News, literature, and events in the ethical, social, and legal implications of psychiatric, neurologic, and behavioral genetics.

Braingenethics Update

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In the Literature

Impact of Behavioral Genetic Evidence on the Adjudication of Criminal Behavior

By Paul Appelbaum & Nicholas Scurich
A representative sample of the U.S. population received a vignette describing an apparently impulsive homicide, accompanied by one of four explanations of the defendant's impulsivity: childhood abuse, genetic predisposition, childhood abuse and genetic predisposition, or simple impulsive behavior. The participants were asked to identify the crime that the defendant had committed and to select an appropriate sentence range. Evidence of genetic predisposition did

The next Braingenethics Update should arrive in your inbox in September. Between now and then we will continue to collect scientific and popular articles; lectures; coures; announcements and reviews of new books; radio shows, etc. that are relevant to the ethical, social, and legal implications of psychiatric, neurological, and behavioral genetics.

We are especially eager to include commentaries on advances in or the implications of such genetics research. For a few examples, please see: Nancy Berlinger, Erik

not affect the crime of which the defendant was convicted or the sentence. Paradoxically, the genetic and genetic + abuse conditions engendered the greatest fear of the defendant. These findings should allay concerns that genetic evidence in criminal adjudications will be overly persuasive to jurors, but should raise questions about the impact of genetic attributions on perceptions of dangerousness.

Gene×Environment Interactions in Early Externalizing Behaviors: Parental Emotional Support and Socioeconomic Context as Moderators of Genetic Influences?
By Amanda K. Cheung, Kathryn Paige Harden, & Elliot M. Tucker-Drob
This study uses longitudinal population-based samples of young siblings to examine the effects of parental emotional support and family socioeconomic status. Results indicated stronger genetic influences at lower levels of parental emotional support but higher levels of socioeconomic status; only the latter interaction remained significant when the two moderators were simultaneously modeled.

Biological Insights from 108 Schizophrenia-associated Genetic Loci
By Schizophrenia Working Group of the Psychiatric Genomics Consortium
This paper reports a multi-stage schizophrenia genome-wide association study that identified 128 independent associations spanning 108 conservatively defined loci that meet genome-wide significance, 83 of which

Parens, and Paul Appelbaum.

If you would like to suggest material of any sort, please write to braingenethics@thehastingscenter.org. If you know someone who might be interested in receiving or helping us to build this resource please forward them this issue of the Update.

-Erik Parens, Paul Appelbaum, & Mohini Banerjee

Free Online Course

Introduction to Human Behavioral Genetics
Matt McGue, University of Minnesota

This course provides an introduction to behavioral genetics, demonstrating that nature and nurture both play a fundamental role in the development of psychological traits. It explores how early behavioral genetic research radically changed how

have not been previously reported. Many findings have the potential to provide entirely new insights into etiology. Independent of genes expressed in the brain, associations were enriched among genes expressed in tissues that have important roles in immunity, providing support for the speculated link between the immune system and schizophrenia.

Genetic and Environmental Influences on Gambling and Substance Use in Early Adolescence
By Frank Vitaro, Amy C. Hartl, Mara Brendgen, Brett Laursen, Ginette Dionne, & Michel Boivin
This study examined the genetic and environmental architecture of early gambling involvement and substance use to determine whether genetic or environmental factors that contribute to substance use also put young adolescents at risk for early involvement in gambling. Genetic and nonshared environmental factors almost equally accounted for gambling involvement, with no contribution from shared environmental factors. In contrast, both shared and nonshared environmental factors played important roles in substance use; the contribution of genetic factors was also substantial.

The Genetic Architecture of Pediatric Cognitive Abilities in the Philadelphia Neurodevelopmental Cohort
By E. B. Robinson, A. Kirby, & K. Ruparel
The objective of this analysis was to examine the genetic architecture of diverse cognitive abilities in children and adolescents, including the

psychologists conceptualized human behavior and how mapping the human genome is fundamentally altering current research approaches to a wide range of behavioral characteristics.

In the News

Gene Discovery May Add New Piece to Schizophrenia Puzzle
A chromatin-related gene may contribute not just to schizophrenia, but to obsessive-compulsive and other psychiatric disorders according to a paper in Neuron.

Genetic Mutation May Lead to Autism Subtype
According to a study in Cell, CHD8, a gene that regulates the structure of DNA, is found to predict one type of autism and other related conditions.

