FEEDING IN INFANCY AND SUBSEQUENT PSYCHOLOGICAL DIFFICULTIES.

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IN many theories concerning the development of psychological illness, stress has been laid upon the difficulties encountered during the earliest period of life. The problems of feeding in infancy and early childhood have, in particular, been believed to colour if not actually to determine certain neurotic and psychotic behaviour.

These are theories which are derived chiefly from the subjective evaluation of individual case-material. Their conclusions should, however, be susceptible to more objective methods of study. Such methods are urgently needed in the future development of psychiatry.

The purpose of this investigation has been to study the relationship, if any, which exists between feeding difficulties experienced in infancy and the subsequent development of the child when he has attained school age, as measured by his achievement, behaviour and psychological status. The group of children studied did not belong to a psychiatrically selected class, and it was hoped that the analysis of such a group would, in addition, throw some light upon the occurrence and relative frequency of psychological difficulties in the childhood period of a presumably normal section of the population.

Many of the studies which have been concerned with the problem of the relationship between feeding in infancy and subsequent psychological development, such as those of Childers and Hamil, and J. Hill, have suffered from at least two drawbacks. In the first place, the data concerning the period of infancy have usually been obtained by a method of retrospection, and not from observations or records made at the time. In the second place, the individuals studied have been a psychiatrically selected group, so that even if retrospective falsification can be eliminated, the significance of the observations is difficult

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to assess. Before evaluating the significance of the presence of a particular difficulty in a psychiatrically selected class of individuals, it is essential to know whether this difficulty is shared also by many normal individuals. One needs a standard of normality upon which to project the findings in the abnormal or specially selected group.

The possibility of utilizing clinical data available in the records of a child welfare centre, supplemented by information obtained from a follow-up visit to the home of the child when he had attained school age, suggested itself as a useful approach to the problem. Both the objections which have been mentioned would be avoided ; the data on feeding and infancy would be information recorded by the physician at the time, and not culled from the memory of the parent ; and the group available for study would not be a psychiatrically selected one.

The co-operation of the Salomons Centre of Guy's Hospital was obtained for this project. This is an infant welfare centre, offering pre- and post-natal care and advice to the offspring of mothers living in the districts around the hospital. The area is the centre of considerable industrial activity, and contains an essentially stable protestant and catholic working-class population. The occupations of the men run the gamut from the small shopkeeper, policeman and publican to the casual dock labourer and street pedlar. Although the standard of living is neither high nor uniform, the inhabitants are, in general, honest, straightforward, self-respecting folk. Considerable slum-clearance schemes have been and are being carried out in the district.

Infants from this environment are seen in the Salomons Centre from birth to the age of five years. The Centre is an out-patient clinic. Specialized medical care, when such is needed by the child, is obtained by referral to the appropriate department of the general hospital. Two and sometimes three physicians are in attendance at the Centre, and the new cases, as they appear, are divided between them. Once a particular physician has seen a new case, he follows that case until the mother no longer brings the child to the clinic, or until the child attains the age of five years and is no longer eligible to attend.

For the sake of consistency, it was decided to consider only those cases seen by one physician who was working in the Centre during the whole period of the study. The clinical histories vary considerably both in respect to the age at which the child was first seen and the total number of times the child attended the clinic. Some standards of selection in these two respects had to be adopted, and it was further decided to consider only those histories which fulfilled the following three criteria :

(1) The infant was seen by the physician before the age of six months.

(2) The infant was seen by the physician for a period of at least six months.

(3) The infant was seen by the physician at least five times.

Of the 373 consecutive clinical records of new infants seen by one physician

during the time-period April 15, 1928, until June 30, 1932, 223 records fulfilled the above three requirements and were abstracted on a uniform schedule. Care was taken to keep this abstracting consistent and to avoid progressive changes in method.

Starting in the summer of 1937, by which time all of the children in the original group of 223 had attained the age of five years or more, an attempt was made to trace these children to their homes, to interview the parent or guardian, and to obtain information on the present status of the child. To avoid any subjective correlation between the data obtained from the welfare centre and the information gained at the time of follow-up, only the name, address, birth date, birth order and the date of the first and last visit to the Welfare Centre was known to the visitor at the time of the follow-up visit. Because of slum-clearance schemes and the other obvious difficulties of tracing families after a lapse of time varying from months to years, it was possible to trace only half of the children of the original group. Eleven families were known to have moved either completely away from or to widely scattered localities on the outskirts of Greater London. Because of the factors of time and distance no effort was made to trace these 11 families to their new abode. Except for these 11, however, every possible effort was made to locate the families, many of whom were finally found living in new building estates both in the environs of Guy's Hospital and in more remote districts.

