# BIRTH ORDER AND MENTAL DEFICIENCY IN INSTITUTIONALIZED RETARDATES[1]

CHARLES C. CLELAND AND BEEMAN N. PHILLIPS
*The University of Texas at Austin*

In a review of the literature on relation of birth order to eminence, intelligence, college attendance and other social parameters, Altus (1966) found first-borns generally over-represented. Particularly consistent findings were noted in studies on ordinality and eminence with first-borns over-represented. Altus "found no study that shows trends divergent from those here reported" (on birth order and eminence). These findings suggest a positive correlation between first-born family position and intelligence—since intelligence and eminence are closely linked in our culture. Evidence by Warren (1966) on birth-order and intelligence is more equivocal, but includes over-representation of first-borns among college attenders as a consistent finding. The occurrence of more first-borns among eminent and college-attending samples appears supportive of the thesis that exceptionality of a superior nature is disproportionately manifested by first-borns. Numerous investigators have explored the correlates of birth-order and certain relatively stable relations have been demonstrated, but ". . . the reasons behind the relations are as yet unknown or at best dimly comprehended." (Altus, 1966)

Exceptionality of a superior nature, especially in cognitive functioning, appears more often manifested among first-borns. Similar logic suggests an under-representation of first-borns when the focal population is mentally retarded. Review of the literature on mental deficiency and ordinal family position revealed little of relevance to the issue. Colver and Kerridge's (1962) study on birth-order among epileptics (N = 174) found first-borns over-represented and although intelligence was not a specific focus, the criterion for inclusion (one or more seizures for ten successive days) would suggest some retardates were included (Sarason, 1949). If so, the over-representation of first-borns among epileptics is contrary to Lilienfeld and

[1] The authors gratefully acknowledge the cooperation of Dr. Charles D. Barnett, Assistant Deputy Commissioner for Mental Retardation, State Department of Mental Health and Mental Retardation; Dr. Philip Roos and Mr. W. T. Lawler, Superintendents of the Austin and Travis State Schools, respectively; and Mr. Lyndon Brown, Chairman of the Board of The Brown Schools, for permission to conduct this study. The authors also express thanks to Mrs. Marynelle Bettcher for assistance.

This investigation was supported, in part, by a research grant from the Office of Vocational Rehabilitation, Department of Health, Education, and Welfare, Washington, D. C.

Pasamanick's (1956) findings in a study of maternal and fetal factors in the genesis of retardation. Utilizing 781 *Ss* they found ". . . risk of mental deficiency is lowest in the lower birth order and it increases with increasing birth order." Examination of standard works in mental retardation (Benda, 1952; Masland, Sarason & Gladwin, 1958; Jordan, 1961; Hutt & Gibby, 1965; and Ellis, 1963) revealed no studies having ordinality and retardation as the focal concern. Such a lacuna seriously limits generalizations relative to birth-order and intelligence and while inferences can be derived from studies of highly-intelligent, eminent, etc., empirical data are needed.

Interestingly, the paucity of data on birth order and mental deficiency may itself offer a clue in defining patterns of incidence among institutionalized samples. In the studies on birth order and eminence, a wealth of information is provided by biographers including data on infancy and childhood (McCurdy, 1957). For various reasons, probably arising from the devalued role of retardates in society, little biographical information is available. Such an omission suggests social factors might provide an interpretative rationale most consistent with existing theorizing (Altus, 1966) and empirical data.

