SEX DIFFERENCES IN THE DEVELOPMENT OF INDEPENDENCE OF INFANT MONKEYS

by
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(With 12 Figures)
(Rec. 7-III-1967)

In our laboratory, the roles of the mother and infant in the development of mutual independence have been the focus of a longitudinal study of monkeys. The interaction between mothers and their infants, observed as pairs, has been studied through the first six months of the infants' lives (JENSEN et al., 1967). The experiment was structured to give consideration to the effects of different physical and social environments on this relationship. The design has permitted an analysis of differences in it when the sex of the infant is the independent variable and the environment is controlled.

From our general observations of mother-infant pairs two specific hypotheses were formulated for test. First, the relationship between a mother monkey and her son differs from that between a mother and her daughter, even in the early weeks after birth. Second, there is greater and earlier mutual independence between mothers and sons. More specifically, we believed that male infants are more active, climb on their mothers more and receive more punishment than females, and that these and other facets of the infants' and mothers' roles in determining sex differences could be tested.

EXPERIMENTAL DESIGN AND PROCEDURE

Female pigtailed monkeys (*Macaca nemestrina*), which had matured to adolescence or adulthood in the wild, were bred in the laboratory. These mothers and their infants lived as individual pairs in highly simplified and controlled environments. The privation environment was a cage, approximately 4 ft square, situated in a soundproof room. A mother and her infant thus were denied variation in visual and auditory stimulation. The walls of the

1) These studies were aided by grant FRoo166 from the National Institutes of Health.
cage although smooth permitted climbing, and there were no objects to manipulate. In contrast, the more varied or "rich" environment included monkeys caged nearby which could be seen and heard. Furthermore, the cage contained a variety of objects to be manipulated or climbed and these were changed daily.

The data were obtained by a quantitative observational method. It was developed for rapid recording of items of behavior, termed "behavioral units" (Bobbitt et al., 1964). When recorded with a system of codes, these units document each event in its sequence of occurrence. In short, they tell who did what to whom in what position relative to the other monkey. Observers maintained reliability at the average level of 80% agreement (Bobbitt et al., 1966).

Development has been evaluated statistically through analysis of variance and trends, using the techniques described by Edwards (1950), as modified by Grant (1956), and programming them for the computer. 1) Detailed description of the social development in monkeys could thus be begun with statistical confidence. Such description is the first step in creating hypotheses about the many variables in behavioral development; i.e., the factors or laws governing this process.

Analysis was performed on data for the first 15 weeks of life for five male and five female infants and their mothers. These pairs were selected for a balanced sampling of both environments, three of each sex for the privation environment and two of each sex from the varied environment. Although environment had some effect on the results, only the measures that differentiate the sexes, irrespective of environment, are presented here.

DEVELOPMENT OF MUTUAL INDEPENDENCE

The relative positions or closeness assumed by the mother and infant are basic to the concept of independence. Animals which mostly cling together are obviously more dependent on each other than those which pursue individual activities in different areas of the cage. Four relative positions of mother and infant were defined on a continuum from closest contact to complete separation (Bobbitt et al., 1964). In Position 1, the infant is clinging to the mother's ventral surface with both hands and usually both feet as well. In Position 2, the infant is still in the mother's "lap" area, but is clinging to the mother with only one hand. In Position 3, the animals are still in contact but the infant is outside the "lap" area. In Position 4, space is clearly visible between the animals.

As the most physically separated, Position 4 is the most independent one.

1) These programs are available as listings, Fortran cards, and binary cards.