The results of the follow-up were:

Children successfully traced	111
Children whose whereabouts were undiscoverable	90
Children known to have moved too far away to trace	11
Children known (either from clinic record or follow-up visit) to have died	11
Total in original group	223

The details of the follow-up visit will be discussed at a later stage, when the data on the children at school age are presented. Two of the 111 children who were successfully traced were suffering from a partial cleft palate, and because of this specialized handicap, they were excluded from the study. The study, then, is concerned with the 109 children contacted originally as infants attending the Salomons Centre, and subsequently traced to their homes when they had reached school age.

The question of which factor or factors are to be considered in the feeding history of these infants calls for discussion. Theoretically, in the feeding of an infant at least three main groups of factors are concerned, variations in any or all of which might be studied. There is the availability, supply and quality of the milk offered the infant, the suckling or actual intake of the milk by the infant, and lastly the digestion and assimilation of the milk by the infant.

Ideally, therefore, there are a number of differential headings under which one would like to subdivide the children. For example, there are those cases in which there is a disturbance of the source of supply due to an inadequate milk-supply from the breast, cracked nipples, illness or unwillingness on the part of the mother, etc. Then there are those cases in which there is a disturbance of suckling on the part of the child which might arise for a variety of reasons. One might further differentiate breast-fed children who encountered such suckling difficulties from bottle-fed children with comparable difficulties. Children with digestive disturbances would afford another sub-group and so on. Such theoretical groupings, however, can seldom be achieved in practice, for the groups shade off into one another, and the child with inadequate suckling may have to contend with a breast in which the milk-flow is not fully established.

It is therefore necessary to adopt some simpler grouping, and to decide upon criteria of feeding difficulties which shall be as objective and as practical as possible. In some studies, such as the two already mentioned and that of G. H. J. Pearson, the age at weaning from the breast has been used as a criterion of the type of feeding and as a measure of the difficulties encountered during feeding. This criterion is open to criticism. The fact that breast-feeding is abandoned at a given age does not necessarily imply that the infant was entirely and uneventfully breast-fed up to that age. Moreover, when artificial feeding is resorted to, one needs to know something of the psychological background in which this occurs. It is obvious that the nature and composition of the milk is only one of many factors which have to be considered. Successful breast-feeding implies that both mother and infant are able and willing to carry out the normal physiological routine. Among some people and in some communities a departure from this routine implies a considerable deviation from the normal, and signifies that a struggle to achieve breast-feeding has broken down in the face of difficulties. Among others, however, breast-feeding may be readily abandoned or never attempted because artificial feeding has become the accepted standard of normality. When such variations as these are considered, the age at which the last breast-feed was abandoned seems an inadequate measure of the type of feeding and of the feeding difficulties experienced by an infant.

In the Salomons Centre, breast-feeding is one of the ends towards which both the medical and nursing staff of the clinic strive, and it is the accepted standard of normality among the mothers. When a mother who is attending the clinic does not entirely breast-feed her child, the situation represents a feeding difficulty, a failure on the part of either the mother or the child. Thus in the Salomons Centre Group a division between those children who were entirely breast-fed and those who had more or less artificial feeding represents a rough criterion of the presence or absence of feeding difficulties. It is not contended that all those who were completely breast-fed had no feeding

difficulties whatever. These were, however, the children in whom feeding difficulties were not so serious as to cause the mother to introduce artificial feeding. Similarly, it is not contended that the children with artificial feeding all presented major feeding difficulties. But this was the group in which, for some reason or another, an artificial element had to be introduced, and their feeding on these grounds alone could be called abnormal. The criterion is not the only, nor is it necessarily the best one that could be adopted as a measure of feeding difficulty. But it is simple and objective, and its significance is enhanced by the nature of the group in which it had been adopted.

A detailed analysis of the reasons for artificial feeding will be given later in this paper; meanwhile one may state, by way of definition, the following: The children who were entirely breast-fed during infancy were here regarded as the group without feeding difficulties; the children who received more or less artificial feeding in infancy as the group with feeding difficulties. The term "infancy" has been used throughout to denote the period from birth to the introduction of solid foods into the diet.

The breast-fed group, or the 62 infants without feeding difficulties, is a satisfactory and homogeneous one from many points of view. None of the possibly disturbing factors, such as failure of breast-milk, disorders of the nipples, difficulties in suckling on the part of the infant, illness of the mother or the infant, were sufficiently acute to interrupt the routine of breast-feeding. The artificially-fed group, or the 47 infants with feeding difficulties, on the other hand, is not such a homogeneous one. As will be seen from Table I, it includes infants who received artificial feeding to diverse extents and at different ages in the infancy period. It is a pertinent reflection of the efforts of the Salomons Centre towards breast-feeding that only two of the entire total of 109 infants were completely bottle-fed.