There are important characteristics of retardates leading to somewhat different child rearing practices than those observed among the inteligent. Yarrow (1961) describes how differential treatment occurs ontogenetically: ". . . the infant with the higher level of alertness and responsiveness is likely to elicit more stimulation." This underscores the reciprocal nature of infant-parental interactions. The first-born of high intellectual endowment is responsive and initiates a mutually reinforcing socialization process validating parental aspirations for their first-born while first-borns are subjected to adult dominated social learning to an extent seldom encountered by later-borns. If parents enjoy the social stimulus power of their first-borns the likelihood of dual rewards for the infant are enhanced. To the extent first-borns mirror adult-prescribed behaviors, they learn to take risks on an all-or-none basis, i.e., the parents may give all or withhold all. In later adult roles, first-borns may persist in striving for adult valued goals of eminence, excellence, etc. for which they have early learned to gamble. Later-borns, even if intellectual peers of the first-born, are exposed to behavioral productions of parents *and* sib(s) and consequently a random pattern—partly adult- and partly child-defined. Thus, the more abstract mode of expression to which first and only children are early conditioned finds, for those of high intellectual endowment, expression and reward in academic, scientific, or other roles dependent on

abstract thinking. One rationale for the consistent over-representation of first-borns among the eminent may be that the first-born, for at least part of the formative years, is differentially exposed to an adult-defined world.

A mutually rewarding infant-parental interaction has been hypothesized for superior first-borns. Assuming a similar relationship for subnormal first-borns, the prediction would be an under-representation of first-borns in an institutionalized sample. If the stimulation variables are related to the infant's developmental progress and assuming progress of infant an important definer of parental reactions (Yarrow, 1961), such a prediction appears oversimplified. Parental reactions, when the first-born is defective, may be greatly influenced by perception of such deviance. A neonatal retardate may display minimal or inappropriate responsiveness which, in turn, causes a disruption of infant-mother relationships (Kulka, et al., 1960). When profoundly retarded, both intelligent *and* moron-level parents would note such gross pathology. However, in mild retardation, parental reactions to deviance may be related to intelligence and social class background. Ordinal position of the retarded child may thus represent an important variable in institutionalization, but the decision to institutionalize appears subject to parental awareness of the child's ability and probability of fulfilling parentally defined social roles. One would expect the combination of intelligent parents and high social class position to maximize ordinal effects among all levels of retardation whereas, unintelligent and lower social class parents might differentially resort to institutionalization only if the child is profoundly retarded.

In the aforementioned studies on eminence, a preponderance of *S*s were male. Others (Sampson, 1962; Rosenberg & Sutton-Smith, 1964; Schooler, 1964) have shown some birth order effects to be dependent on sex of the subject and, in two-children families, sex of sibling. Since child-rearing practices may be differential, dependent on sex, inclusion of both sexes appears desirable.

The present paper provides evidence on exceptionality as expressed at the lower end of the intellectual continuum. Demographic variables of sex, ethnicity, family size, educational level of father, and levels of retardation are explored and methodological issues are discussed relative to birth-order studies. Implications of the major findings and their congruence with established phenomena are also presented.

## METHOD

Subjects were obtained from both public and private institutions

for the retarded by means of individual patient record review. This yielded a total of 4,600 *Ss*, including 2,310 from the Austin State School, 1,590 from Travis State School, and 700 from The Brown Schools. Subject inclusion was based on standardized, individually-administered intelligence tests results, excluding those beyond IQ 75. Adherence to this criterion and unreliability of certain birth order data resulted in 202 rejections, yielding a final total sample of 4,398 *Ss*.

The extent to which this sample of institutionalized retardates is representative of retardates in the total population can only be estimated. Scheerenberger (1965) surveyed public and private institutions in the United States and determined three percent of the nation's retardates are institutionalized. In Texas, the present institutionalized population represents approximately 3.5 percent of the estimated 310,000 retardates and the 4,398 *Ss* in this study comprise 35 percent of Texas' institutionalized retardates. This sample appears reasonably representative of institutionalized retardates in the Southwestern states. Since *Ss* from the upper middle class are known to be under-represented in public institutions, *Ss* from a private facility were included. Various authorities, Tarjan (1959), Wunsch (1951), and the U. S. Public Health Service (1964) have consistently noted an over-representation of males among retarded samples and Scheerenberger's (1965) survey of institutionalized *Ss* revealed 58 percent male and 42 percent female. The present sample percentages were 69 and 31, respectively.

