

# Social Preferences of Mother and Infant Squirrel Monkeys Following Different Rearing Experiences

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Mother and infant squirrel monkeys that were previously housed together in either a social or restricted environment were given the opportunity to select each other, an unfamiliar female, an unfamiliar infant, or an empty cage, in a free-choice situation. The time spent with the different choices was used as an index of the animal's preference. Five of the six socially reared infants clearly preferred their mother to the other choices, whereas only one (the youngest) of the six infants reared alone with its mother showed a preference for her. Most of the mothers in both groups did not show any preference among the four choices, although two mothers from the social group and two from the restricted group did spend considerably more time with their own infant. The difference between the two groups of infants is discussed in terms of differences in the environmental characteristics and mother-infant relationship of the two rearing environments.

Rhesus and pigtailed macaque mothers housed with their infants in a socially restricted environment are more punitive and less protective of their infants than mothers housed with their infants in a social group (Hinde & Spencer-Booth, 1967; Jensen, Bobbitt, & Gordon, 1968; Wolfheim, Jensen, & Bobbitt, 1970). Kaplan (1972) has recently reported similar results for mothers of a New World species, the squirrel monkey (*Saimiri sciureus*). As an extension of this latter study, the present experiment is the first of a series designed to examine the effects of different rearing experiences in the squirrel monkey. More specifically, the "emotional attachment" between mothers and infants

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reared together in either a social or restricted environment was measured by their preference for each other in a free-choice situation.

### Method

The animals studied were mother-infant pairs of squirrel monkeys (*S. Sciureus*) previously housed together in either a social or restricted environment (Kaplan, 1972). Five mother-infant pairs, and a sixth infant that was fostered by one of the mothers, were housed as a group in a cage 92-cm wide, 66-cm deep, 154-cm high (social environment). Six mother-infant pairs were individually housed in cages 61-cm wide, 46-cm deep, 41-cm high (restricted environment). They were placed into these environments shortly after birth and remained in them until the present experiment began. Both social and restricted groups were housed in their respective environments in the same animal room. Mothers and infants in the restricted environment, therefore, could see and hear but not touch the other animals.

All infants were separated from their respective mothers on the same day, and on the following day their preferences were measured. The ages of the infants at the time of separation are presented in Table 1. Mother preference was measured one day after the infants' preference was measured.

The test apparatus was made of galvanized steel walls and a wire mesh floor and contained four alleys with a central intersection (Fig. 1). It rested on a metal frame 46-cm above the ground. In addition, a wire mesh ceiling was used to

TABLE 1. Ages that infants were separated from their mothers and tested on social preferences.

Infant	Sex	Separation Age (wks)
<u>Social</u>		
15	F	24
16*	M	24
17*	M	23
18	F	22
20	M	22
21	M	22
<u>Restricted</u>		
13	F	25
14	M	22
19	M	22
22	M	22
23	M	18
25	M	14

\*Reared by same mother.