TABLE I.—*Group "B": Artificially-fed Infants. Type of Artificial Feeding, Frequency and Average Age at which Artificial Feeding was First Introduced in Infancy.*

Type of artificial feeding.	Number of infants.	Average age in weeks when first introduced.
Entirely bottle-fed	2	0
Breast-fed, becoming bottle-fed	8	14·1
Breast-fed, becoming supplementary-fed, becoming bottle-fed	9	7·3
Breast-fed, with regular supplementary feeding	22	18·2
Breast-fed, with interval of supplementary feeding	5	9·8
Bottle-fed, becoming breast-fed	1	0
Total	47	13·0

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TABLE II.—*Group "B": Artificially-fed Infants. Factors Necessitating Introduction of Artificial Feeding in Infancy.*

Factors necessitating artificial feeding.	Frequency.
Insufficient milk in breast	25
Diseases of breast or nipples	6
Other illness of mother	3
Mismanagement	8
Mother working	2
All others	3
Total	47

In Table II is given, for the infants with feeding difficulties, the apparent factors operating to necessitate the introduction of artificial feeding. "Insufficient milk in breast" includes only those cases in which there was an inadequate supply of breast-milk unaccompanied by any illness or other discernible difficulty on the mother's part. This is by far the largest group, and it includes more than half the total cases. In 11 instances the inadequacy of the breast-milk was present in conjunction with difficulties of suckling on the part of the infant. "Diseases of the breast or nipples" includes 3 cases in which the nipples were cracked or depressed, 1 case of mastitis with cracked nipples as well, 1 case of cracked nipples accompanied by influenza in the mother, and finally 1 case of "depressed nipples and no lactation at all". "Other illnesses of the mother" includes 1 case of bronchitis, 1 of tonsillitis in which the breast-milk was lost in three days, and 1 case in which the mother, shortly after the birth of the child, attempted suicide by drinking lysol. "Mismanagement" includes only those cases in which, under the existing circumstances, breast-feeding could have been continued except for the wilful and unadvised introduction of artificial food by the mother. This group includes 4 cases in which the mother surreptitiously weaned the infant from the breast to the bottle, 3 cases of unadvised and unnecessary supplementary feeding, and 1 case in which the mother flatly refused to carry on breast-feeding. "Mother working" includes 2 cases, 1 of which was that of an illegitimate child. Lastly, "all others" includes 3 miscellaneous cases: 1 a premature infant bottle-fed for nine weeks before breast-feeding was established; 1 of an infant described as "suffering from nervous unrest . . . went clean off the breast"; and finally, 1 case in which the infant had difficulties of suckling, but in which no other explanation was recorded for the introduction of artificial feeding.

In the 62 cases of infants without feeding difficulties, there were two instances of diminished milk-supply, 1 associated with short nipples, and poor suckling on the part of the infant, and 1 associated with an illness of the influenzal type on the part of the mother. There were also 4 instances of "diseases of

the breast or nipples", 3 or which consisted of depressed nipples and 1 of mastitis in one breast. In none of these cases, however, was it necessary or advisable in the eyes of the physician to resort to artificial feeding.

As was stated, the artificially fed group is not as homogeneous as one might ideally desire, either from the point of view of the amount of artificial feeding received in infancy, or the age at which such feeding was first instituted. However, the group as a whole does represent the failures, the cases in which, either because of unwillingness, inability or defect on the part of the mother, the child, or both, complete breast-feeding could not be maintained.

With the presence or absence of artificial feeding as a criterion or index of feeding difficulties in infancy, the children with feeding difficulties and those without feeding difficulties were compared and contrasted from the point of view of their behaviour, psychological difficulties and school achievement at elementary school age. Before this was done, however, a comparison between the two groups at infancy was made to discover what pertinent factors other than feeding difficulties were similar and what dissimilar.

The two groups of infants had several common characteristics. The sex distribution was very similar. 55% of the total 109 infants were males. In Group A, infants without feeding difficulties, the males constituted 56% of the total, and in Group B, infants with feeding difficulties, 53%. Since the proportion of males was approximately the same in the two groups, and since the total frequencies were not large, variations in relation to sex in subsequent analyses were not considered. The proportion of instrumental as contrasted with non-instrumental births in the two groups was identical: 19% of the total births in each group were instrumental. The average age of the mother at the birth of the child was substantially the same for the two groups. For Group A it was 29·3 years, for Group B 28·2 years. The age span covered by the mothers was from 18 to 40 years. The age at which the infant was first seen in the clinic was also very comparable for the two groups, being 4·9 weeks for Group A, 5·1 weeks for Group B, and 5·0 weeks for the total 109 infants. It is important to recall in this respect that only infants seen for the first time when they were under the age of 6 months were included.

There is one other point of similarity which should be mentioned. "Infancy" in this paper was used to cover the period from birth to weaning, that is, the introduction of solid food into the diet. When weaning from the breast was considered, it was specifically termed "breast-weaning". The average age at which solid food was introduced, or the upper limit of the infancy period, was practically identical for the two groups, being 30·7 weeks for Group A and 31·1 weeks for Group B. For the total it was 30·9 weeks.

