Children of depressed mothers have a different brain

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Researchers think that brains are sensitive to the quality of child care, according to a study that was directed by Dr. Sonia Lupien and her colleagues from the University of Montreal published today in the *Proceedings of the National Academy of Sciences*. The scientists worked with ten year old children whose mothers exhibited symptoms of depression throughout their lives, and discovered that the children's amygdala, a part of the brain linked to emotional responses, was enlarged.

Similar changes, but of greater magnitude, have been found in the brains of adoptees initially raised in orphanages. Personalized attention to children's needs may be the key factor. "Other studies have shown that mothers feeling depressed were less sensitive to their children's needs and were more withdrawn and disengaged," explained Drs. Sophie Parent and Jean Séguin of the University of Montreal's, who followed the children over the years.

Scientists have established that the amygdala is involved in assigning emotional significance to information and events, and it contributes to the way we behave in response to potential risks. The need to learn about the safety or danger of new experiences may be greater in early life, when we know little about the world around us. Indeed, studies on other mammals, such as primates, show that the amygdala develops most rapidly shortly after birth. "We do not know if the enlargement that we have observed is the result of long-term exposure to lower quality care. But we show that growing up with a depressed mother is associated with

enlarged amygdala."

"Having enlarged amygdala could be protective and increase the probability of survival," Lupien said. The amygdala may be protective through a mechanism that produces stress hormones known as glucocorticoids. The researchers noted that the glucocorticoids levels of the children of depressed mothers who participated in this study increased significantly when they were presented with unfamiliar situations, indicating increased reactivity to stress in those children. Adults who grew up in similar circumstances as these children show higher levels of glucocorticoids and a greater glucocorticoid reaction when participating in laboratory stress tests. "What would be the long term consequences of this increased reactivity to stress is unknown at this point."

Although this study cannot clarify the causes of enlarged amygdala, the researchers note that the adoption studies have also shown that children who were adopted earlier in life and into more affluent families than others did not have enlarged amygdala. "This strongly suggests that the brain may be highly responsive to the environment during early development and confirms the importance of early intervention to help children facing adversity," Lupien said. "Initiatives such as prenatal and infancy nurse home visits and enriched day care environments could mitigate the effects of parental care on the developing brain." Séguin adds, "Future studies testing the effects of these preventive programs and observational studies involving children exposed to maternal depressive symptoms at different ages, and consequently for different lengths of time, should provide more insight into how this occurs, its long term consequences, and how it can be prevented."

More information: "Larger amygdala but no change in hippocampal volume in 10-year-old children exposed to maternal depressive symptomatology since birth", *Proceedings of the National Academy of*

Sciences.

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