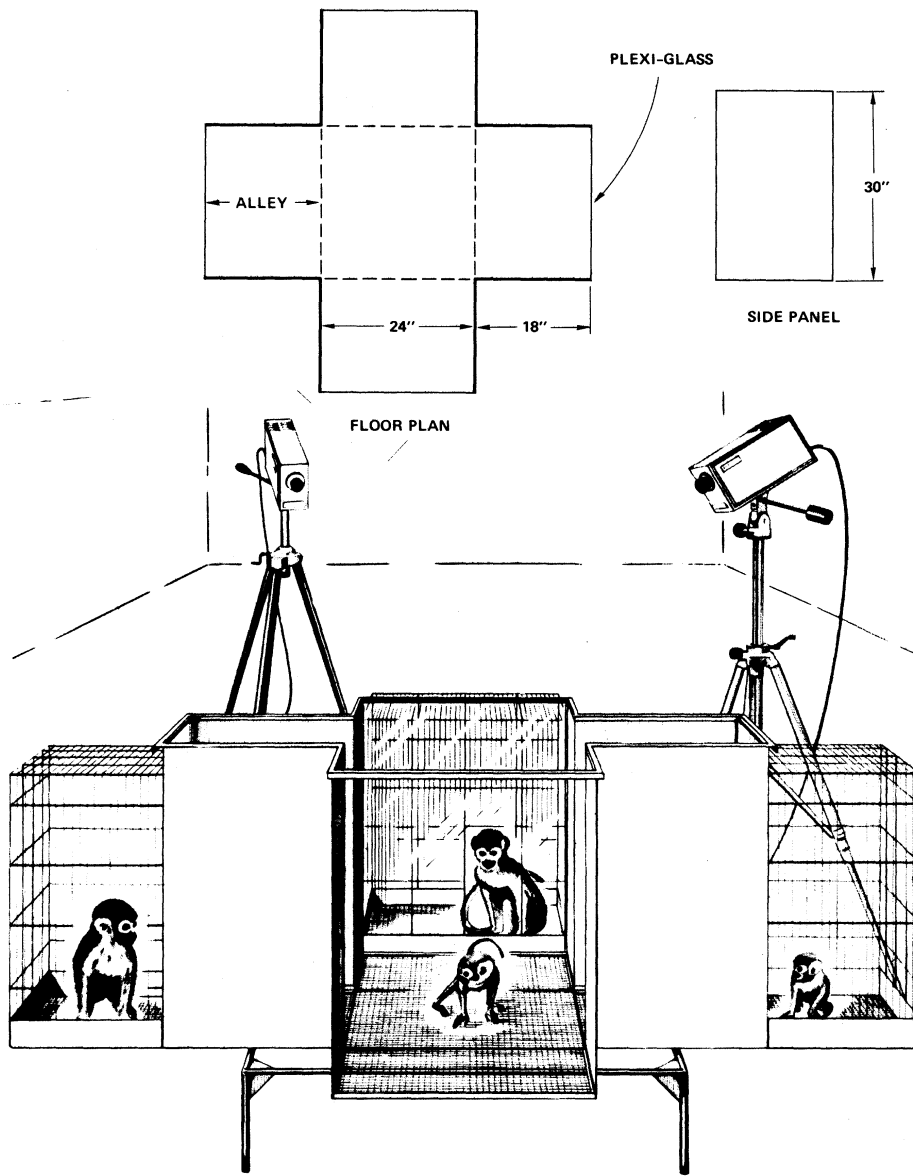


Fig. 1. Test apparatus (empty cage adjoining 4th alley not shown).

prevent the mothers from jumping out when they were tested. A cage in which stimulus monkeys could be presented was located behind a Plexiglas window at the end of each alley. For the preference tests, three of the cages contained: (a) infant's own mother or mother's own infant, (b) unfamiliar female adult, or (c) unfamiliar infant, 37 weeks of age; the fourth cage remained empty. The same unfamiliar stimulus adult female and stimulus infant were used for all preference tests. The testing sequence of each monkey and the alley position for

the stimulus monkey was randomly selected and balanced for both groups of adults and both groups of infants. Preference scores for each animal were obtained in one 12-min session by observing the animal on closed-circuit TV and recording its time in each alley during successive minutes. Prior to the 12-min choice session, infants were placed under a Plexiglas container in the central intersection for 5 min, allowing them to view all the alleys. However, infants rarely oriented during this period; instead most infants from both groups tried frantically to escape. Mothers were simply placed into the central intersection and randomly faced at the start of the 12-min session. The mother that reared two infants served twice as a subject (she was tested as the first adult with one infant and as the last adult with the other infant) and twice as a stimulus choice, once for each of her infants.

### Results

The infants appeared to be quite disoriented immediately after they were released from under the Plexiglas container at the beginning of the choice period. All of them ran into the alley they were facing initially and remained there throughout most of the first min. After this time, the social infants spent on the average half or more of each succeeding minute in the alley adjoining their mother's cage, as compared with the restricted infants who generally spent less than 25 sec of each succeeding minute in their mother's alley (see Fig. 2). The difference between the two groups in preference for own mother during this period was statistically significant ( $p < .02$ , Mann-Whitney U-test).