In contrast with these similarities, the groups had several characteristics which were not so comparable. Although the frequencies are small, there was a discrepancy in the proportion of premature births in the two groups. Only 1 of the 62 infants in Group A was premature, while 5 of the 47 in Group B

were born before term. Premature infants often present specialized problems of feeding, and this undoubtedly accounted for the higher proportion which was found in the artificially-fed group.

The birth order of the infants in the two groups also showed a considerable disparity. 36% of the infants in Group A were first born as contrasted with 60% in Group B. The proportion of first-born infants in the total of both groups was 46%. The disproportion of first-born infants between the two groups is statistically significant, the value of $\frac{\text{difference}}{\sigma\,\text{difference}}$ being 2·5. It is very unlikely that the observed difference reflects only random sampling variation. As a further check on this, the proportion of first-born children in two similar groups of infants, that is in a breast-fed and an artificially fed group, was determined for the 101 infants whose histories were abstracted, but who were excluded from the study because they could not be traced. 29% of the 52 breast-fed infants and 65% of the 49 artificially-fed infants were firstborn. The proportion in the total 101 infants was 47%. These figures corroborate the conclusion that there is a significant association between the birth order of the child and the presence of artificial feeding.

A possible explanation of this association may be that a mother, in rearing her first baby, is constantly faced with new situations and problems, in the handling of which she has had little previous experience. The fact that artificial feeding was resorted to relatively more frequently in the case of the firstborn, as contrasted with the not firstborn, may reflect a difficulty on the part of the mother in successfully carrying out breast-feeding for the first time.

Another point of difference between the two groups of infants was the average number of times they attended the clinic under the age of one year. Group A attended on the average 12·4 times; Group B 17·5 times. The corresponding average for the total of both groups was 14·6 visits. The difference between Group A and Group B in this respect is statistically significant, the value of $\frac{\text{difference}}{\sigma\,\text{difference}}$ being 3·9. Again, it is very unlikely that the observed differences represent only sampling variation. The attendance figures for the age-period under one year showed a similar difference between the breast-fed group and the artificially-fed group of the 101 children who were excluded from the present study.

Turning next to the data contained in the clinical records of these two groups of infants, as would be expected from the basis on which the two groups were originally divided, there was a considerable difference between them as regards the age at which the infants were weaned from the breast. For Group A the average age at breast-weaning, that is, the average age at which the breast-feed was abandoned, was 11·0 months, for Group B it was 7·9 months. None of the infants in Group A were completely breast-weaned

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before the age of 6 months, while 36% of Group B were no longer receiving any breast-feeds at this age.

Thirty-seven infants, or 34% of the total 109, showed a disorder of suckling at some time during the infancy period. By " disorder of suckling " was meant such notes by the physician as " poor, lazy suckling ", " greedy suction, gets wind ", etc. Cases such as those in which a thrush, nasal catarrh or some physical block in the respiratory passage was described as interfering with suckling were not considered " disorders ". 27% of the infants in Group A and 42% of those in Group B showed disorders of suckling. About two-thirds of the cases in both groups were those of poor or inadequate suckling. As has already been mentioned, inadequate suckling on the part of the infant was frequently seen in association with a failing milk-supply in the mother's breast. The higher incidence of suckling disorders in Group B undoubtedly reflected this fact.

When the incidence of excessive crying, sleeplessness or fretting was considered in the infancy period of the two groups, 13% of Group A, 17% of Group B and 15% of the total showed such behaviour. A positive instance of this type of behaviour was restricted either to a marked outburst, or a repeated series of outbursts on a less severe scale. An occasional sleepless night or an isolated fretful day was not considered a positive instance. In every case the grading was made without a knowledge of the feeding group to which the infant belonged. The observed difference between the two groups with the size of the sample available was obviously not statistically significant. What evidence there was, however, pointed to a slightly higher incidence of restless behaviour in the artificially-fed group.

Considering next the general state of health or well-being of the two groups in infancy. With the almost limitless possibility of variation both in type and severity of disorders affecting the human body, no practicable means has yet been devised to describe and measure varying states of health in a group of individuals. In the present case, therefore, an unpretentious and simple classification was employed to express this variability. " Good health " was used to describe infants basically healthy with only a few minor ailments; " fair health ", infants in reasonably good health for the greater portion of the time, but who showed either one serious or a number of minor disturbances; " poor health ", infants in indifferent health for the greater portion of the time, who showed a number of complaints of either a serious or less serious nature. Infants were graded on this scale, with no knowledge of the feeding group to which they belonged. The results in proportionate form are given in Table III.

As can be seen from Table III, Group A showed a definite superiority to Group B in respect to general state of health in infancy. Not only was there a considerably higher proportion of infants in " good health ", but there was also a considerably lower proportion in " poor health ". The value

TABLE III.—*General State of Health in Infancy. Proportionate Distribution for the Two Groups.*

Main group.	General state of health.			Total.	Total. frequencies.
	Good.	Fair.	Poor.		
Group "A"	48%	50%	2%	100%	62
,, "B"	30%	55%	15%	100%	47
Total	40%	52%	7%	99%	109

of "p" in the χ^2 test on actual frequencies in the same table is about ·01, so that it is very unlikely that the observed differences reflect only random sampling variation.

