurotic depressive reaction, there is no statistically significant difference between the sexes. It is noteworthy that male alcoholics tend to be later born and the deviation of their mean birth order nearly reaches a significant level (t= 1·9938, 50 d.f., p between ·10 and ·05) and that their maternal age is significantly older than in the general population.

Other diagnostic groups where the mean maternal age is significantly older are male epilepsy, male pathological personality and female affective disorders. On the whole the mean maternal age tends to be older in each diagnostic group except in immature personality, male psychoneurotic disorders (others) and female organic psychosis, which however do not reach a statistically significant level.

Place in Sibship

(a) Division by sex: Table VII shows observed and expected frequency distributions of place in sibships of males and females, calculated according to Russell Davis' test. Although there are fewer firstborn males and last-born females than expected, the deviations do not reach a statistically significant level. The findings are in the same direction as those calculated by Slater's method.

(b) Division by diagnosis: significant deviation from expectation is only found in male alcoholism and in female immature personality. It is noted from Tables VIII and IX that there are fewer first and second born male alcoholics; whereas in female immature personality fewer last and penultimate born are observed than expected. These findings are in accord with those calculated by Slater's method, although the latter did not reach a statistically significant level as shown in Table VI.

Only Children

Since only children are excluded from the calculation of mean birth order and place in sibship, they are considered separately here. Calculations have not been made where the observed number of only children in males or females was under 5. Table X shows that there is no significant difference between males and females according to any diagnosis. The sexes may therefore be combined as in Table XI. It is interesting to find that there are comparatively more only children in the group of reactive depression, immature personality and pathological personality than in the group of affective disorders and schizophrenia. The difference reaches a statistically significant level.

DISCUSSION

The present study fails to demonstrate any significant birth order effect except in male alcoholism and female immature personality.

An over-representation of later-born subjects among alcoholics has also been reported by Deshaies (1951), Martensen-Larsen (1957), Navratil (1959) and Schachter (1959). On the basis of his finding that the later-born do not particularly wish to be with others in an anxiety-provoking experimental condition, Schachter suggests that the later-born can be expected to be over-represented among alcoholics, who seek to handle problems by drinking rather than by social means of affiliation with others; he finds supporting evidence for his hypothesis by

TABLE VI

Birth Order and Maternal Age by Diagnosis

Diagnosis	f.s.	n_b	b ± S.E.	p_b	n_a	a ± S.E.	p_a
Schizophrenia (300)							
Male ..	4·5	98	0·5307 ± 0·0396	·5—·4	85	29·5 ± 0·7	·2—·1
Female ..	4·3	108	0·4748 ± 0·0379	·4—·3	100	29·0 ± 0·6	·5—·4
Affective Disorders (301 and 302)							
M ..	4·0	119	0·5172 ± 0·0374	·7—·6	97	28·8 ± 0·6	·7—·6
F	4·4	221	0·4916 ± 0·0270	·8—·7	187	29·3 ± 0·4	·05—·025
Neurotic Depressive Reaction (314)							
M ..	4·0	88	0·5430 ± 0·0439	·4—·3	91	29·6 ± 0·8	·2—·1
F	4·1	120	0·4460 ± 0·0438	·3—·2	125	28·7 ± 0·5	·7—·6
Hysteria (311)							
M ..	—	9	—	—	6	—	—
F	4·2	34	0·5430 ± 0·0737	·6—·5	37	29·6 ± 1·2	·4—·3
Obsessive-compulsive Reaction (313)							
M ..	—	14	—	—	20	29·8 ± 1·1	·3—·2
F	4·1	23	0·5411 ± 0·0859	·7—·6	21	32·0 ± 2·0	·1—·05
Other Psychoneurotic Disorders (310, 312 and 315–318)							
M ..	3·7	40	0·4375 ± 0·0674	·4—·3	39	26·8 ± 1·6	·3—·2
F	4·1	61	0·4917 ± 0·0534	·9—·8	57	29·2 ± 0·7	·4—·3
Pathological Personality (320 except 320·6)							
M ..	3·8	80	0·4682 ± 0·0468	·5—·4	83	30·4 ± 0·7	·01—·005
F.. ..	4·1	86	0·5360 ± 0·0436	·5—·4	80	29·2 ± 0·6	·3—·2
Immature Personality (321)							
M ..	3·7	41	0·4745 ± 0·0654	·8—·7	39	28·3 ± 1·0	·9—·8
F	3·6	53	0·4283 ± 0·0572	·6—·5	58	26·7 ± 1·3	·2—·1
Alcoholism (322)							
M ..	4·3	51	0·6091 ± 0·0547	·1—·05	52	30·7 ± 1·0	·05—·025
F.. ..	—	16	—	—	12	—	—
Organic Psychoses (304–308, 025 and 688·1)							
M ..	4·8	24	0·5486 ± 0·0822	·3—·2	15	—	—
F	4·3	20	0·5950 ± 0·0877	·3—·2	21	27·6 ± 1·5	·6—·5
Epilepsy (353)							
M ..	4·0	63	0·5486 ± 0·0524	·4—·3	59	30·7 ± 0·8	·01—·005
F	3·3	38	0·5950 ± 0·0706	·4—·3	41	30·0 ± 1·1	·5—·4