Patient records of the three institutions provided the following information: (a) *birth order*, for which three categories were utilized—only children, first borns, and later borns; (b) family size, excluding parents but including the retarded *Ss* in question; (c) *ethnicity*, including Anglo, Negro and Mexican-American; (d) *degree of mental retardation*, based on the most recent IQ score. Three levels of intelligence were defined: Level I with IQ's of 20 and below, Level II with IQ's of 21-50 and Level III with IQ's of 51-75; (e) socio-economic status, as measured by the father's education, including Level I, illiterate; Level 2, those with schooling through completion of 8th grade; and Level 3, those having some high school through advanced degrees.

Two methodological procedures were employed. Only children were separated from first-borns with siblings since certain ambiguities may result from combining only children and first-borns with siblings in analyses of ordinal effects.

The second procedure was to consider the fact that proportion of first-born in comparison with later-borns is dependent on family size. For example, in two-child families 50 percent will be first-born,

and in four-child families only 25 percent will be first-born. Therefore, incidence of first-borns in comparison with later-born children cannot be meaningfully interpreted without an adjustment of frequencies to accomplish equalization of opportunity to be first- or later-born. The largest family included nineteen children; the smallest, excluding only-children families, was the two-child family. In the case of the two-child family, the raw frequency of first-borns was multiplied by .5 and the raw frequqency of later-borns was also multiplied by .5. In two-child families a child has an equal chance of being a first- or a later-born; in three-child families, the chance of being first-born is one in three; hence, the adjustment factor aplied to the raw frequency for the first-borns was .67, while the adjustment factor applied to raw frequencies for the later-born in three-child families was .33.

## RESULTS

The frequency distributions of first- and later-borns which were obtained for the variables explored are given in Table 1 as raw and adjusted frequencies, and statistical inferences about differences in these adjusted frequencies was based on comparisons made through the Chi-square test of significance. Chi-squares were not computed on raw frequencies, although obviously, many of the distributions presented would have been highly significant. Raw frequencies were adjusted in all instances in terms of the actual family size *prior* to the tabulations shown in Table 1 where family sizes were grouped. Only children were excluded from Table 1 tabulations.

In the data on incidence of first-borns relative to later-borns in the total sample no over-representation of first-borns occurred. However, there was a significant difference in first-borns being over-represented in 2-4 child families and under-represented in families of 5-19. The observed and expected adjusted frequencies of sex differences in the distribution of first- and later-born retardates differ only slightly, although males out-numbered females among institutionalized retardates.

When family size and sex were considered together, four possible combinations existed, and for this $2 \times 4$ distribution of adjusted frequencies for first- and later-born retardates, Chi-square failed to attain significance. The observed versus expected frequency trends, however, follow the same pattern as the comparison based only on family size; i.e., first-borns are over-represented in smaller families and later-borns are over-represented in larger families to approximately the same degree regardless of *Ss'* sex. Results indicate there is no interaction between sex and family size with respect to the incidence of institutionalized first- and later-born retardates.

## TABLE I

Differences Between Observed and Expected Frequencies of First-born and Later-born Mental Retardates