Summarizing the data on the infancy periods of the two groups of children, those without feeding difficulties and those with feeding difficulties, both the sex distribution and the proportion of instrumental births in the two groups was about the same. The average age of the mother at the birth of the child and the average age at which the infant was first seen in the welfare centre were similar. On the other hand, the artificially-fed group showed a higher proportion of premature births and a considerably higher proportion of first-born offspring. The artificially-fed group was also seen a significantly greater number of times at the welfare centre when the infant was under the age of one year. From the point of view of the clinical histories during infancy, the artificially-fed group showed a higher incidence of suckling disorders. The incidence of restless behaviour as evidenced by excessive crying, sleeplessness or fretting was not very different for the two groups, but it was slightly higher in the artificially-fed infants. Lastly, when the general state of health and well-being of the two groups was studied, the breast-fed infants showed a marked superiority over the artificially fed.

These data suggest that in selecting the group of children with feeding difficulties, one is also selecting a group which in other ways did not have so successful a start in life. The coincidence of certain other difficulties with feeding difficulties is clearly to be expected, and this coincidence may be dependent upon a number of factors. The artificially-fed group of infants showed a higher percentage of sickly infants. This higher proportion of ill-health may be the result of constitutional inferiority, prematurity, of chance illness acquired during infancy, or possibly of adverse psychological factors in the environment into which the infant was born. All of these factors may be significantly associated with the feeding difficulties observed without the association being one of cause and effect. The other main possibility is that the feeding difficulties may be the causative agent of the inferiority, either through the unsuitability of the non-breast milk or through the psychological

problems involved. In this connection, reference may be made to the work of Faber and Sutton, who found that under the best conditions bottle-fed babies, under one year of age, throve from the point of view of gain in weight and freedom from infection as well as or better than normal breast-fed children. In their study, of course, there is no reason to assume a positive correlation between the artificial feeding and feeding difficulties such as can be clearly assumed in the present study.

Paucity of data makes it impossible to draw valid conclusions concerning the cause and effect relationship, if any, which exists in these two groups of infants between feeding difficulties and the other difficulties which have been discussed. One is entitled to say only this : that here are two groups of infants, one specifically selected for the presence of feeding difficulties, the other not showing such difficulties. Both groups present certain other problems, some similar and others dissimilar, which may or may not bear a causal relationship to the feeding difficulties. However, had the original classification been made, not on the basis of feeding difficulties but on the basis of these "other problems", quite different groupings would have resulted. The next step is to review the two groups at school age, and to compare the problems which they present at this time.

Before discussing the material obtained from the children at school age, from the follow-up visit, the manner in which this material was obtained will be presented.

Through the co-operation of the Salomons Centre, the visit was made as a follow-up visit from the welfare centre. It was explained to the parent or guardian interviewed that since the child was too old to return to the clinic, the visitor was interviewing the mother to inquire about the present state of the child's health and progress. In the majority of the cases, the visitor, with this introduction, was received with cordiality and interest. It was comparatively easy to establish a good *rapport* and to fill out a uniform questionnaire on each child.

The mother was first asked about the child's general state of health, the illnesses he had suffered since leaving the clinic, and his weight and growth. Questions on appetite and sleep followed these. The mother was next asked, " What kind of a child is he ? ", and after an answer had been received, specific questions on various personality traits, including the questions, " Is he a nervous child ? " and " Has he any fears ? ". Following these came questions on the child's relationship with various members of his family, and with his playmates, and on the school he was attending, whether he liked school, and whether he was having any difficulties at school. Then followed questions on the child's infancy, habit-training and enuresis. Lastly were asked the usual questions on economic status, size and composition of the family group, number of rooms in the home, employment and unemployment of the father, etc. A uniform schedule was completed for each child, and great care was taken

to keep both the questioning and the filling out of the questionnaire consistent from case to case.

In only seven instances was a relative other than the father or mother of the child interviewed. In six instances the relative was the grandmother, and in one an aunt. In all seven cases, however, the relative interviewed was an accepted member of the household in which the child lived.

It was felt that a school report would offer additional information from an independent source. With the help of the Department of Psychological Medicine at Guy's Hospital, the routine school report of the Department was requested for each of the 109 children. School reports on 79 children were obtained in this way. The 30 children on whom no school reports were obtained were scattered through many different schools and classes and no obvious bias could be discovered in this selection.

At the time of the follow-up visit, the average age of the children in the two groups was almost identical. It was 7·0 years for Group A and 7·1 years for Group B. These averages are based on data specific for both year and month of age. The span covered by the children was from five years and one month to ten years.