Individual scores for the infants of both groups are presented in Fig. 3. Five

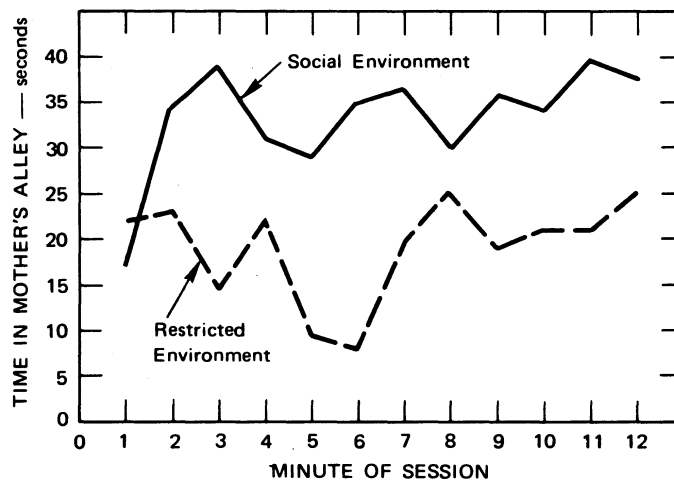


Fig. 2. Mean time spent in alley adjoining mother's cage on successive minutes of 12-min test session for infants from social and restricted environments.

of the 6 infants reared with their mother in the social environment spent considerably more time in her alley than in any of the other alleys, whereas only the youngest (#25) of the 6 infants from the restricted environment showed a similar preference. Moreover, 1 infant from the restricted group showed a preference for the unfamiliar adult female whereas another preferred the unfamiliar infant. All of the infants from both groups clearly preferred the social stimuli over the empty cage.

The behavior of the two groups of infants was also qualitatively different. During the first few minutes of the session many of the infants from the social environment repeatedly lunged at and banged into the Plexiglas window separating them from their mother; only a few such responses were directed at other windows. Infants from the restricted environment rarely exhibited this behavior, but when they did, they randomly directed it toward the various windows.

The infants choice behavior did not appear to be influenced by either their mother's behavior or that of the other stimulus animals. Only one mother (#15's mother) from the social environment displayed any noticeable excitement, e.g., repeated vocalization, pacing, and attempts to retrieve her infant when her infant was tested in the apparatus.