| Sample | Raw Frequencies | | | | Adjusted Frequencies | | | | $X^2$ | P |
|---|---|---|---|---|---|---|---|---|---|---|
| | First-born | | Later-born | | First-born | | Later-born | | | |
| | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. | | |
| Total Incidence | 1093 | 1973.5 | 2854 | 1973.5 | 710 | 708 | 706 | 708 | 0.01 (df=1) | < .90 |
| Family Size | | | | | | | | | | |
| 2-4 Members | 877 | 632 | 1407 | 1652 | 530 | 512 | 490 | 508 | 4.65 (df=1) | < .05 |
| 5-19 Members | 216 | 461 | 1447 | 1202 | 180 | 198 | 215 | 197 | | |
| Sex | | | | | | | | | | |
| Male | 747 | 749 | 1959 | 1957 | 485 | 484 | 481 | 482 | 0.20 (df=1) | < .70 |
| Female | 346 | 344 | 895 | 897 | 225 | 226 | 225 | 224 | | |
| Sex-Family Size | | | | | | | | | | |
| Male - 2-4 | 595 | 425 | 940 | 1110 | 358 | 345 | 331 | 344 | 5.00 (df=3) | < .20 |
| Male - 5-19 | 152 | 324 | 1019 | 847 | 126 | 138 | 150 | 138 | | |
| Female - 2-4 | 282 | 207 | 467 | 542 | 172 | 166 | 159 | 165 | | |
| Female - 5-19 | 64 | 136 | 428 | 356 | 53 | 59 | 65 | 59 | | |
| Ethnicity | | | | | | | | | | |
| Anglo (A) | 823 | 769 | 1950 | 2008 | 524 | 525 | 524 | 523 | 2.12 (df=2) | < .50 |
| Negro (N) | 103 | 106 | 276 | 277 | 73 | 66 | 59 | 66 | | |
| Mexican-American (MA) | 159 | 218 | 628 | 569 | 113 | 118 | 123 | 118 | | |
| Ethnicity-Family Size | | | | | | | | | | |
| A - 2-4 | 705 | 505 | 1119 | 1319 | 422 | 410 | 397 | 409 | 9.08 (df=5) | < .20 |
| A - 5-19 | 122 | 264 | 831 | 689 | 101 | 115 | 128 | 114 | | |
| N - 2-4 | 86 | 49 | 96 | 127 | 51 | 42 | 32 | 41 | | |
| N - 5-19 | 27 | 57 | 180 | 150 | 23 | 25 | 27 | 25 | | |
| MA - 2-4 | 92 | 79 | 192 | 205 | 57 | 60 | 62 | 59 | | |
| MA - 5-19 | 67 | 139 | 436 | 364 | 56 | 59 | 61 | 58 | | |
| Ethnicity-Sex | | | | | | | | | | |
| A - Male | 574 | 529 | 1335 | 1380 | 364 | 361 | 356 | 359 | 4.48 (df=5) | < .50 |
| A - Female | 253 | 240 | 615 | 628 | 159 | 164 | 169 | 164 | | |
| N - Male | 77 | 84 | 226 | 219 | 53 | 51 | 48 | 50 | | |
| N - Female | 30 | 22 | 50 | 58 | 21 | 16 | 11 | 16 | | |
| MA - Male | 96 | 137 | 398 | 357 | 68 | 73 | 78 | 73 | | |
| MA - Female | 63 | 81 | 230 | 212 | 45 | 45 | 45 | 45 | | |

(Table continued on next page)

TABLE 1 (Continued)

| Sample | Raw Frequencies | | | | Adjusted Frequencies | | | | $X^2$ | p |
|---|---|---|---|---|---|---|---|---|---|---|
| | First-born | | Later-born | | First-born | | Later-born | | | |
| | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. | | |
| Intelligence | | | | | | | | | | |
| Levels I & II, IQ 0-50 | 801 | 858 | 2298 | 2241 | 524 | 543 | 558 | 539 | 5.60 | < .02 |
| Level III, IQ 51-75 | 292 | 235 | 556 | 613 | 186 | 167 | 148 | 167 | (df=1) | |
| Intelligence-Family Size | | | | | | | | | | |
| Level I & II - 2-4 | 636 | 473 | 1089 | 1247 | 386 | 384 | 379 | 381 | | |
| Level I & II - 5-19 | 165 | 380 | 1209 | 994 | 138 | 159 | 179 | 158 | 10.04 | < .02 |
| Level III - 2-4 | 241 | 155 | 318 | 404 | 144 | 128 | 111 | 127 | (df=3) | |
| Level III - 5-19 | 51 | 80 | 238 | 209 | 42 | 39 | 36 | 39 | | |
| Intelligence-Sex | | | | | | | | | | |
| Level I & II - Male | 559 | 595 | 1588 | 1552 | 365 | 375 | 383 | 373 | | |
| Level I & II - Female | 242 | 264 | 710 | 688 | 159 | 168 | 175 | 166 | 5.92 | < .20 |
| Level III - Male | 188 | 155 | 371 | 404 | 120 | 109 | 98 | 109 | (df=3) | |
| Level III - Female | 104 | 80 | 185 | 209 | 66 | 58 | 49 | 57 | | |
| Intelligence-Ethnicity | | | | | | | | | | |
| Level I & II - A | 585 | 582 | 1518 | 1521 | 374 | 390 | 403 | 387 | | |
| Level III - A | 242 | 187 | 432 | 487 | 150 | 136 | 122 | 136 | | |
| Level I & II - N | 84 | 87 | 229 | 226 | 58 | 53 | 48 | 53 | 7.48 | < .20 |
| Level III - N | 23 | 19 | 47 | 51 | 15 | 13 | 10 | 12 | (df=5) | |
| Level I & II - MA | 132 | 189 | 551 | 494 | 93 | 100 | 107 | 100 | | |
| Level III - MA | 27 | 29 | 77 | 75 | 20 | 18 | 16 | 18 | | |
| Father's Education | | | | | | | | | | |
| Level 1 | 31 | 67 | 211 | 175 | 23 | 31 | 40 | 32 | | |
| Level 2 | 188 | 233 | 649 | 604 | 130 | 133 | 136 | 133 | 5.68 (df=2) | < .10 |
| Level 3 | 428 | 347 | 822 | 903 | 269 | 258 | 247 | 258 | | |