f.s.=mean family size; n_b=number where birth order is known;
b ± S.E.=mean birth order and standard error calculated from theoretical variance;
p_b=p value of deviation from the expected mean birth order of 0·50;
n_a=number where maternal age is known; a ± S.E.=mean maternal age and standard error;
p_a=p value of deviation from the mean maternal age of 28·5 from general population.

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TABLE VII

Place in Sibship (by Russell Davis' Test)

	Place	Obs.	Exp.	(O−E)	(O−E)²/E	p(4 d.f.)
Male	First	147·50	160·6542	−13·1542	1·08	
	Second.. ..	98·00	91·1542	+ 6·8458	0·51	
	Middle ..	80·50	78·7162	+ 1·7838	0·04	
	Penultimate ..	61·00	58·8209	+ 5·1791	0·48	
	Last	160·00	160·6542	− 0·6542	0·0003	
	Total	547·00	546·9997	+ 0·0003	2·11	·8—·7
Female	First	191·00	182·7759	+ 8·2241	0·37	
	Second.. ..	100·00	103·2759	− 3·2759	0·10	
	Middle ..	102·50	95·8962	+ 6·6038	0·68	
	Penultimate ..	70·50	64·2759	+ 6·2241	0·60	
	Last	165·00	182·7759	− 17·7759	1·73	
	Total	629·00	628·9998	+ 0·0002	3·48	·5—·4

TABLE VIII

Place in Sibship of Male Alcoholism

Place	Obs.	Exp.	(O−E)	(O−E)²/E	p
First	7·00	13·3922	−6·3922	3·05	
Second	7·00	9·3922	−2·3922	0·61	
Middle	8·00	7·7255	+0·2745	0·001	
Penultimate	13·50	7·0982	+6·4018	5·77	
Last	15·50	13·3922	+2·1078	0·33	
Total	51·00	51·0003	−0·0003	9·76 (4 d.f.)	·05—·025
First and Second ..	14·00	22·7874	−8·7844	3·39	
Remainder	37·00	28·2159	+8·7841	2·73	
Total	51·00	51·0003	−0·0003	6·12 (1 d.f.)	·025—·010

TABLE IX

Place in Sibship of Female Immature Personality

Place	Obs.	Exp.	(O–E)	(O–E)²/E	p
First	19·50	16·9730	+2·5270	0·38	
Second	12·00	8·4730	+3·5270	1·47	
Middle	8·00	6·1079	+1·8921	0·59	
Penultimate	3·50	4·4730	−0·9730	0·21	
Last	10·00	16·9730	−6·9730	2·86	
Total	53·00	52·9999	+0·0001	5·51 (4 d.f.)	·3—·2
Remainder	39·50	31·5539	+7·9461	2·00	
Penultimate and Last ..	13·50	21·4460	−7·9460	2·94	
Total	53·00	52·9999	+0·0001	4·94 (1 d.f.)	·05—·025