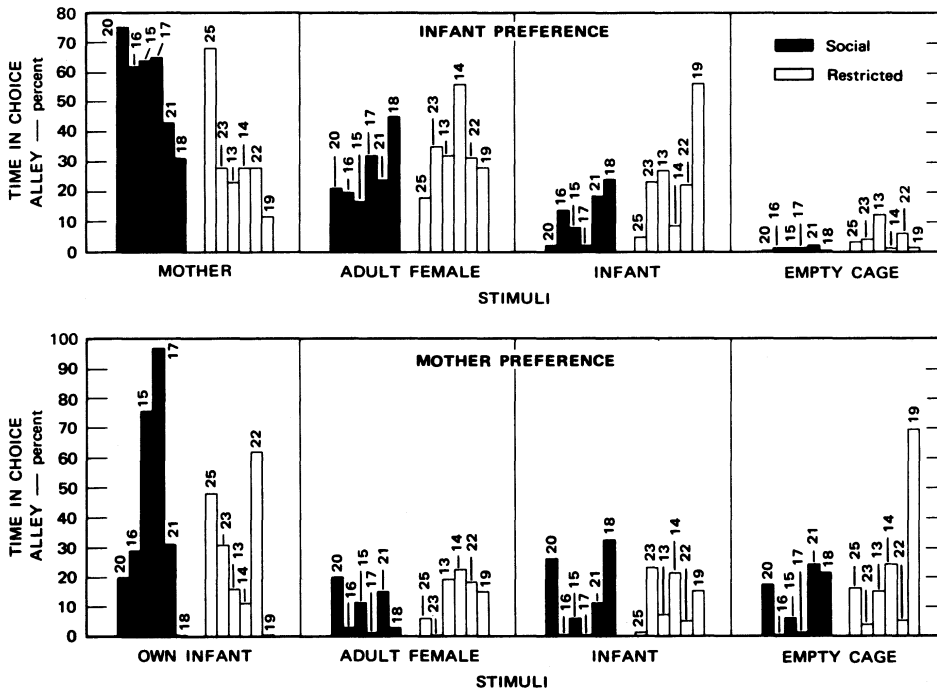


Fig. 3. Percent of time spent in 4 choice alleys for individual infants (top) and individual mothers (bottom) from social and restricted environments. Numbers above bars refer to infants' ID.

The data for the individual mothers are also presented in Fig. 3. Neither group of mothers showed a consistent preference for any one of the stimulus choices. The 1 mother from the social group that became excited when her infant was tested behaved in a similar fashion when she was tested, and spent 76% of her time in her infant's alley. The social mother that reared 2 infants (#16 and #17) spent 97% of her time with one of them (#17), but this high score is somewhat misleading because she consistently faced away from her infant and spent her time just inside the entrance to the alley and thereby provided a misleading high score. Two mothers from the restricted group spent considerably more time in their infant's alley than what might be expected merely on the basis of chance. One mother (#19) from the restricted group preferred the alley with the empty cage. Other mothers, regardless of which group they were from, distributed their time rather evenly among the alleys, including the alley containing the empty cage. Most of the mothers were extremely active throughout the entire 12-min session when they were tested, and spent much of their time climbing on the ceiling and attempting to get out of the apparatus. These latter responses accounted for many of the relatively low total scores for the 4 choice alleys.

### Discussion

Controlled observations and measurements of the present study indicate that shortly after separation the social preference of infants, but not mothers, is influenced by their preceding living arrangements. Most infants reared from birth with their mother in a social environment containing other mothers and infants consistently and persistently, over a period of 12 min, preferred her to an unfamiliar adult female or an unfamiliar infant. Most restricted infants, reared only with their mother, did not show a consistent preference for any of the stimulus choices. The single case of the youngest infant from the restricted group showing a marked preference for its mother, suggests that an infant's age may overshadow the effects of restricted and nonrestricted rearing conditions with regard to the display of social preferences. Thus, these effects may not be manifested until the infant reaches a critical age.

The specific reasons for modification in the strength of the infants' attachment to their mother is not immediately apparent. They may be attributed to differences in the physical characteristics of the two rearing environments or differences in the previous mother-infant relationship, or both. For example, the monkeys in the restricted group were somewhat limited in their three-dimensional movement and exposure to environmental stimuli since their cages were more confined than the one which housed the social group. The sudden change to a more stimulating environment may have facilitated exploratory behavior in these infants and thus interfered with mother

preference. Moreover, it should be noted that the novelty of the test apparatus did not merely produce random activity in the restricted infants, for even they preferred social stimuli to the empty cage. Perhaps more important than the physical living conditions, was the difference in the mothers' behavior toward their infants in the two environments. Mothers in the social environment were more protective, while mothers in the restricted environment were more punitive and apparently less concerned with their infants (Kaplan, 1972). Whether these differences actually affected the infants' choice behavior can not be determined at this time. However, Wolfheim, Jensen, and Bobbitt (1970) have recently presented evidence for the pigtailed macaque suggesting that group-housed mothers, who are more protective of their infants, also develop a closer relationship with them as compared with socially restricted mothers.

Another alternative explanation for the present results might be called the "familiarity breeds contempt" hypothesis. That is, restricted infants who have been living in a small cage with their mother as the primary source of social stimulation, become more likely at a given age to explore other sources of social stimulation than infants raised in a social environment.

### Notes

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