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I must admit to sharing fully this belief that research with the nonhuman primates will, in the long run, help to improve the human condition. And, as a psychologist, I naturally assume that this faith is as appropriate for behavioral investigations as for other kinds of research.

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The problem, as Howard E. Hunt has put it, is that ".... without sensible attention to species differences in organization of behavior, development, and other biological arrangements, we will never be able to bridge the species gap inferentially, at will and with confidence."

1. Hunt, H.E.: Problems in the interpretation of "experimental neurosis." Psychol. Rep. 15; 27-35, 1964.

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That a comparable change has occurred in motivational factors or the internal mechanisms that govern behavior seems most likely. In my own work with young chimpanzees I have found it necessary to speak in terms of a generalized motivational state, because more specific motives - fear, aggression, hunger, sex - do not seem capable of rendering a satisfactory account of their behavior. ¹ ² Could these changes - amounting to a generalized reduction in the strength, the efficiency, and the rigidity of instinctive patterns - be the result of the same evolutionary process that has caused the prolongation of primate infancy, and that has led to our description of man as the most neotenus of the primates? Robert Kuttner has argued, I think convincingly, that this is most likely, concluding that the enormous plasticity of behavior which is characteristic of the primates in

general, and of man in particular, is the basis of our intellectual supremacy and the product of a neotenus trend.

1. Mason, W.A.: Determinants of social behavior in young chimpanzees. In: A.M. Schrier, H.F. Harlow and F. Stollnitz (Eds.): Behavior of Non-human primates. New York, Academic Press, 1965, pp.335-364.
2. Mason, W.A.: Motivational aspects of social responsiveness in young chimpanzees. In: Harold W. Stevenson (Ed.): Early Behavior: Comparative and Developmental Approaches. New York, John Wiley & Sons, Inc., 1967. pp. 103-126.
3. Kuttner, R.: An hypothesis on the evolution of intelligence. Psychol. Rep. 6: 283-289, 1960.

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At later stages of behavioral development we find evidence of similar trend toward the "loosening" of motor patterns. Consider locomotion: Rhesus monkeys progress chiefly by walking on all fours. Although they could doubtless be trained to walk bipedally on hands or feet they rarely do so spontaneously. The chimpanzee will often show elaborate variations on the basic quadrupedal pattern. They not only walk bipedally but may also progress by twirling like a ballerina, or in a series of somersaults, or by using their arms as though they were crutches, or by sliding on back or belly across the floor. Social relations, and the use of objects would furnish many other examples of a similar enrichment in motor patterns.

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If it can be shown that behavioral neoteny is a generalized human characteristic, an important conceptual advance will have been made toward understanding many of the distinctive attributes of man: The loose relationship between hormonal factors and sexual and maternal activities; the prominence of such traits as playfulness, curiosity and inventiveness in the behavior of human adults would be seen in a somewhat different light. So too, would the retention of other childlike elements in human behavior - the persistence of infantile needs and attachments, for example. Could neoteny be one of the reasons why it has been so difficult to demonstrate unequivocally the instinctive bases of human behavior, why the vagaries of individual experience seem to play so large a part in human destiny, and why the great students of human nature have felt

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compelled to postulate broad, pervasive forces such as the libido and the death wish to explain the instinctual basis of human conduct? Neoteny is probably a general primate characteristic, but man has gone farthest in this evolutionary venture - a venture in which the reliability and efficiency of instinctive patterns have been sacrificed to achieve the behavioral plasticity and the liberation of psychic energies that play so large a part in human frailties and human achievements.

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Through the courtesy of Dr. Harry Harlow, we obtained three monkeys which had been removed from their mothers within 24 hours of birth and raised in total isolation for the next 12 months. Extensive social and behavioral opportunities were provided to these animals during the ensuing 3 years during which they were exposed to other isolates and to normal monkeys of all ages. The data from these social confrontations, as reported by Rowland,¹ Sackett² and Mitchell³ on their various studies with these monkeys at various stages, demonstrated unequivocally that these monkeys manifested only minimal social interactions and those that did occur were of an increasingly aggressive nature.

1. Rowland, G.L.: The effects of total social isolation upon learning and social behavior in rhesus monkeys. Unpublished doctoral dissertation

University of Wisconsin, 1964.

2. Sackett, G.P.: Response of rhesus monkeys to social stimulation presented by means of colored slides. Percept. Motor Skills 20: 1027-1028 1965.
3. Mitchell, G.D., Raymond, E.J. Ruppenthal, G.K., and Harlow, H.E.: Long-term effects of total social isolation upon behavior of rhesus monkeys. Psychol. Rep. 18: 567-580, 1966.

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The data clearly indicated that the social isolation which had occurred during the first year of life of these now adult monkeys did not affect their capacity to acquire both discriminated instrumental and cardiac responses to avoidance stimuli. It did impair their ability to respond to social stimuli such as the facial expressions that communicated information regarding impending shock. Thus, they could neither express normally nor interpret accurately the social behavior of others of their species. Accordingly, it would appear that the ability to communicate effectively with other members of their species must be acquired by monkeys during early infancy, or not at all. This acquisition may be analagous to the phenomenon of "imprinting," or "primary socialization" described in other species. It is quite possible that the socially deprived monkey's inappropriate

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Such speculations become permissible in the light of the observations by Mason and by Harlow on the many similarities between the bizarre behaviors of the socially isolated monkeys and those exhibited by autistic children. Like these monkeys, autistic children differ from normals in processing facial expressive information. Thus, Hutt and Ounsted recently demonstrated that such children avoid eye-to-eye contact with others and will not even inspect drawings of the human face. While the similarities may be purely coincidental, it is quite possible that the autistic child, like the deprived monkey, is suffering from some innate or acquired flaw in the utilization of the myriad of nonverbal expressive cues in the social milieu that surrounds him.

1. Hutt, C., and Ounsted, C: The biological significance of gaze aversion with particular reference to the syndrome of infantile autism. Behav. Sci. 11: 346-356. 1966.

