

Kids whose bond with mother was disrupted early in life show changes in brain

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Children who experience profound neglect have been found to be more prone to a behavior known as "indiscriminate friendliness," characterized by an inappropriate willingness to approach adults, including strangers.

UCLA researchers are now reporting some of the first evidence from human studies suggesting that this behavior is rooted in brain adaptations associated with early-life experiences. The findings appear in the Dec. 1 issue of the peer-reviewed journal *Biological Psychiatry*.

The UCLA group used functional magnetic resonance imaging (fMRI) to demonstrate that youths who experienced early maternal deprivation—specifically, time in an institution such as an orphanage prior to being adopted—show similar responses to their adoptive mother and to strangers in a brain structure called the amygdala; for [children](#) never raised in an institutional setting, the amygdala is far more active in response to the adoptive mother.

This reduced amygdala discrimination in the brain correlated with parental reports of indiscriminate friendliness. The longer the child spent in an institution before being adopted, the greater the effects.

"The early relationship between children and their parents or primary caregivers has implications for their social interaction later in life, and we believe the amygdala is involved in this process," said Aviva Olsavsky, a resident physician in psychiatry at the Semel Institute for

Neuroscience and Human Behavior at UCLA and the study's first author. "Our findings suggest that even for children who have formed attachments to their adoptive parents, this early period of deprivation has led to changes in the brain that were likely adaptations and that may persist over time."

Indiscriminate friendliness is in some sense a misnomer. The behavior is not characterized by a deep friendliness but simply by a lack of reticence that most [young children](#) show toward strangers.

"This can be a very frightening behavior for parents," said Nim Tottenham, an associate professor of psychology at UCLA and the study's senior author. "The stranger anxiety or wariness that young children typically show is a sign that they understand their parents are very special people who are their source of security. That early emotional attachment serves as a bedrock for many of the developmental processes that follow."

Located in the limbic system of the brain, the amygdala is involved in a variety of functions, including detecting the salience of stimuli, and is believed to play an important role in intense relationships and attachments. Studies in rodents have found that the process of forming a maternal bond early in life has powerful effects on amygdala development and attachment-related behaviors. Research has also shown that youths whose early childhood did not include the typical caregiving experience may exhibit a variety of behaviors, including indiscriminate friendliness, but such behavior had not been well characterized at the brain level.

For the study, 67 youths between the ages of 4 and 17 underwent fMRI while they were shown pictures of their adoptive mother and of an unfamiliar female. Approximately half the children had spent time in institutions, ranging from five months to about five-and-a-half years,

before being adopted. As part of the study, the parents of the participating children were given a questionnaire designed to gauge the likelihood of their child wandering away with a stranger, as well as how trusting the child was with new adults.

The UCLA researchers found that while the typically raised children exhibited higher amygdala signals for their mothers relative to strangers, the previously institutionalized youths showed amygdala responses to strangers that were similar to those they showed toward their adoptive mothers. Additionally, the children with a history of institutional rearing showed greater amygdala reactivity to strangers than did the typically raised children. Reduced [amygdala](#) differentiation was correlated with greater reports of indiscriminate friendliness by the parents.

In order to understand the heterogeneity of the sample, the researchers examined the role of age at adoption. They found that children who had been adopted later displayed the least discrimination on the scans and the greatest degree of indiscriminate behavior.

The study raised several questions: What, if any, effects does early maternal deprivation have on children as they move into adulthood? And do these findings also apply to less severe forms of deprivation, such as neglectful home environments? The researchers are continuing to use fMRI to examine the role of parents in brain development and the contribution of early experiences to mental health outcomes later in life.

Provided by University of California, Los Angeles

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