Note: The expected and adjusted frequences were rounded to the nearest whole number.

Frequencies of first- and later-born retardates were not significantly different in Anglo, Negro and Mexican-American sub-samples. Trends, however, show more first-borns among Negroes than expected, with more later-borns in the Anglo and Mexican-American groups. Taking family size into account, ethnic differences in the incidence of retardation among first- compared to later-borns approached significance ($p < .20$). The greatest differences were found in the Anglo group, where first-borns were more likely to come from small families while later-borns come from larger families more

often than chance would allow. The same trend arose among Negroes, although there was only a slight tendency for over-representation of later-borns in larger families. Among Mexican-American *Ss*, there was a slight over-representation of later-borns regardless of family size. When ethnic differences in the frequency of retardation between first- and later-borns was related to sex, no significant differences occurred.

Comparisons initially were made of first- and later-born distritions within the several intelligence levels. While the differences in frequencies of first- and later-born *Ss* within these levels of intelligence did not reach significance, a further analysis in which Levels 1 and 2 were combined and compared with Level 3 revealed a difference significant at the .02 level. In this instance, there was a greater number of later-borns than expected in Levels 1 and 2, and a greater than expected frequency of first-borns in Level 3. When frequencies for first- and later-borns were determined for combinations of levels of intelligence and family size, results were significant at the .02 level. There was an over-representation of later-borns among those with lower IQ's in the larger families and an under-representation of later-borns among those with lower IQ's in smaller families; put another way, first-borns among the 51-75 IQ group are strongly over-represented in smaller families. When different levels of intelligence were combined with sex, analyses yielded a directional but non-significant difference. The most obvious trend occurred for Level 3 females where first-borns were over-represented. When subjects were classified by intelligence level and ethnicity, differences in the distributions obtained for first- and later-borns approached significance. In all three ethnic groups there was a tendency for first-borns to be over-represented in the 51-75 IQ range, and a similar tendency for over-representation of later-borns in the lower IQ levels among Anglos and Mexican-Americans.

The last tabulations in Table 1 involve socio-economic status as inferred from father's education level, and differences in frequency of first- and later-borns approached significance ($p < .10$). First-borns appeared more frequently than expected among higher status families, and later-borns appeared more frequently than expected among lower status families. Since information on father's educational level was obtainable for only 50 percent of the Table 1 sample, analyses of socio-economic status in relation to other variables were omitted.

The remaining analyses were conducted on the 451 only-children in the total sample, and raw frequency adjustments were unnecessary. The analyses determined whether the distributions obtained with regard to each of the variables studied differed from the dis-

tributions obtained for each of these variables for the remainder of the total sample. A summary of results is presented in Table 2.

