

# How Mother-Child Separation Causes Neurobiological Vulnerability Into Adulthood

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The evidence from psychological research is clear: When children are separated from their parents, it can have traumatic repercussions for kids' lives down the line.

But attachment is much more than a feeling — according to [research](#) in *Current Directions in Psychological Science*, it's an umbrella term critical to development across the lifespan.

The attachment bond between a mother and her child is first formed in the womb, where fetuses have been found to develop preferential responses to maternal scents and sounds that persist after birth, explains Myron Hofer, who was director of the Sackler Institute for Developmental Psychology at

Columbia University until his retirement in 2011. These rapid early-learning processes continue during the newborn stage of development, in which children begin to recognize their mothers' faces and voices.

From this point on, early maternal separation can result in a series of traumatic emotional reactions during which the child engages in an anxious period of calling and active search behavior followed by a period of declining behavioral responsiveness.

In a study of infant rats, Hofer found that this behavior was largely a response to the loss of warmth a child receives through bodily contact, nutrients, and other physiological interactions with its mother. While Hofer was able to normalize the cardiac and REM-sleep cycles of neonatal rats in his lab by providing them with artificial warmth, tactile stimulation (e.g., petting them with a paint brush), and abundant milk, this research did not, he writes, account for the role of higher-level behaviors such as reciprocity, imitation, attunement, and play in the mother–child relationship.

“In thinking about the implication of these findings for human infants, one can suppose that these kinds of simple maternal regulators would be found early in a baby’s postnatal period, but that soon more subtle and intricate interactions would become important,” Hofer writes.

Hofer and colleagues also studied the effect of separation on rats in adolescence and adulthood. When submitted to a 24-hour period of immobilization, 80% of adolescent rats who were removed from their mothers before weaning were found to develop stomach ulcers in response to the stress. Normally reared rats, meanwhile, experienced no ulceration at all. Unexpectedly, those same early-weaned rats were then less vulnerable to ulcers in adulthood, when approximately 50% of normally reared rats experienced ulceration, suggesting they may have become less stress-responsive with age.

Though human relationships are more complex than those of rodents, the research suggests that withdrawing maternal support early in a child’s life can have a number of physiological and behavioral consequences that may contribute to a complex, changing pattern of vulnerability over the life span, Hofer says.

“Variations in qualities of mother–infant relationships among humans thus appear to have deep biological roots in the form of their capacity to shape children’s psychological and biological responses to their environment — effects that extend into adulthood,” he writes.

## Resources

Hofer, M. A. (2006). Psychobiological Roots of Early Attachment. *Current Directions in Psychological Science*, 15(2), 84–88. doi:10.1111/j.0963-7214.2006.00412.x

Pascuzzo, K., Moss, E., & Cyr, C. (2015). Attachment and Emotion Regulation Strategies in Predicting Adult Psychopathology. *SAGE Open*, 5, 215824401560469. doi:10.1177/2158244015604695