CRIME Times

Linking Brain Dysfunction to Disordered/Criminal/Psychopathic Behavior

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SPECIAL ISSUE: GENES AND BEHAVIOR
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Antisocial children: heredity more to blame than home life

Antisocial children often appear different from birth, and can be nearly impossible to control by the time they reach kindergarten. Historically, intervention to address these children's problems has focused on family therapy, but a new study adds to evidence that antisocial children's difficult behaviors—including physical violence, oppositional behavior, lying, stealing, and bullying—are influenced far more by genes than by home environment.

Louise Arseneault and colleagues analyzed the behavior of 1,116 pairs of 5-year-old twins participating in a longitudinal study. Mothers, teachers, study examiners, and the children themselves evaluated the subjects' levels of antisocial behavior.

The researchers' analysis revealed that the antisocial behavior of children who exhibited problems in all settings was heavily influenced by genetics, with a heritability estimate of 82 percent. When behaviors were reported by only a single informant, the

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Switched monkeys show powerful effects of genes

What makes some children far more aggressive than others? A new study suggests that genetic makeup may be far more important than upbringing.

Rhesus macaques are a "female-bonded" species, in which related females from multiple generations live together. Noting that the aggressive behaviors of young female monkeys are very similar to those of their mothers in these social groups, Dario Maestripieri designed an experiment to determine how much of this similarity stemmed from genetic influences, and how much was a result of exposure to maternal aggression after birth. He selected 10 female infants which he switched immediately after birth to unrelated mothers, who then raised them. There was no physical or visual contact between the infants and their original parents or social groups.

"I was surprised by what we found," Maestripieri says. Observing the young monkeys for three years, he detected no significant associations between the aggressiveness of the babies and the aggression levels of their adoptive mothers. On the contrary, the offspring closely resembled their biological mothers in their rates of both aggression and social contact—particularly during the last two years of the investigation. For instance, monkeys who often used threats and slaps had biological mothers who also exhibited such tendencies.

"It is noteworthy that behavioral similarities between offspring and their biological mothers occurred despite differences in age and reproductive conditions," Maestripieri says. "These similarities may have been even more marked if the offspring had been observed as adults,

Monkeys who often used threats and slaps had biological mothers who also exhibited such tendencies.

and if their mothers had been observed in a period without dependent infants."

Interestingly, the offspring were not similar to their biological mothers in measurements of grooming and submissive behavior. Says Maestripieri, "This raises the possibility that these behaviors are more flexible and dependent on individual or social learning than contact and aggression."

Commenting on the study, primate expert Joan Silk says, "This study adds to a growing body of evidence that temperament and behavioral predispositions vary among individuals and that temperamental differences are stable over the life course.... These findings have important implications for understanding how evolution shapes behavior and temperament in primates and humans."

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"Similarities in affiliation and aggression between cross-fostered rhesus macaque females and their biological mothers," Dario Maestripieri, *Developmental Psychobiology*, Vol. 43, No. 4, November 2003, 321-327. Address: Dario Maestripieri, Animal Behavior Research Group, University of Chicago, 5730 S. Woodlawn Avenue, Chicago, IL 60637, dario@uchicago.edu.

—and—

"Social behavior among monkeys may be more nature than nurture," news release, University of Chicago Medical Center, December 3, 2003.

Editorial

A SECOND LOOK AT NATURE AND NURTURE

The human brain is the most fantastic thing on earth. Nothing could do what the human brain does, yet somehow the brain does it—and keeps getting better at it. During six million years of human development, the brain has continued to enlarge and to become more complex.

Our understanding of the brain is growing as well, although far too slowly. (Only near the end of the last century did the U.S. Department of Health and Welfare decide to declare a "Decade of the Brain.") The Human Genome Project, increasingly sophisticated scanning techniques, and other advances are allowing a greater understanding of how the brain functions and—even more important—how it can malfunction.