TABLE 2

Differences Between the Observed and Expected Frequencies of Only Children

| Sample | Observed | Expected | df | $X^2$ | p |
|---|---|---|---|---|---|
| SEX | | | | | |
| Male | 309 | 309 | 1 | 0.00 | 1.00 |
| Female | 142 | 142 | | | |
| ETHNICITY | | | | | |
| Anglo | 365 | 317 | | | |
| Negro | 53 | 44 | 2 | 45.21 | < .001 |
| Mexican-Amer. | 33 | 90 | | | |
| INTELLIGENCE | | | | | |
| Level I | 110 | 132 | | | |
| Level II | 220 | 223 | 2 | 10.22 | < .01 |
| Level III | 121 | 96 | | | |
| EDUCATION OF FATHER | | | | | |
| Level 1 | 12 | 26 | | | |
| Level 2 | 43 | 92 | 2 | 68.76 | < .001 |
| Level 3 | 176 | 113 | | | |

The first data presented in Table 2 involved comparisons of the percentage of males and females among only-children *S*s with percentages for the remaining sample. No significant differences occurred. A highly significant difference occurred with regard to ethnicity with an under-representation of only-children in the Mexican-American subgroup and an over-representation in the Anglo. Comparing the observed and expected frequencies of only-children in the three intelligence levels, a highly significant difference arose, with an over-representation of only-children in the 51-75 IQ category and an under-representation in the under 20 IQ category. When the distributions of only-children by status levels were determined, a highly significant difference arose, with only-children over-represented in the higher socio-economic category, based on obtainable fathers' educational levels (N = 231 only-children or 51 percent of Table 2 total).

## DISCUSSION

Implications of this study should be considered in terms of the background and conditions under which the sample was obtained. All subjects were institutionalized and it is known that the lowest levels of retardation are over-represented in such samples. Another

consideration is the inadequate knowledge or control of different etiological factors in mental retardation. If such factors are classified as environmental and genetic, indications are that genetic factors are more important in the lowest levels of retardation, and less so in the higher levels of retardation. Therefore, *S*s with IQ's from 51-75 are probably those in which environmental influences are greatest, while those in the 0-20 IQ range would be most influenced by genetic factors. Thus, until etiological data have been gathered and analyzed the import of this differentiation cannot be adequately assessed. Other limitations undoubtedly exist to restrict generalizations from the present study.

An essentially environmental position was adopted in this study; it was held that ordinal effects are due to differences in family interaction patterns for first- and later-borns. This is the predominant viewpoint in studies of intellectually gifted. Applying this rationale to retardates, it appears that influences tending to accentuate intellectual development of superior first-borns in ways frequently leading to eminence, college attendance, etc. would *decrease* the incidence of first-borns in retarded samples, since these differential family interaction influences should tend to enhance the intellectual functioning of retarded first-borns in essentially the same way they enhance intellectual functioning of superior first-borns. This effect could be expected to be magnified among the Level III retardates, since it would be among those whose retardation is most likely associated with environmental conditions that these differential birth order influences would occur. Such a position under-emphasizes the latest theoretical and empirical developments in child-rearing. Parent-child relationships are reciprocal, and to some degree, effects of particular family interaction patterns depend on the child's own characteristics. It is reasoned that family interaction patterns accentuating development of intellectually *superior* first-borns will interfere with the development of intellectually *inferior* first-born children. Thus, first-borns were expected to be over-represented in institutions, rather than under-represented, as extrapolation of the theory developed in relation to intellectually superior first-borns would predict. What is known of family interaction patterns as related to sex, socio-economic status, ethnicity, and family size would generate the prediction that over-representation of first-borns would be greatest among males, in the upper-middle class, among Anglos, and in small families.

Raw frequencies in Table 1 suggest the conclusion of an under-representation of first-borns and an over-representation of later-borns. Adjusted frequencies, however, reveal no difference in observed and expected frequencies of first- and later-borns among insti-

tutionalized retardates, thus leading to a contrary conclusion. Although Anastasia (1956) indicated the methodological significance of this frequency adjustment a decade ago, it is apparent many birth order studies omitted this consideration and the implications are evident in the present results.