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TABLE X

Only Children by Diagnosis and Sex

Diagnosis	Sex	Total Cases (100%)	Only Children (%)	X^2 (1 d.f.)	p
Schizophrenic Disorder	M	107	9 (8·4)	0·38	·6—·5
	F	121	13 (10·7)		
Affective Disorder	M	131	12 (10·1)	2·19	·2—·1
	F	233	12 (5·2)		
Reactive Depression	M	97	9 (9·3)	1·34	·3—·2
	F	140	20 (14·3)		
Pathological Personality	M	90	10 (11·1)	0·02	·9—·8
	F	96	10 (10·4)		
Immature Personality	M	47	6 (12·8)	0·003	·98—·95
	F	61	8 (13·1)		
Total	M	472	46 (9·7)		
	F	651	63 (9·7)		

TABLE XI

Only Children by Diagnosis

Diagnosis	Total Cases	Only Children Obs.	Exp.	(O–E)	$(O–E)^2/E$	p
Schizophrenic Disorder	228	22	22·13	− 0·13	0·0008	
Affective Disorder	364	24	35·33	−11·33	3·63	
Reactive Depression	237	29	23·00	+ 6·00	1·57	
Pathological Personality	186	20	18·05	+ 1·95	0·21	
Immature Personality	108	14	10·48	+ 3·52	1·18	
Total	1123	109	108·99	+ 0·01	6·59 (4 d.f.)	·2—·1
Schizophrenic and Affective Disorders	592	46	57·46	−11·46	2·29	
Remainder	531	63	51·53	+11·47	2·55	
Total	1123	109	108·99	+ 0·01	4·84 (1 d.f.)	·05—·025

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reanalysing 1,493 alcoholics reported by Bakan (1949). However, Smart (1963) reports that the later-born are not over-represented in the sample of his clearly-defined 242 alcoholics, who exhibited symptoms of alcoholism such as "loss of control of drinking or withdrawal states when drinking was terminated". He points out that the earlier authors did not specify the extent to which their alcoholics fitted the usual definition of alcoholism and that they did not correct birth order data in terms of sibship size. The 51 male alcoholics studied in the present material were the subjects who had ever been diagnosed as suffering from "322, Alcoholism" according to the International Classification of Diseases. It will be worth while to investigate further on a much bigger sample in both sexes.

There were comparatively more earlier-born in female immature personality (321, ICD), which included emotional instability, passive dependency and aggressiveness. Thurstone *et al.* (1931), Sears *et al.* (1957) and Greenberg *et al.* (1963) report a similar finding that first born are more frequently problem children, aggressive and emotionally unstable, than their sibs. Schachter (1959) also claims that first-born are subjected to more inconsistent care than are later-born and consequently show more dependency behaviour in the form of affiliative responses; he finds support for his hypothesis from studies reported by Rosnow and Whyte (1931), Sletto (1934) and Sears (1950). On the other hand, in a similar study, Baker *et al.* (1929) and Levy (1931) find no evidence of such a relationship. For further study along this line, it seems desirable to define more clearly this quite heterogeneous group of "immature personality".

As to the distribution of only children according to diagnosis, a tendency similar to that of the present study has also been reported by Vogel and Lauterbach (1963). They show that only children are very much more frequent among psychiatrically disturbed soldiers (12/79 =15 per cent.) than among normal controls (2/117=2 per cent.). From the observed distribution of those 12 only children according to diagnosis, an expected distribution can be calculated as in the table below.