From the appearance of the home at the time of the follow-up visit, an estimate was made of the economic status of the family according to the following scale :

COMFORTABLE . .	A home with evidence of comforts beyond the necessities of adequate food, clothing and warmth—a radio, comfortable furniture, etc.
MARGINAL . .	A home with evidence of the necessities of food, clothing and warmth, but with no evidence of luxuries beyond these necessities.
SUB-MARGINAL .	A home with evidence of inadequate clothing, food or warmth.

In Table IV is given on this scale of economic status the percentage distribution of the two groups of children.

TABLE IV.—*Economic Status of the Home at Elementary School Age. Proportionate Distribution for the Two Groups.*

Main group.	Economic status.			Total.
	Comfortable.	Marginal.	Sub-marginal.	
Group "A" .	37% .	55% .	8% .	100%
" "B" .	47% .	40% .	13% .	100%
Total .	41% .	49% .	10% .	100%

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It does not appear from Table IV that the economic backgrounds in which the two groups of children were living at the time of the follow-up visit were markedly dissimilar. There is no evidence of a consistent or marked superiority of one group over the other. Group A had a lower proportion of children living under " sub-marginal " conditions, but Group B had a higher proportion living in " comfortable " homes.

In only 8 cases of the total 109 was the family circle broken in the sense that one or both parents were not living in the household. Six of these cases were in Group A and 2 in Group B. There were 2 instances of an illegitimate child living with an unmarried mother, 2 cases of the death of one parent and 4 cases of the separation of the parents. In over 90% of the cases the child was living in a home complete with both parents. The incidence of broken homes in the data is too low to make feasible a further consideration of this factor.

In Table V is given the percentage distribution of the effective birth order for the children in the two groups at the time of follow-up. Effective birth order is defined as the relative position of the child in the family to his living siblings.

TABLE V.—*Effective Birth Order at Elementary School Age. Proportionate Distribution for the Two Groups.*

Main group.	Effective birth order.				Total.
	Only child.	Eldest child.	Youngest child.	All others.	
Group "A"	21%	23%	30%	26%	100%
,, " B "	23%	38%	30%	9%	100%
Total	22%	29%	30%	18%	99%

The proportion of only children and youngest children is very similar in the two groups. However, Group B has a considerably higher proportion of eldest children and a correspondingly lower proportion of " all others ". It might be noted in this connection that in the infancy period Group B showed a considerably higher proportion of first-born infants than did Group A. The question of birth order is one which has received considerable attention in the psychiatric literature, and it is one for which it would be desirable to keep the data specific in subsequent analyses. To do this, the four main groupings in Table V would have to be maintained. When any other factor was considered, such a procedure would result in very low frequencies, the significance of which would be extremely questionable. Because of this physical limitation, it is impossible to consider birth order in relation to the psychological difficulties which will be presented.

Turning now to the mother's description of the child at the time of follow-up,

no attempt will be made to present the data on each child as a clinical entity. Rather will two groups as a whole be considered in relation to the incidence of certain types of behaviour and psychological difficulties.

Considering first the question of appetite, the mother was asked how the child was eating, and after this general question had been answered, she was asked specifically about food fads and food refusals. In analysing the replies to these questions, either a skimpy, erratic appetite or one marked by considerable evidence of food fads or food refusals was considered to be a poor appetite. If the food fad was a minor one, such as, "He don't eat greens like his father," or "Won't touch rice puddings," and if the child was eating other foods well, the appetite was considered "good". In Table VI are given the results.

TABLE VI.—*Incidence of Appetite Disturbances at Elementary School Age for the Two Groups.*

Main group.	Appetite. Good.	Poor.	Total.	Percentage with poor appetite.
Group "A"	44	18	62	29%
,, "B"	27	20	47	43%
Total	71	38	109	35%

Of the total 109 children, 35%, or about one-third were described by their mothers as having a poor appetite. When the proportion for the two groups is examined, it is seen that Group A with 29% is considerably lower than Group B with 43%. About 14 times in 100 from the operation of random sampling a difference between the two groups of the order observed would be expected from the operation of chance variation. Such odds are certainly not conclusive, and one would hesitate to ascribe the difference observed between the two groups to some factor or factors other than chance variation. However, the question of consistency also enters into the interpretation of the data. And, as will be seen in subsequent analyses, Group B shows a consistently higher incidence of difficulties than does Group A.

Following questions on appetite, the mother was asked how the child was sleeping, followed by specific questions on nightmares and sleep-walking and sleep-talking. Using a scale similar to the one for appetite, the children were graded into two classes—those sleeping well and those sleeping badly. The results are given in Table VII.

The prevalence of sleep disturbances was considerably lower than that of appetite disturbances. Only 17% of the total children showed difficulties in this respect. The difference between Group A and Group B is very small, but again it is Group B which shows the higher proportion of difficulties.

TABLE VII.—*Incidence of Sleep Disturbances at Elementary School Age for the Two Groups.*

Main group.	Sleep.		Total.	Percentage with poor sleep.
	Good.	Poor.		
Group "A"	52	9	61	15%
,, "B"	38	9	47	19%
Total	90	18	108	17%

There was one case in Group A in which information on the sleep of the child was not available, and this case was omitted from Table VII.