Generally, results support the proposed interpretation of family interaction influences. First-borns, as predicted, are over-represented in small families and in the highest intellectual level but no overall differences occurred in regard to ethnicity and sex, which is contradictory. However interactions between these variables afford modest support. For example, first-borns are over-represented among Level III retardates in higher social class families, and this also holds in smaller families where first-borns are over-represented only in the 51-75 IQ group. Results are less clear-cut for non-Anglo *Ss* than Anglos. The evidence generally supports the theory that family interaction influences which positively influence the intellectually superior first-born toward eminence and college attendance, positively influence the intellectually inferior first-born toward institutionalization. Often one thinks of child-rearing practices as operating uniformly on all children in a family, but the notion that the child's own characteristics help to determine both how his parents relate to him, and how these relationships influence him, is a point increasingly made by those investigating child-rearing practimes.

In summary, results indicate no overall over-representation of first-borns among institutionalized mental retardates. There is an over-representation of first-borns in certain subcategories of the total institutionalized sample and these were discussed in relation to a family interaction rationale. Since these over-representations of retarded first-borns were found in sub-samples wherein such differentials in family interaction should occur, the theoretical viewpoint presented appears to merit further consideration.

REFERENCES

Altus, W. D. Birth order and its sequelae. *Science*, 1966, 151, 44-49.
Anastasi, Anne. Intelligence and family size. *Psychological Bulletin*, 1956, 53, 187-209.
Benda, C. E. *Developmental disorders of mentation and cerebral palsies.* New York: Grune & Stratton, 1952.
Colver, T. & Kerridge, D. F. Birth order in epileptic children. *Journal of Neurological and Neurosurgical Psychiatry*, 1962, 25, 59-62.
Ellis, N. R. *Handbook of mental deficiency.* New York: McGraw-Hill, 1963.
Hutt, M. L. & Gibby, R. G. *The mentally retarded child.* Boston: Allyn & Bacon, 1965.
Jordan, T. E. *The mentally retarded.* Columbus: Chas. E. Merrill Books, 1961.
Kulka, Anna, Fry C. & Goldstein, F. J. Kinesthetic needs in infancy. *American Journal of Orthopsychiatry*, 1960, 30, 562-571.
Lilienfeld, A. M. & Pasamanick, B. The association of maternal and fetal fac-

tors with the development of mental deficiency II: Relationship to maternal age, birth order, previous reproductive loss and degree of mental deficiency. *American Journal of Mental Deficiency*, 1956, 60, 557-569.

McCurdy, H. G. The childhood pattern of genius. *Journal of Elisha Mitchell Science Society*, 1957, 73, 448-462.

Masland, R. L., Sarason, S. G., & Gladwin, T. *Mental Subnormality*. New York: Basic Books, Inc., 1958.

Rosenberg, B. G. & Sutton-Smith, B. The relationship of ordinal position and sibling sex status to cognitive abilities. *Psychonomic Science*, 1964, 1, 81-92.

Sampson, E. E. Birth order, need achievement, and conformity. *Journal of Abnormal and Social Psychology*, 1962, 64, 155-159.

Sarason, S. B. *Psychological Problemsi n Mental Deficiency*. New York: Harper & Brothers, 1949.

Scheerenberger, R. C. A current census of state institutions for the mentally retarded. *Mental Retardation*, 1965, 3, 4-6.

Schooler, C. J. Birth order and hospitalization for schizophrenia. *Journal of Abnormal and Social Psychology*, 1964, 69, 574-579.

Tarjan, G. Prevention—A program goal in mental deficiency. *American Journal of Mental Deficiency*, 1959, 64, 4-11.

U. S. Department of Health, Education, and Welfare, Public Health Service. *Patients in mental institutions 1961: Part I, public institutions for the mentally retarded*. Washington, D. C.: U. S. Dept. of Health, Education, and Welfare, 1964.