One of the most complex features of the brain is its control of behavior, and research in this area is demonstrating that many of our long-held ideas about behavior are incorrect. Not many decades ago, even scientists thought the newborn brain was a "blank slate," and that all behavior, good and bad, was learned. Research now shows conclusively that this idea was wrong. Today researchers estimate that around fifty percent of behavior is genetically acquired, and thus attributable to "nature." Even a trait such as poor logic, which can lead to bad behavior, may be transmitted genetically, possibly by preventing the brain's neurons from connecting normally.

In retrospect, it is surprising that both science and society have been so slow to recognize that if people can genetically acquire hair and eye color, a predisposition to diabetes, and so much more, we can also inherit different behaviors—just as dogs and horses inherit different behavioral tendencies. It is equally remarkable that it has taken us so long to understand that when a malfunctioning brain is inherited, bad behavior can be the result.

The 'nurture' factor

It doesn't take much calculation to determine that if "nature" is responsible for 50 percent of behavior, "nurture" has to be responsible for the other half. Because society thinks of nurturing as pertaining to home conditions, and especially parenting, billions of dollars are spent by governments in an effort to improve troubled children's home environments.

Not many decades ago, even scientists thought the newborn brain was a "blank slate," and that all behavior, good and bad, was learned. Research now shows conclusively that this idea was wrong.

These billions, however, are failing to help. Why? Judith Rich Harris in her book, *The Nature Assumption*, presents a strong argument that neither home conditions nor parenting have any effect on the development of a child's personality and behavior. Harris shows, step by step, how past research on the subject was flawed due to errors of correlation, and errors in confusing cause with effect. (For example, researchers often attributed children's behavior problems to parental discipline styles, failing to note that those disciplinary styles frequently evolved in response to children's aberrant behavior.) Indeed, Harris cites evidence showing that peers have a greater influence on a child's behavior than parents do.

The effect of both parents and peers on behavior, however, is dwarfed by another form of "nurture:" a child's biophysical environment. For example, malnutrition, smoking, or alcohol use by the mother during gestation can adversely affect the brain of a fetus in ways that alter the child's behavior forever. So can birth trauma, postnatal malnutrition, or exposure to environmental contaminants. Moreover, research shows that many children are particularly vulnerable to these insults, due to their genetic makeup.

It is critical that we recognize the crucial role that genes, often coupled with biological insults, play in determining behavior. Parents, including parents of adopted children, need to realize that if their children have "gone bad," it may be the result of an innate genetic vulnerability or physical insult rather than psychological trauma. And governments need to realize that a far greater share of the funds targeted at reducing crime and violence should be spent on finding ways to help the genetically vulnerable children who are most at risk for dangerous brain dysfunction.

QUOTABLE

"The fact that complex behavioral patterns can be triggered by a tiny concentration of molecules coursing through the bloodstream, and that different animals of the same species generate different amounts of these hormones, is something worth thinking about when it's time to judge such matters as free will, individual responsibility, and law and order."

Carl Sagan, in
Shadows of Forgotten Ancestors

Memories of mom and dad: are they influenced by genes?

Psychotherapy is based largely on the idea that children's relationships with their parents affect their later adjustment in adulthood. A new study suggests, however, that the genetic makeup of the children themselves can significantly influence their memories of how they were raised.

Paul Lichtenstein and colleagues studied 150 pairs of identical (monozygotic) twins, and 176 pairs of fraternal (dizygotic) twins, all female. Because fraternal twins share only half as many genes as identical twins, differences between the two can be used to determine the effects of heredity.

The researchers asked the women to describe their own personal characteristics, and to report their memories of their relationships with their parents. "Quantitative genetic analysis showed moderate genetic influences for remembered parental warmth," they say, "which also was partly explained by genetic influences for optimism, aggression, and humor." Environmental influences, conversely, appeared to affect memories of whether parents were protective or authoritarian (although an earlier study by a different research group found modest effects of genetics on adults' recollections of parental protectiveness or authoritarianism).

