

estimated from the matrix of IQ correlations involving biological mothers, their adopted-away offspring, adoptive parents, and the natural children of the adoptive parents.

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TWINS: COGNITIVE PATTERNING AND DEVELOPMENT AS MEASURED ON THE WECHSLER PRESCHOOL AND PRIMARY SCALE OF INTELLIGENCE

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Cognitive patterning and development was appraised for 142 pairs of twins at 4, 5, and 6 years of age, based on their test scores on the WPPSI. Compared with singletons, the twins showed an initial lag at age 4, with V-IQ more depressed than P-IQ, but by age 6 the deficit was fully recovered. MZ twins displayed high within-pair correlations for V-IQ and P-IQ at age 4, and the correlations further increased by age 6 as the measures of IQ became stabilized. MZ twins also showed significant concordance for the patterning of subtest scores. DZ twins displayed moderate within-pair correlations for IQ which declined somewhat over age, and which fell significantly below the MZ correlations. Measures of family socioeconomic status and parental education correlated 0.28-0.32 with the twins' IQ at age 6. The results indicated that within a broad range of home environments, the genotype exercised a profound influence on childhood mental development. It was coded not only for a general factor, as represented in Full Scale IQ, but also for the differential strength of the composite abilities which were separately measured on the Verbal and Performance Scales. In addition, the genotype was coded for the patterning of relative strengths and weaknesses as revealed on the individual subtests.

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TWINS: CONCORDANCE IN INFANT DEVELOPMENT AS MEASURED ON PIAGET-TYPE SCALE

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Bayley's Mental Scale was examined to determine which items were comparable to those found on Piagetian-type instruments used to assess infant development. Fifty items were found appropriate for infants during the first year of testing (at 3, 6, 9, and 12 months), and 10 items were found for the second year of testing (at 18 and 24 months). Test data based on infant twins' responses to Bayley's Mental Scale were reanalyzed to determine if genetic influences could be found for infants' responses to a Piagetian-type scale. Within-pair correlations were obtained for 126 same-sex twin pairs (82 MZ, 44 DZ) during the first year, and 154 same-sex twin pairs (91 MZ, 63 DZ) during the second year. During the first year, the within-pair correlations for MZ and DZ twins were 0.83 and 0.55, respectively; during the second year, the correlations were 0.66 and 0.40. Despite the restriction in range of scores, especially during the second year, the data indicate that there are genetic influences on infant behavior assessed by Piagetian-type items analogous to those found for conventional infant mental tests.

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PSYCHOLOGICAL FOLLOW-UP STUDY IN TWINS FROM BIRTH TO FIVE YEARS

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Classical psychological twin studies, planned as investigations of the respective influence of nature and nurture, have yielded

in part equivocal and sometimes contradictory results. Besides the complexity of the problem, the delicate character of the diagnosis, and the rudimentary tools which were used, several other factors are underlying this situation:

1. Insufficient systematization of the set-up and the careless design of the investigations.
2. Lack of follow-up studies which allow to follow the phenomena in their evolution and, on each level, to take into account a series of precedents which were registered in due time. Naturally, one should herewith dispose of a systematic series of hypotheses and alternate hypotheses. Confusion between correlation and causal relationship is too frequent, due to lack of view on alternate explanation and of data on other aspects and relationships.
3. Uncertain diagnosis of zygosity; in MZ twins no attention to, nor data on, the age of the ovum at the time of cleavage.
4. Lack of consideration for antenatal and perinatal influences.
5. No attention paid to the typical circum-

stances which are linked to the twin situation, with the added possibility that differences exist between MZ and DZ twins.

All this makes it difficult to balance nature against nurture on the basis of comparison between MZ twins, DZ twins, and singletons. Interactions may also appear between the effect of twinning and other factors such as the socioeconomic circumstances. Because of these reasons, we started a new investigation which ran into great difficulties. Besides the twins, a group of matched control singletons was constituted. For the time being the follow-up study is completed up to the age of 5 years in 13 MZ and 20 DZ twin pairs (+ controls, that is to say, 99 children). For the younger-age group are the numbers already larger. The children were observed and subjected to psychological tests at the age of 6 months and of 1, 2, 3, 4, and 5 years. This interim report allows only for limited conclusions.

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2. Personality Development

A TWIN STUDY OF CREATIVITY AND OF ESTHETIC AND EMOTIONAL EXPERIENCES

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A battery of tests was administered to a total sample of 61 (36 MZ and 25 DZ) same-sexed twin pairs, aged 18 to 25 years and approximately equally subdivided between male and female.

The tests included the Barron-Welsh Art Scale, the Perceptual Acuity Test, the Gottschaldt Figures, the Child Esthetic Preference Test, the M-threshold Inkblots, the Frank Drawing Completion Test, and the Gough Adjective Check List.

The variables of central interest were the perceptual and esthetic preference and expression measures. The Adjective Check

List was included as a measure of self-perception that surveys a large number of traits. Moreover, the twins were asked to go through the 300-item checklist under three different conditions: (1) describing themselves, (2) describing the cotwin as the cotwin would describe himself, and (3) guessing at what adjectives the cotwin would check under condition 2.

The results show relatively high heritability estimates for the human-empathic response to the M-threshold inkblots ($h^2 = 0.61$ for threshold for human movement and 0.69 for volume), as well as for the Gottschaldt Figures ($h^2 = 0.66$), the quality rating of productions on the Frank Drawing Completion Test ($h^2 = 0.63$), and the Perceptual Acuity Test ($h^2 = 0.55$).

The most important aspect of the Adjective Check List analysis is revealed in the sets of specific adjectives that show greater concordance among MZ twins, such as *artistic*, *inventive*, *dreamy*, *imaginative*, and *original*. If these are considered as a cluster, heritability estimates range from 0.60 to 0.80.