The incidence of sleep disturbances in this group of children was about the same as that observed by Michaels and Goodman in a study of 475 children attending a Detroit summer camp. Although the mean age of these 475 children was considerably higher than that in the present study, being between 11 and 12 years, the proportion of children showing sleep disturbances, 19·5%, was comparable with the 17% observed in the present study.

TABLE VIII.—*History of Enuresis at Any Time Prior to Follow-up Visit for the Two Groups.*

Main group.	History of enuresis.		Total.	Percentage with positive history.
	Negative.	Positive.		
Group "A"	46	10	56	18%
,, "B"	32	12	44	27%
Total	78	22	100	22%

When the mother was asked about enuresis, as will be seen from Table VIII, 22% of the 100 children on which data in this respect were available were stated to have suffered from enuresis, either diurnal or nocturnal, at some time after toilet training was fully established. This proportion is also comparable to that found by Michaels and Goodman in the study just quoted, in which 24·7% of the total group were found to have been enuretic.

Again, although the difference is not of a high order, Group B shows a higher proportion of difficulties than Group A. There were 9 children, 6 in Group A and 3 in Group B, on whom, for a variety of reasons, data on enuresis were not available. Of the 100 children on whom data were available, 9 were actively suffering from enuresis at the time the follow-up visit was made. Five of these were in Group A and 4 in Group B.

Although questions were asked of the mother on the age at which bladder and bowel control was established, the answers were too vague and admittedly unreliable to make an analysis of them worth while.

For those children to whom a younger sibling had been born, the mother was asked if the child showed any jealousy at the birth of this sibling. The results are given in Table IX. In 55 cases the child had had no younger sibling, and these cases were not included in the calculations. 28% of the total 54 children to whom a younger sibling had been born showed jealousy at the birth of this baby. Such jealousy ranged from peevishness and deterioration of appetite to active hostility, such as "attacking the baby with scissors" to "trying to put the baby in the dustbin". Once more, as will be seen from Table IX, it was Group B which showed the higher proportion of children experiencing a particular difficulty. No comparable data were found in the literature with which to compare the incidence of this type of jealousy.

TABLE IX.—*History of Jealousy at Birth of Younger Sibling in the Two Groups.*

Main group.	History of jealousy.		Total.	Percentage with positive history.	Children with no younger sibling.
	Negative.	Positive.			
Group "A"	25	6	31	19%	31
,, "B"	14	9	23	39%	24
Total	39	15	54	28%	55

When the mother was asked if the child had any fears, in 26% of the total cases the answer was in the positive. This is a considerably lower proportion than the 45% which Michaels and Goodman found and the 63·8% found by Preston and Shepler in a study of 83 school-children in the third and fifth grades of a United States Public School. No explanation for this difference could be advanced. Fears ran the scale from "Afraid to go to bed without a light", to "Afraid of cats" and "Terrified of the bogy-man in the lavatory". Once more, as will be seen from Table X, the children in Group B showed a higher incidence of this trait than did those in Group A.

TABLE X.—*Incidence of Fears at Elementary School Age for the Two Groups.*

Main groups.	Children with—		Total.	Percentage with fears.
	No fears.	Fears.		
Group "A"	49	13	62	21%
,, "B"	32	15	47	32%
Total	81	28	109	26%

In the relatively high proportion of 39% of the total cases, the child was described as "nervous" by the mother in answer to the question, "Is he a nervous child?" As will be seen from Table XI, the proportion described as nervous in Group B, 49%, is considerably higher than the 32% in Group A. Nervousness shows the highest incidence in the total group of any of the traits or difficulties which were studied. Nervousness, especially as used by the layman, is a loose term, covering as it does everything from muscular irritability and restlessness to timid, withdrawn behaviour. Nevertheless, it is interesting to note that both in the case of specific difficulties, such as disorders of the appetite, sleep disturbances and enuresis and in the case of the more general trait of nervousness, the artificially-fed group showed a consistently higher proportion of difficulties than did the breast-fed group.

TABLE XI.—*Incidence of Nervousness at Elementary School Age for the Two Groups.*

Main group.	Children.		Total.	Percentage nervous.
	Not nervous.	Nervous.		
Group "A"	42	20	62	32%
,, "B"	24	23	47	49%
Total	66	43	109	39%

This "nervousness" showed an interesting association with the incidence of one or more of the difficulties of appetite disturbance, sleep disturbance, enuresis or fears. Of the 43 children described as nervous, only 5, or 12%, were free from all of the above four difficulties. On the other hand, of the 66 children who were not described as nervous, 33, or 50%, were entirely free from these four difficulties. The incidence of jealousy at the birth of a younger sibling was omitted in this comparison. Without complicating enormously the presentation of the data, it would be impossible to distinguish between the absence of jealousy and the absence of exposure to risk—in other words, the cases in which no younger sibling had been born.