Lichtenstein et al. say, "It is possible that these associations at least partly reflect the impact of the personal characteristics [of the child] upon parenting—in other words, humor and optimism elicited more parental warmth, aggression less." It is also possible, they say, that the personality traits of the children affected how they remembered their

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Twin study traces roots of psychopathic behavior

Psychopaths make up a minority of criminals, but the damage they cause far outweighs their numbers. Nearly two-thirds of psychopathic offenders commit another crime within three years of release from prison, compared to only one-quarter of non-psychopathic prisoners, and psychopaths released from prison are far more likely than other former inmates to commit a violent crime.

Because there is evidence that heredity plays a role in psychopathy, several research groups are focusing on teasing out the effects of genes on different facets of psychopathic behavior. A recent study by Jeanette Taylor and colleagues sought to determine the influence of genes on two trait dimensions that define psychopathy: impulsive/antisocial behavior, and callous/unemotional personality.

> Taylor et al. say their findings indicate that psychopathic traits are present before adulthood, and stem to a significant degree from genetic factors.

The researchers studied two separate groups of teenaged male twins. One group included 142 identical (monozygotic) and 70 fraternal (dizygotic) twin pairs, while the other included 128 identical and 58 fraternal twin pairs. All of the teens completed the Minnesota Temperament Inventory (MTI), a questionnaire that includes subsets assessing antisocial traits and detachment.

The researchers say their results indicate a significant influence of genes on each trait dimension, and a common genetic influence on these two trait dimensions. The latter, they say, is "consistent with the notion of common biological substrates for impulsivity/antisocial behavior and emotional detachment." Slightly more than half of the co-variation between the two trait dimensions was associated with genetic factors, while slightly less than half was associated with non-shared environmental factors (differences in peer groups and other non-familial factors).

Taylor et al. say their findings indicate that psychopathic traits are present prior to adulthood, and stem to a significant degree from genetic factors. "The results of this study also suggest that shared environmental factors are not particularly salient in the development of psychopathy traits," they say.

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"Genetic and environmental influences on psychopathy trait dimensions in a community sample of male twins," Jeanette Taylor, Bryan R. Loney, Leonardo Bobadilla, William G. Iacono, and Matt McGue, *Journal of Abnormal Child Psychology*, Vol. 31, No. 6, December 2003, 633-45. Address: Jeanette Taylor, Department of Psychology, Florida State University, Tallahassee, FL 32306-1270, taylor@psy.fsu.edu.

SEEKING MORE RESOURCES?

Researchers and scholars interested in obtaining in-depth information about many of the latest developments in genetic research pertaining to behavior may wish to review several hundred research abstracts available online at http://www3.interscience.wiley.com/cgi-bin/abstract/105057253/ABSTRACT. The abstracts, which describe presentations given during the XIth World Congress of Psychiatric Genetics, appear in the *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, Volume 122B, Issue 1, Sept. 11, 2003, pages 1-178.

In addition, see *Crime Times* Vol. 7, No. 1, 2001, a special issue on the role of genes in criminality, substance abuse, and aberrant behavior.

Studies show suicide runs in families; gene effects cited

Family members of suicide victims are at higher-than-average risk of attempting suicide themselves. A new study by D. A. Brent and colleagues indicates that genes contribute powerfully to this risk.

The researchers compared the offspring of three groups of people suffering from mood disorders:

- Suicide attempters with siblings who also tried to commit suicide.
- Suicide attempters with siblings who had not tried to commit suicide.
- Non-suicidal individuals with non-suicidal siblings.

Brent et all report that the offspring of the first group (in which both the parent and a sibling of the parent had attempted suicide) had a higher risk of attempting suicide than did offspring of a non-suicidal parent, and had an earlier age of onset of suicidal behavior than the offspring of a suicidal parent with a non-suicidal sibling. In addition, they found, subjects with suicidal siblings, and their offspring as well, reported greater levels of lifetime impulsive aggression when compared with the other two groups. For the offspring, impulsive aggression proved to be the most powerful predictor of suicide attempts made early in life.

