Genetic Risk for Anxiety Does Not Have to be Destiny

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A growing body of basic animal research and studies of abused and neglected children provide a strong basis of support for the hypothesis that individuals with particular genotypes are at greater risk for depression, anxiety disorders, and problems with the abuse of alcohol and other substances. These gene-by-environment interactions are so powerful that some might assume that these genotypes identify people who are predestined to negative life outcomes.

However, a new study in the May 1st issue of *Biological Psychiatry* (www.elsevier.com/locate/biopsychiat), published by Elsevier, challenges this view. Investigators studied infant monkeys from four different rearing conditions to examine how social context and different forms of early adversity interact with genotype to influence behavior.

Animals reared in small social groups were more likely to be aggressive and anxious, particularly among those with a low activity MAOA genotype. However, no genotype effects were evident in monkeys reared in larger social cages.

There are some circumstances in a child's development - such as abusive parenting - that everyone would agree constitutes "adversity." This study suggests, however, that other, more subtle features of the broader social environment influence development, and that genes that affect our behavioral responses are sensitive to these influences. So even though an infant may be reared with its nurturing mother, the relative absence of other social partners, for both the mother and the infant, can result in the

infant developing an anxious style of responding to challenges, particularly if it possesses a “risky” genotype.

Of particular significance, said senior author John Capitanio, Ph.D., is “that animals that were raised in rich, complex settings with mothers, other kin, and peers, were completely protected from the potentially deleterious effects of having the ‘risky’ form of the MAOA gene.”

Highlighting the importance of this study’s findings, John Krystal, M.D., editor of *Biological Psychiatry*, noted that “we now urgently need research that can tell us whether genetics can help us to do a better job in matching particular maltreated children to supportive interventions. It would seem that in the case of some of the negative consequences of childhood maltreatment, genetics is not destiny but it may seem so if society doesn’t provide these children with help that they need.”

More information: The article is “What is an “Adverse” Environment? Interactions of Rearing Experiences and MAOA Genotype in Rhesus Monkeys” by Genesio M. Karere, Erin L. Kinnally, Jessica N. Sanchez, Thomas R. Famula, Leslie A. Lyons, and John P. Capitanio. Authors Karere and Lyons are affiliated with the Department of Population Health and Reproduction, Kinnally and Capitanio are with the Department of Psychology, and Sanchez and Famula are from the Department of Animal Science, all at the University of California, Davis, California. Kinnally, Lyons, and Capitanio are also with the California National Primate Research Center, University of California, Davis, California. Karere is also from the Institute of Primate Research, Nairobi, Kenya. The article appears in Biological Psychiatry, Volume 65, Issue 9 (May 1, 2009), published by Elsevier.

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