Warren, J. R. Birth order and social behavior. *Psychological Bulletin*, 1966, 65, 38-49.

Wunsch, W. L. The first complete tabulation of The Rhode Island Mental Deficiency Record. *American Journal of Mental Deficiency*, 1951, 55, 293-312.

Yarrow, L. J. Maternal deprivation: Toward an empirical and conceptual re-evaluation. *Psychological Bulletin*, 1961, 58, 459-490.

ABSTRACT

Altus' review of the literature (*Science*, 1966) on the relation of birth order to eminence, intelligence, college attendance and other social parameters was generally consistent in finding first-borns to be over-represented. Complementary evidence at the lower end of the intellectual continuum following an extensive review of the mental deficiency literature appeared non-existent. To partially fill this lacuna, an effort was made to provide evidence concerning the relation between ordinal position of birth and mental deficiency. Data were obtained for 4,398 institutionalized retardates. First-borns with siblings were compared with later-borns on the variables of family size, sex, ethnicity, intelligence, and socioeconomic status, yielding significant differences between observed and expected frequency distributions on groupings of family size, intelligence, and father's educational level. Only-children were studied separately; the distribution being significantly different from expectation on the variables of ethnicity, intelligence, and father's educational attainment. Two methodological issues relevant to birth order studies are considered and implications are discussed in terms of family interaction patterns.

RESUMEN

El examen de Altus de la literatura (*Science*, 1966) sobre la relación del orden de nacimiento a la eminencia, inteligencia, asistencia a la universidad y otros parámetros sociales, fue generalmente consistente al encontrar a los primogénitos como sobre-representados. La evidencia complementaria en la parte inferior del continúum intelectual, después de un extenso repaso de la literatura sobre deficiencia mental, apareció inexistente. Para llenar parcialmente esta laguna, se hizo un esfuerzo para dar evidencia sobre la relación entre la posición ordinal de nacimiento y la deficiencia mental. Se obtuvieros datos para 4,398 retardados institucionalizados. Los primogénitos con hermanos fueron comparados con otros nacidos más tarde, con variable del número en la familia, sexo, origen étnico, inteligencia y estatus socio-económico, dando diferencias significantes entre la frecuencia de distribución observada y esperada de agrupamientos de tamaño de familia, inteligencia y el nivel educacional del padre.

Por separado se estudiaron los hijos únicos, la distribución tuvo marcadas diferencias de las que se esperaban en las variables de origen étnico, inteligencia, y el logro educacional del padre. Se consideran dos problemas metodológicos relativos al estudio del orden de nacimiento y se discuten las implicaciones en términos de la interacción de diseños de familia.

RESUMO

A revisão da literatura levada a efeito por Altus (*Science*, 1966) sôbre a relação da ordem de nascimento à eminência, estudos universitários, e outros parâmetros sociais, mostrou uma consistência geral indicando uma super-representação de primogênitos. Dados complementares no extremo baixo do contínuo intelectual, provenientes de uma revisão da literatura no campo da deficiência mental, não foram encontrados. Com o fim de preencher esta lacuna, pelo menos de modo parcial, uma tentativa para prover dados a respeito da relação entre posição ordinal de nascimento e deficiência mental foi levada a efeito. Dados foram obtidos para 4.398 retardados institucionalizados. Primogênitos (com irmãos) foram comparados com não-primogênitos segundo as variáveis tamanho da familia, sexo, origem étnica, inteligência, e status sócio-econômico, mostrando os resultados diferenças significativas entre distribuições de frequências esperadas e observadaas em agrupamentos de tamanho da família, inteligência, e nível de educação do pai. Filhos únicos foram estudados separadamento, diferenças significativas tendo sido encontradas nas variáveis origem étnica, inteligência e nível de educação do pai. Duas questões metodológicas relativamente a estudos de ordem de nascimento são consideradas, e certas possibilidades interpretativas são discutidas em têrmos de padrões de interação familiar.