The researchers conclude, "Familial loading for suicide attempts may affect rates of transmission as well as age at onset of suicidal behavior, and its effect may be mediated by the familial transmission of impulsive aggression."

Commenting on the study in the *Psychiatric Times*, Ping Qin notes that the tendency of suicidal behavior to run in families is most likely due to genetic factors. Qin notes that identical twin pairs have a significantly greater concordance for both completed and attempted suicide than fraternal twin pairs, and cites a study showing that suicide is more common among biological relatives of adopted suicides than among biological relatives of adopted non-suidical controls. Qin's own study showed that suicide mortality in first-degree relatives of suicide victims is 3.5 times higher than in first-degree relatives of controls.

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"Peripubertal suicide attempts in offspring of suicide attempters with siblings concordant for suicidal behavior," D. A. Brent, M. Oquendo, B. Birmaher, L. Greenhill, D. Kolko, B. Stanley, J. Zelazny, B. Brodsky, S. Firinciogullari, S. P. Ellis, and J. J. Mann, *American Journal of Psychiatry*, Vol. 160, No. 8, August 2003, 1486-93. Address: D. A. Brent, Western Psychiatric Institute and Clinic, Pittsburgh, PA 15213.

—and—

"The relationship of suicide risk to family history of suicide and psychiatric disorders," Ping Qin, *Psychiatric Times*, Vol. 20, No. 13, December 2003. Address: Ping Qin, National Centre for Register-Based Research, Aarahus University, Denmark.

QUOTABLE

"Scientists [now] know more about the relationship between genes and environment in the creation of disease. Even as researchers are linking individual genes to specific diseases, they are also discovering that particular substances in the environment can 'turn off' or 'turn on' these genes. The description often used by scientists is that 'genetics loads the gun, but environment pulls the trigger.'"

Joan Lowy, "Canaries in the Mine: Evidence of Chemical Effects on Kids Mounts," Scripps Howard News Service, December 2003

Antisocial children: genes count more than upbringing

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heritability estimate ranged from 33 percent (when only the children themselves reported antisocial behaviors on their parts) to 71 percent (for antisocial behavior reported by teachers). This indicates, the researchers say, that antisocial behavior that is pervasive across all settings is more strongly influenced by genetics than is milder, "situational" antisocial behavior.

> Arseneault et al. found that genetic influences were extremely powerful for antisocial behaviors that occurred in multiple settings.

Arseneault et al. say that their study, along with four others that reported similar findings, "show that genetic risks contribute strongly to population variation in antisocial behavior that emerges in early childhood." Their findings, they say, indicate that "research and theory on the etiology of childhood antisocial behavior must look beyond the current focus on socioeconomic contexts and parenting processes, to incorporate genetic explanations and develop new theories of nature-nurture interplay."

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"Strong genetic effects on cross-situational antisocial behaviour among 5-year-old children according to mothers, teachers, examiner-observers, and twins' self-reports," Louise Arseneault, Terrie E. Moffitt, Avshalom Caspi, Alan Taylor, Fruhling V. Rijsdijk, Sara R. Jaffee, Jennifer C. Ablow, and Jeffrey R. Measelle, *Journal of Child Psychology and Psychiatry*, Vol. 44, No. 6, September 2003, 832-48. Address: Louise Arseneault, Box Number P080, Institute of Psychiatry, De Crespigny Park, London SE5 8AF, UK, l.arseneault@iop.kcl.ac.uk.

ADHD, reading disability: genetic links investigated

Between one-fifth and one-quarter of children and teens diagnosed with attention deficit hyperactivity disorder (ADHD) also suffer from a reading disability. A new gene study, by Sandra Loo and colleagues, indicates a genetic link between the two conditions.

Loo et al. measured the reading ability of 233 sibling pairs in which both children were diagnosed with ADHD. They then conducted a linkage study, searching for molecular markers that were shared by the siblings more often than would be expected based on their degree of genetic relationship.