New Strategy Could Uncover Genes at the Root of Psychiatric Illnesses Researchers describe a strategy involving the creation of pluripotent stem cells that may help reveal how genetic risks interact with other risk factors or environmental exposures to affect the development of the nervous system, pinpointing a genetic variant that may predispose individuals to schizophrenia.
Can We Predict Which Teens Are Likely To Binge Drink? Maybe.
More than half of 16-year-olds in the United States have tried alcohol. Although many of them learn to drink responsibly, some go on to binge on alcohol, putting themselves at risk for trouble. While researchers aren't sure

magnitude of common genetic effects and patterns of shared and unique genetic influences. This study used genome-wide complex trait analysis to estimate the SNP-based heritability of each domain, and several of the individual domains suggested strong influence of common genetic variants (e.g. reading ability, emotion identification, verbal memory).

Disruptive CHD8 Mutations Define a Subtype of Autism Early in Development

By Raphael Bernier, Christelle Golzio, Bo Xiong et al.

This study examines the Autism spectrum disorder (ASD)-associated gene CHD8 in 3,730 children with developmental delay or ASD. In addition to a high likelihood of an ASD diagnosis among patients bearing CHD8 mutations, characteristics enriched in this group included macrocephaly, distinct faces, and gastrointestinal complaints. The findings indicate that CHD8 disruptions define a distinct ASD subtype and reveal unexpected comorbidities between brain development and enteric innervation.

Neuropsychosocial Profiles of Current and Future Adolescent Alcohol Misusers

By Robert Whelan et al.

This study applied machine learning to a wide range of data from a large sample of adolescents to generate models of current and future adolescent alcohol misuse that incorporate brain structure and function, individual personality and cognitive differences, environmental

why, it may be possible to predict with about 70% accuracy which teens will become binge drinkers, based on their genetics, brain function, personality traits, and history, according to a study in Nature.

Recent Advances in the Epidemiology and Genetics of Bipolar Disorder

This lecture by Dr. Kathleen Ries Merikangas covers some of the recent developments in understanding bipolar disorder. It is part of the 2014-2015 Genomics in Medicine Lecture Series sponsored by NIH Mental Health.

In the Literature

Alzheimer's Disease Genetics: From the Bench to the Clinic

By Celeste M. Karch, Carlos Cruchaga, & Alison M. Goate

This paper provides an overview of the importance and difficulties of genome studies used to understand Alzheimer's disease (AD). Genome-wide association studies and whole-exome and whole-genome sequencing have revealed more than 20 loci associated with AD risk. The studies discussed have provided insights into the molecular pathways that are altered in AD pathogenesis, which have, in turn, provided insight into novel therapeutic targets.

Prenatal Expression Patterns of Genes Associated With Neuropsychiatric Disorders

factors (including gestational cigarette and alcohol exposure), life experiences, and candidate genes. These models were accurate and generalized to novel data, and point to life experiences, neurobiological differences and personality as important antecedents of binge drinking.

DNA Modification Study of Major Depressive Disorder: Beyond Locus-by-locus Comparisons
By Gabriel Oh, Sun-Chong Wang, Mrinal Pal et al.
This study examined DNA modification analysis in white blood cells from monozygotic twins discordant for Major depressive disorder (MDD), in brain prefrontal cortex, and germline (sperm) samples from affected individuals and controls. In addition to the traditional locus-by-locus comparisons, this paper explored the potential of new analytical approaches in epigenomic studies. In the microarray experiment there were a number of nominally significant DNA modification differences in MDD . Some MDD epigenetic changes, however, overlapped across brain, blood, and sperm more often than expected by chance. Further, a series of new analytical approaches, such as DNA modification networks and machine-learning algorithms using binary and quantitative depression phenotypes provided additional insights on the epigenetic contributions to MDD.

Rebecca Birnbaum, Andrew E. Jaffe, Thomas M. Hyde, Joel E. Kleinman, & Daniel R. Weinberger
Neurodevelopmental disorders presumably involve events that occur during brain development. The authors found that neuropsychiatric disorders considered to be developmental in etiology are associated with susceptibility genes that are expressed differently during fetal life.

Personalized Gene Silencing Therapeutics for Huntington Disease
By C. Kay, N.H. Skotte, A.L. Southwell, & M.R. Hayden
This paper compares the prospect of safe treatment of Huntington disease (HD) by gene silencing approaches and reviews HD population genetics used to guide target identification in the patient population.

To contribute a news item, an academic article, or an event on the ethical, legal, and social implications of psychiatric, neurological, and behavioral genetics research please email us.

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