Although the distribution is not statistically significant and the number of only children is very small, there are comparatively more only children in the group of character and behaviour disorders, but fewer among schizophrenics. This tendency is in the same direction as those shown in Table XI, where the only children are comparatively abundant not only in immature and pathological personality but also in reactive depression. It is interesting to note that only children are remarkably fewer in endogenous affective disorder; whereas there are more of them in reactive depression. If only children are supposed to be subjected to more 'stresses", as claimed by Vogel and Lauterbach (1963), the above findings may be explained on the ground that environmental aetiological factors contribute much more to neurosis and personality disorder than to endogenous psychosis. However, from an analysis of family data on 1,000 patients admitted to a Canadian mental hospital, Gregory (1959) reports that only children are unduly frequent among patients with manic-depressive psychosis as well as psychoneurosis and pathological personality. Unless further careful control studies can be done to exclude possible artefacts, any attempt to come to a conclusion on the data of the distribution of only children according to diagnosis would be premature. The findings, in the case of manic-depressive illness, might possibly be accounted for by the relatively late age of onset of this illness; a higher proportion

Diagnosis	Total Cases	Only Obs.	Children Exp.	(O–E)	$(O-E)^2/E$	P (2 d.f.)
Schizophrenia	24	1	3·65	−2·65	1·92	
Neurosis	19	2	2·88	−0·88	0·19	
Character and Behaviour Disorder..	36	9	5·47	+3·53	2·87	
Total	79	12	12·00	0·00	4·98	·10—·05

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of the patients so diagnosed may have been born at a time when families were larger, and only children less frequent, than they have come to be in more recent years.

As in the present study, the older mean maternal age of psychiatric patients has also been reported by Gregory (1958). He has analysed the data given by Norton (1952), in which the mean maternal age of 500 neurotic and personality disordered patients attending the psychiatric department of the London Hospital was compared with 500 physically ill patients selected from the hospital's general in-patients matched for sex, age and social class. The results showed that the mean maternal age (31·14) of the psychiatric patients was significantly older (1·04±0·40) than that (30·10) of the controls. Interpretation of such findings depends on how well the subjects and controls are comparable, particularly when the mean maternal age is taken from the general population, as in the present study. Barry (1945) points out that the distribution of maternal ages in the general population varies with time and place; his study covered the incidence of advanced maternal ages of 1,000 State hospital patients, and the maternal age of 584 schizophrenics was found to be older than that of the controls from the general population. For further analysis of data on maternal age, it is desirable to compare the observed distribution according to the year of birth of each subject with the expected distribution derived from the data given, for England and Wales, in the Registrar-General's Reports. In a study of maternal ages of Down's syndrome, Chitham and MacIver (1965) show how a precise comparison can be done by utilizing the expected data from the Registrar-General's Reports, in which there has been a gradual lowering of the mean maternal ages since 1939, when such expected data were first available.

For future study, it will be interesting to see whether the theoretical expected mean birth order of 0·5 in Slater's method applies to the general population, in both sexes equally. Although the difference between the sexes in mean birth order was not statistically significant, it was seen in the present material taken as a whole, irrespective of diagnosis, males tending to come later in birth order than females. Granville-Grossman's finding (1966) of a significant sex difference in this direction in Bethlem-Maudsley schizophrenics may not therefore be specific for this diagnosis. It would be desirable to study a much bigger psychiatric sample, and also a large control group from the general population. It is clear that the analysis of birth order and maternal age may suggest some profitable lines for further investigation.

Summary

Deviations from expectation in respect of maternal age at birth and place in sibship may suggest aetiological considerations worth further investigation. The methods used for the analysis of birth order and maternal age effects have been reviewed.

The medical records of 1,435 (679 male, 756 female) adult psychiatric in-patients at the Maudsley Hospital, 1961–1962, have been studied using the Greenwood-Yule, Slater and Russell Davis methods. The study shows that: (1) there is no significant birth order effect in any diagnostic group except in male alcoholism, which tends to appear late, and in female immature personality, which tends to appear early in the birth order; (2) the mean maternal age is significantly older than that of the general population (1939 births); (3) only children are comparatively more frequent in reactive depression and immature and pathological personality than in the endogenous psychoses.

The importance of the proper application of the methods is emphasized, and some lines for further investigation are suggested.

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