The researchers detected evidence of shared genetic factors for ADHD and reading disability on chromosomes 16, 17, and possibly 10, as well as evidence for genes on chromosomes 2, 8, and 15 that appear to be unique to reading problems.

Their data, Loo and colleagues say, support the idea that common genes underlie ADHD and reading disability, although unique genes also contribute to each.

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"Genome-wide scan of reading ability in affected sibling pairs with attention-deficit/hyperactivity disorder: unique and shared genetic effects," S. K. Loo, S. E. Fisher, C. Francks, M. N. Ogdie, I. L. MacPhie, M. Yang, J. T. McCracken, J. J. McGough, S. F. Nelson, A. P. Monaco, and S. L. Smalley, *Molecular Psychiatry*, November 18, 2003 (Epub). Address: Sandra K. Loo, Neuropsychiatric Research Institute, 760 Westwood Plaza, Los Angeles, CA 90024.

Infant study shows genes' effects on aggression, language

The powerful effects of genes on physical aggression can be detected even in children under the age of two, according to a new study.

Ginette Dionne and colleagues studied a group of 562 19-month-old children, including 107 identical (monozygotic) twin pairs and 174 fraternal (dizygotic) twin pairs, evaluating the children's levels of aggression and their verbal skills. The researchers report that a modest correlation was detected between aggression and expressive vocabulary. They theorize that poor verbal abilities may play a role both in accelerating development of aggressive behavior and in forestalling the normal drop in this behavior that occurs as children reach school age.

In addition, the researchers found a "substantial heritability" (58%) for physical aggression. The second finding, Dionne and colleagues say, "means that individual differences in the frequency of physical aggression at 19 months may be substantially driven by genetically based factors." Their study, they say, is the first to demonstrate the heritability of physical aggression at such a young age.

The researchers say their findings highlight the importance of identifying children with language delays early in life, and offering intervention.

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"Physical aggression and expressive vocabulary in 19-month-old twins," Ginette Dionne, Richard Tremblay, Michel Boivin, David Laplante, and Daniel Perusse, *Developmental Psychology*, Vol. 39, No. 2, 2003, 261-73. Address: Ginette Dionne, Ecole de psychologie, Universite Laval, Quebec, Quebec G1K 7P4, Canada. ginette@psy.ulaval.ca.

Memories: a role for genes?

(continued from page 4)

relationships with their parents. While circumstances in the subjects' adult lives could have affected their perceptions of parental warmth, the researchers say this was not consistent with their data.

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"Remembered parental bonding in adult twins: genetic and environmental influences," Paul Lichtenstein, Jody Ganiban, Jenae M. Neiderhiser, Nancy L. Pedersen, Kjell Hansson, Marianne Cederblad, Olof Elthammar, and David Reiss, *Behavior Genetics*, Vol. 33, No. 4, July 2003, 397-408. Address: Paul Lichtenstein, Department of Medical Epidemiology, Karolinska Institutet, Box 281, S-171 77 Stockholm, Sweden, paul.lichtenstein@mep.ki.se.

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LETTER TO THE EDITOR

To the Editor:

Regarding the *Crime Times* editorial in Volume 9, Number 4, 2003, on the debate over John Hinckley's unsupervised home visits:

I agree that acts committed by individuals having mental health problems are supposed to be viewed in an entirely different light than those same acts committed by a so-called rational being. However, the statement in the last paragraph [re] "do we deserve" to call ourselves an enlightened society, when we treat the victims of undiagnosed and untreated brain diseases as though they are to blame for their illness, is misleading.

It is my opinion that we have showed ourselves as an "enlightened society" by recognizing John Hinckley had a mental illness following the shooting of President Reagan and Mr. Brady. Hinckley has not been in a prison but in a treatment facility which is another part of an "enlightened society."

The question of whether he should or should not be allowed unsupervised leave has nothing to do with Hinckley "deserving" such treatment. The real question is whether those treating Hinckley or recommending such leave can be trusted to know enough about human beings and their mental illness problems to make a final decision. It isn't about Hinckley; it's about those who think they know best.

