

King's College London - Social, Genetic, and Developmental Psychiatry Centre

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The Social, Genetic and Developmental Psychiatry Centre, one of the world's top psychological research institutions, is trying to bridge the gap between 'nature' (genetics) and 'nurture' (environment) as they interact in the development of behavioral dimensions and disorders. The Centre is highly interdisciplinary, bringing together experts from diverse disciplines, such as epidemiology, child and adult psychiatry, developmental psychopathology, development in the family, personality development, cognitive development, statistical genetics, and molecular genetics. The Centre's focus is on common behavioral disorders in three domains: mood disorders (especially anxiety and depression), 'externalizing' disorders (especially disruptive behavior, including hyperactivity and antisocial behaviors), and cognitive disorders (especially language disorders and mild mental impairment, including autistic symptoms). The Centre concentrates on the etiological aspects – developmental as well as genetic and environmental origins – of these behavioral disorders. However, there is a strong emphasis on methods of measurement and classification, and an attempt to foresee the practical clinical and public health implications of the Centre's findings.

Developmental Theme

The Centre's developmental theme leads to research focused on childhood disorders, because relatively little is known about them despite their public health importance. However, a developmental perspective involves more than studying children – it is an etiological approach that investigates when and how disorders emerge and change during development. This focus on change and continuity in development is the reason why much of the Centre's research is longitudinal. We believe that such research is essential to spawning interventions that prevent the onset of disorders, rather than waiting to treat full-blown disorders. In addition, the Centre's approach to development spans the life course of a disorder.

Genetic Theme

The Centre's strategy toward genetics is to build strength in quantitative genetics as well as in molecular genetics, since both are vital to the understanding of complex traits. Quantitative genetics, such as twin studies, can tell us as much about the environment as about genetics. As such, the Centre strives to recruit and retain samples whose members accurately represent the full range of environmental and genetic risks in the human population. Quantitative genetics, which considers complex quantitative traits influenced by multiple genes as well as multiple environmental factors, also provides the foundation for quantitative trait locus strategies for molecular genetics. The QTL perspective pervades molecular genetic research in the Centre, because much of the liability of common disorders is likely to be on a continuum of variation. Therefore, risk factors for common disorders generally represent the quantitative extreme of the same genetic and environmental factors that create variation in the normal range.

In terms of molecular genetics, two strategic directions are part of the Centre's plan.

First, we believe that progress in identifying genes associated with common behavioral disorders has

been slower than many had predicted because studies have been inappropriately designed and underpowered for finding QTLs of small effect size. Our general approach is, therefore, to collect very large samples, establish them as resources, and develop designs and methods that are capable of detecting and replicating QTLs of small effect size.

Another approach is to test whether measured genes have effects that are more readily detectable when environmental risk exposure is taken into account – the gene-environment interaction approach. High-output technologies are being developed that will focus on direct association analyses using functional DNA variants expressed in the brain, including sets of variants that can be used to explore entire neurotransmitter pathways. Such gene-finding approaches, although intensive and time consuming, are only a prelude to functional genomics that will involve developments in bioinformatics and the integration of genomics, gene expression, proteomic, and brain research relevant to behavioral analysis (Plomin, DeFries, Craig & McGuffin, 2003).

Social Theme

Concerning the Centre's social theme, research on the environment is in many ways more difficult than research on genetics. Genetics is entering a golden postgenomic era, in which the structure and function of the entire genome will eventually be known. In contrast, there is no 'environome' project. Indeed, there are no laws of environmental transmission and there is nothing like a simple triplet DNA code. Another important factor in the slow progress towards understanding the environment has been the traditional tendency of psychology to ignore genetics or to consider environmental influence as in opposition to genetics. In fact, two of the most important sets of discoveries about environmental mechanisms in the past decade have come from genetic research, including work by Centre members. The first finding is that, contrary to most socialization theories, environmental influences on many traits tend to not be shared; that is, they make children growing up in the same family as different as children growing up in different families. A priority for environmental research, therefore, should be to identify these environmental factors. The second finding, sometimes called the 'nature of nurture,' is that genetic factors influence the way we experience our environments. Thus some measures, ostensibly of environmental risks such as life events and psychosocial stress, show genetic influence. Similarly, associations between environmental risks and disorders are often substantially mediated genetically. Our view of the way forward is to bring together genetic and environmental strategies, using environmental measures within genetic designs to investigate coactions, interactions, and correlations between environmental risks and genetic susceptibilities.

History

The SGDP Centre was launched in 1995 by Michael Rutter and Robert Plomin, and now includes 22 faculty, 25 PhD students, and more than 100 other staff. The Centre moved into its new \$25 million building in 2003, which includes state-of-the-art molecular genetic laboratories. The Centre's research programs have attracted more than \$20 million in funding. The SGDP Centre is a department within the Institute of Psychiatry, which has an outstanding international research reputation and is the top-rated psychiatric research institution in England. The Institute of Psychiatry and the SGDP Centre focus all of their training efforts on PhD students and postdoctoral students, not undergraduates. The Institute of Psychiatry has 550 postdoctoral students and 750 staff and is in Denmark Hill, near central London.

A past *Observer* article concluded that "the SGDP Centre is preparing the vanguard of a generation of scientists who can move easily back and forth across the nature-nurture boundaries exploring the

pathways between genes and behavior at all levels of analysis” (June 2003). The SGDP Centre’s PhD program is innovative, aiming to blend the American model of extensive class-work and the European model of tutorials and independent research. The first year of the four-year PhD program includes tutorials with the SGDP Centre’s senior faculty in quantitative and molecular genetics, psychiatry and psychopathology, social and developmental psychology, and statistics. At the end of the first year, successful students are awarded a masters of science degree and are promoted to PhD training. In the second year, a research rotation is required so that students experience greater breadth in their training. Weekly Centre-wide seminars, monthly colloquia, and journal clubs add to the interdisciplinary experience. Students are involved in research as soon as they enter the program, working closely with their supervisors at first, and then are encouraged to move increasingly towards independent research during the four-year program. The PhD students are diverse in their backgrounds, about half coming from social science and the other half from biological science. They are also diverse internationally, including students from the United States, Finland, Germany, Italy, and Spain, as well as the United Kingdom. Because science is becoming so international, our students are highly competitive in terms of positions offered in the United States and throughout the world.

The Centre also has a lively postdoctoral training program, welcoming postdoctoral fellows from several countries, including the United States. The Centre’s first postdoctoral student, Steve Petrill, is now an associate professor at Pennsylvania State University. Kirby Deater-Deckard is now associate professor at the University of Oregon, and Alison Pike is a faculty member in the department of cognitive sciences at the University of Sussex in England. Sara Jaffee, a Wisconsin PhD who recently completed her postdoctoral training at the Centre, is now an assistant professor at the University of Pennsylvania. “The resources at the Centre are unmatched anywhere,” she said. “It’s very exciting to be at the fastest moving research center in your chosen field.”

Faculty

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References

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