



Harlow, H. F. & Zimmerman, R. R. Affectional responses in the infant monkey. Science, 1959, 130, 421-432.

Reviews some of his findings from his article "The Nature of Love" as well as describing some tentative new ones.

surrogate

Infant monkeys were fed on/wire mothers and cloth mothers. Over 165 days, a distinct preference of both groups were seen for the cloth surrogate mother. Very obvious from this and other data that contact comfort is a variable of critical importance in the development of affectional responsiveness to the surrogate mother and that nursing appears to play a negligible role. "With increasing age and opportunity to learn, an infant fed from a lactating wire mother does not become more responsive to her, as would be predicted from a derived drive theory, but instead becomes increasingly more responsive to its nonlactating cloth mother. These findings are at complete variance with a drive-reduction theory of affectional development" (423).

Cloth mother was preferred over gauze-covered heating pad...indicates that differential heating (between wire and cloth mother) is not a critical variable. Preference also significantly observed when infants were presented with a fear stimulus. After receiving "comfort" from cloth mother, infant monkey would then venture out, using mother as base of operations, to explore the stimulus. Monkeys given presence of wire mother would not do this, showed a constant fear response, did not run and grasp surrogate mother, would not explore, etc. All results are striking---suggest that primary function of nursing may be that of insuring contact comfort. Monkeys with wire mothers, in presence of fear stimulus, would either clutch themselves and rock and vocalize or rub against the side of the cubicle. These monkeys (those raised with the single wire mother) had the highest emotionality scores of all groups. Presence of mother did not reduce emotionality.

Butler, in 1953, (J. comp. physiol. psych., 46, 95-) demonstrated that mature monkeys enclosed in a dimly lighted box would open and reopen a door for hours on end with no other motivation than that of looking outside the box. Also showed that that there was selectivity in rate and frequency of door-opening in response to stimuli of different attractiveness. Harlow used this in his experiments; With infants raised on cloth mothers, they showed equal responsiveness (rate and frequency of door opening in regard to the stimulus which they could then see) to the cloth mother and to another infant monkey, and no greater responsiveness to the wire mother than to an empty box. Again, the results are independent of the kind of mother, cloth or wire, that was the feeding (lactating---bottle placed in chest area of surrogate mother) mother. Infants raised with only a wire mother ~~xxx~~ were more highly ~~responsive~~ responsive to the monkey than to either of the mother surrogates, also showed a higher frequency of response to the empty box than to the wire mother.

"In summary, the experimental analysis of the development of the infant's monkey's attachment to an inanimate mother surrogate demonstrates the overwhelming importance of the variable of soft body contact that characterized the cloth mother, and this held true for the appearance, development, and maintenance of the infant-surrogate-mother tie. ...also..without the factor of contact comfort, only a weak attachment, if any, is formed. Finally, probably the most surprising finding is that nursing or feeding played either no role or a subordinate role in the development of affection, as measured by contact time, responsiveness to strangeness, and motivation to seek and see. No evidence was found indicating that nursing mediated the development of any of these responses, although there is evidence indicating that feeding probably facilitated the early appearance and increased the early strength of affectional responsiveness. Certainly feeding, in contrast to contact comfort, is neither a necessary nor a sufficient condition for affectional development." (428).

In terms of persistency: at time of writing, the whole research program had been initiated less than two years ago, but there was enough evidence available to suggest that the attachment formed to the cloth mother during the first six months of life is enduring and not easily forgotten.



In one test on retention of tie to the ^{cloth} mother, the infant monkeys (after 15 months of separation from surrogate mother) were put into an open-field test (which produces a fear reaction) with surrogate mother, but mother was covered with a clear Plexiglas box. Infants were at first disturbed and frustrated in efforts to secure contact with the mother. After several crashes into the plexiglas box, they adapted to the situation and soon used the box as a place of orientation for exploratory and play behavior. Seems that they gained considerable emotional security from the presence of the mother even though contact was denied. In contrast, infants raised with only lactating wire mothers did not show any significant or consistent trends during the retention sessions other than a general overall reduction of emotionality which could be attributed to a general adaptation, the result of repeated testing.

indicate

"...data ~~indicate~~ that once an affectional bond is formed it is maintained for a very considerable length of time with little reinforcement of the contact-comfort variable. The limited data available for infants that have been separated from their mother surrogates for a year suggest that these affectional responses show resistance to extinction similar to the resistance previously demonstrated for learned fears and learned pain. Such data are in keep with common observation of human behavior" (430).

Bowlby postulated that one of the basic affectional variables in the primate order is not just contact but clinging comfort. This was tested by using four infant monkeys raised with cloth mothers ~~on a cloth-covered inclined plane and on a cloth-covered flat inclined plane~~ and with a cloth covered flat inclined plane. Both objects have same soft cloth, but different shapes, one maximizing clinging, the other minimizing it. Preliminary results suggest that clinging is an important variable. Also used rocking and stationary cloth mothers and rocking and ~~stationary~~ stationary inclined planes. Both groups of infants showed preference for rocking object (as measured in average hours spent on the two objects).

Contact comfort, clinging, and rocking...all seen to be variables of measurable importance to the formation and retention of affection.