Personally, I think the psychologists are wrong in their recommendation. I have supervised a Maximum Security Mental Health Treatment Center in a prison setting for more than five years and still do not absolutely trust without question a psychiatrist's or a psychologist's recommendation.

Sincerely,
Ronald L. Lytle, Warden
Central New Mexico
Correctional Facility

Editor's note: Your point is very well taken. It was certainly not our intent to minimize the fact that there is grave doubt among experts as to whether Mr. Hinckley can safely be left unsupervised in open society, or to suggest that Mr. Hinckley bears no responsibility for his crime.

On the contrary, both Mr. Hinckley and the physicians in charge of him bear the heavy responsibility of recognizing that he may be a terrible threat to society, and of ensuring that this threat is eliminated. If there is the least doubt among his physicians about the safety of allowing him unsupervised visits, his request for these visits should be flatly denied.

That said, our point still stands. We blame mentally ill criminals for acts committed under the influence of disoriented or psychotic brains, but the blame for such crimes can just as logically be laid at the doorstep of a society that fails to identify and help millions of children and adults with brain dysfunction. We will deserve to be called "enlightened" when we recognize that much societal tragedy stems not from evil, but from damaged or poisoned brains—and when we invest as much in preventing or treating brain dysfunction as we invest in the very necessary act of hospitalizing or incarcerating dangerous criminals.

Crime Times is interested in hearing from readers conducting research pertaining to biological influences on criminality and psychopathology. Reprints of research papers are appreciated.

Psychopathic brains: MRIs show more abnormalities

Adding to evidence that the brains of psychopaths are abnormal, Adrian Raine and colleagues have published new data revealing anomalies of the corpus callosum in psychopathic subjects.

The corpus callosum, a thick band of nerve fibers, connects the two cerebral hemispheres, and routes communications between them. Abnormalities of the corpus callosum are linked to a number of brain disorders, ranging from schizophrenia to Fetal Alcohol Syndrome.

Raine and colleagues used structural magnetic resonance imaging to measure the volume of the corpus callosum in 15 men with antisocial personality disorder and high scores on scales of psychopathy, and in 25 controls. The researchers report that compared to controls, the psychopaths showed an increase in callosal white matter volume, an increase in callosal length, a reduction in callosal thickness, and increased connectivity between brain hemispheres. Moreover, Raine et al. report, larger callosal volume was associated with greater affective and interpersonal deficits, lower autonomic stress reactivity (a phenomenon often seen in psychopaths), and low spatial ability.

The researchers theorize that "corpus callosum abnormalities in psychopathic antisocial individuals may reflect atypical neurodevelopmental processes involving an arrest of early axonal pruning or increased white matter myelination."

In an earlier study (see *Crime Times* Volume 6, Number 2, 2000, page 1), Raine et al. used MRI scans to study the prefrontal area of the cerebral hemispheres in men with

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RESEARCH IN BRIEF

ADHD kids have abnormal levels of "messenger" chemicals

Children with attention deficit hyperactivity disorder (ADHD) appear to have markedly altered levels of key neurotransmitters (chemicals that carry messages between brain cells) in the frontal lobes of their brains, according to a new study.

Helen Courvoisie and colleagues used a form of magnetic resonance imaging to measure the levels of six neurotransmitter metabolites (breakdown products) in a small region of the frontal lobes of 16 children ranging in age from 6 to 12. Eight of the children were diagnosed with ADHD, while the others served as controls.

"Our data show children with ADHD had a two-and-a-half-fold increased level of glutamate, an excitatory brain chemical that can be toxic to nerve cells," Courvoisie reports. "The data also suggest a decreased level of GABA, a neuroinhibitor. This combination may explain the behavior of children with poor impulse control." She notes that children with ADHD have multiple problems associated with impairment of the frontal lobes, which play an important role in regulating impulse control, attention, planning, and other "executive" functions.