The coincidence of the difficulties just considered, namely appetite and sleep disturbances, enuresis, fears and nervousness shows a different pattern in the two groups, as will be seen from Table XII. Not only does Group A show a much higher proportion of children entirely free from these five difficulties, but it also showed a correspondingly lower proportion in each of the other four categories except the last. In other words, not only are these five difficulties relatively more frequent in Group B when considered as separate entities, but they also occur more frequently in combination one with another.

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TABLE XII.—*Percentage Distribution of Coincidence of Appetite Disorder, Sleep Disorders, History of Enuresis, Fears and Nervousness at Elementary School Age for the Two Groups.*

Main group.	Combinations of appetite disorder, sleep disorder, history of enuresis, fears and nervousness. None of above five difficulties.	One of above five difficulties.	Two of above five difficulties.	Three of above five difficulties.	Four of above five difficulties.	Five of above five difficulties.	Total.	Total frequency.	Number not included.
Group "A"	48%	21%	14%	7%	7%	2%	99%	56	6
" "B"	14%	34%	23%	20%	9%	..	100%	44	3
Total	33%	27%	18%	13%	8%	1%	100%	100	9

Lastly will be considered the data obtained from the school reports. In the routine form for a school report on a particular child, as used by the Department of Psychological Medicine, there is provision for a report on the position of the child in the class, and upon the achievement level attained in certain subjects. From these reports the children were graded into three classes of achievement levels in school work—above average, average, and below average. The results are given in proportionate form in Table XIII.

TABLE XIII.—*School Reports. Percentage Distribution by Achievement Level in School Work for Two Groups at Time of Follow-up.*

Main group.	Achievement level in school work. Above average.	Average.	Below average.	Total.	Total frequencies.
Group "A"	23%	70%	7%	100%	43
" "B"	19%	42%	39%	100%	36
Total	22%	57%	22%	99%	79

As has already been explained, school reports were obtained on 79 of the total 109 children. The 30 children on whom no reports were returned were scattered through various schools and classes, and no bias in this selection was evident.

From Table XIII, Group A is obviously the more successful group as measured by achievement level in school work. There is a higher proportion of children in both the "above average" and the "average" group. Group B, on the other hand, showed a considerably higher proportion in the "below average" group.

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Under the χ^2 test the probability of getting differences as great or greater than those observed, from the operation of random sampling, lies between ·01 and ·001. The two groups then differ significantly in this respect.

These data were collected entirely independently of the other two sources, namely the clinical records at the Welfare Centre and the material obtained from the follow-up visit. Yet they point to the same general conclusion that the artificially-fed group did not achieve the same successful standard of adjustment to life as did the infants who were entirely breast-fed in infancy.

Conclusion.

In the data which have been presented there is evidence strongly suggesting that there is a positive association between feeding difficulties in infancy and subsequent psychological difficulties at elementary school age. Beyond this conclusion it is not possible to go upon the basis of the present results. Nevertheless, it appears to be of sufficient interest to warrant some speculation now and some further experimental work in the future. It has already been pointed out that the difference between the two groups may be due: (1) to constitutional or acquired difficulties, not the effect of the early feeding difficulties, but perhaps the prime cause of them; (2) to the inferiority of the substitute used for breast-milk in artificial feeding; (3) to the effect of the feeding difficulties themselves. One cannot eliminate any of these possibilities, and it may be that all are operative to some extent, though the second seems to be the least important.

Certain similarities between the two groups suggest that those children with feeding difficulties are not simply the inferior stock which is differentiated in this way. For example, the economic status of the two groups is quite comparable, and the mothers, judged by the number of times they brought their infants to the Welfare Centre, are evidently not less careful of their children's well-being. Some of the original differences between the groups, though they may bias the results quite independently of the presence of feeding difficulties, may also, on the other hand, act to produce feeding difficulties and exert their force in this way. This is true of most of the difficulties recorded.

Other matters, more incidental to the main theme, are worth noting. The significant difference between the school achievement of the two groups is a very striking observation, the more so since it is made by independent observers with no knowledge of the nature of the groups. It is remarkable that the abnormal group of infants was so clearly differentiated after the lapse of years from those whose start in life was smoother. Further work along these lines might shed some more light upon the problem of the retarded child.

The actual incidence of various nervous traits and difficulties is also interesting to note in this group of so-called normal children. Such observations begin

to provide a standard of comparison by which the significance of such occurrence in psychiatric history-taking may be judged.

To return once again to the final conclusion. Two groups of infants have been selected from presumably normal children, one showing feeding difficulties in infancy, the other not showing such difficulties. Both groups presented in infancy certain other problems, the significance of which with the data available it was impossible to ascertain. When the two groups were reviewed at school age, evidence was found which strongly suggested a positive association between feeding difficulties in infancy and subsequent psychological difficulties at elementary school age.

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