Comments psychiatrist and ADHD researcher Russell Barkley, "Although the study is small, it is in line with previous work. It's one more brick in the wall. It is consistent with a number of other larger studies that have shown both structural and functional abnormalities in ADHD children."

The researchers note, however, that all of the children with ADHD were taking stimulant drugs which might have affected the results, although the drugs were discontinued 24 hours before the MRI scans were performed.

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"Imaging children with ADHD," press release, American Medical Association, December 4, 2003. Summarizes research in the *Journal of Neuropsychiatry and Clinical Neurosciences*, currently in press.

—and—

"Brain differences found in ADHD kids, Amanda Gardner, HealthDay, December 5, 2003.

Can barometric pressure affect behavior?

While the purported link between behavior and the phases of the moon appears to be an old wives' tale, a new study by Thomas Schory et al. does suggest a connection between weather and psychiatric symptoms.

The researchers obtained data on suicides and violent crimes during 1999 in the Louisville area, as well as data on documented emergency psychiatric visits and psychiatric admissions at the University of Louisville Hospital that year. They then studied the association between these events and humidity, wind speed, and barometric pressure.

"The data suggest that total numbers of acts of violence and emergency psychiatry visits are significantly associated with low barometric pressure," they report. "Psychiatric inpatient admissions and suicides are not associated with any of the weather variables investigated." Their findings may indicate, they say, that low barometric pressure is associated with impulsivity.

Schory et al. note that low barometric pressure is associated with changes in cerebral blood flow, increased risk of rupture of intracranial aneurysms, premature labor, changes in the norepinephrine metabolite HMPG (at least in women), and changes in cerebrospinal fluid concentrations of the serotonin metabolite 5-HIAA in people with depression. They also note that weather fluctuations are known to influence certain mental disorders, including seasonal affective disorder (SAD) and bipolar disorder.

The researchers hypothesize that "barometric pressure may alter the propensity toward impulsive behavior through changes in brain monoamines or cerebral blood flow."

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"Barometric pressure, emergency psychiatric visits, and violent acts," Thomas J. Schory, Natasha Piecznski, Sunil Nair, and Rif S. El-Mallakh, *Canadian Journal of Psychiatry*, Vol. 48, October 2003, 624-7. Address: R. S. El-Mallakh, Mood Disorders Research Program, Department of Psychiatry and Behavioral Sciences, University of Louisville School of Medicine, Louisville, KY 40292, rselma01@athena.louisville.edu.

MRI: clues to psychopathy

(continued from page 6)

antisocial personality disorder. The researchers found that antisocial subjects exhibited an 11 percent reduction in prefrontal gray matter volume when compared with normal controls, a reduction that could not be accounted for by substance abuse or mental illness.

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"Corpus callosum abnormalities in psychopathic antisocial individuals," A. Raine, T. Lencz, K. Taylor, J. B. Hellige, S. Bihrle, L. Lacasse, M. Lee, S. Ishikawa, and P. Colletti, *Archives of General Psychiatry*, Vol. 60, No. 11, November 2003, 1134-42. Address: Adrian Raine, Department of Psychology, University of Southern California, Los Angeles, CA 90089-1061, raine@usc.edu.

QUOTABLE "What [David] Reiss and his colleagues discovered, in one of the longest and most thorough studies of child development ever attempted, was that parents appear to have relatively little effect on how children turn out, once genetic influences are accounted for. 'The original objective was to look for environmental differences,' says Reiss. 'We didn't find many.' Instead, it seems that genetic influences are largely responsible for how 'adjusted' kids are: how well they do in school, how they get along with their peers, whether they engage in dangerous or delinquent behavior. 'If you follow the study's implications through to the end, it's a radical revision of contemporary theories of child development,' says Reiss. 'I can't even describe what a paradigm shift it is.'"

"Do Parents Really Matter?," by Annie Murphy Paul,
Psychology Today*, Jan.-Feb. 1998*

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