Published in final edited form as:

Am Psychol. 2003 April ; 58(4): 318–319.

Research Psychologists' Roles in the Genetic Revolution

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As psychologists involved in genetic research, we write to broaden the perspective of the important article in this journal by Patenaude, Guttmacher, and Collins (April 2002), “Genetic Testing and Psychology: New Roles, New Responsibilities.” Patenaude et al. explained new roles for counselors and therapists in helping clients deal with genetic information given advances in understanding genetic liability for many disorders. They also envisioned roles for psychologists in understanding individuals' perception of genetic risk and in studying ethical aspects of genetic testing. We agree that psychologists have much to contribute in these areas. In treating research issues, Patenaude et al. briefly noted that

psychologists may also play a role in psychiatric genetics, particularly in “the careful elucidation of diagnostic criteria in studies seeking clues to the genetic underpinnings of mental disorders” (p. 275). Indeed, the phenotyping problem is crucial in both human and animal genetics, and psychologists have much to contribute to this issue. These contributions apply not only to psychiatric diagnoses but also to a range of medical disorders with behavioral involvement and to normal-range behavioral dimensions that at the extremes may be considered by some as disorder. As phenotypic and endophenotypic assessments become more sophisticated than simple diagnoses, that is, as phenotyping for genetic studies of complex disorders becomes increasingly quantitative, multivariate, developmentally sensitive, and neuroscience oriented, psychologists' skills will be in even more demand. Already, psychologists have led the way in finding linkages and using association data for some phenotypes, such as reading disability and attention-deficit disorder in humans, and for the molecular genetic analysis of alcohol-related traits in mice. For some complex mental disorders, it is becoming increasingly clear that susceptibility genes affect continuously distributed traits and that the definition of such traits depends on a sophisticated understanding of the neuroscience of behavior. Psychologists should be critical to this endeavor.

Moreover, research psychologists already are extensively involved in many facets of genetic research beyond phenotyping. Several of us are involved in genetic research, including genome scans, linkage and association studies, work with transgenic and knockout mice, microarray technology, many types of quantitative genetic studies, and genetic counseling for psychological disorders. Our psychology graduate students study molecular genetics and genomics, as well as molecular and systems neuroscience. In doing so, they are preparing to follow traditions of psychologists' contributions to genetic research dating back to selective breeding of rats for behavioral traits in the 1930s. The future of molecular genetic research lies in going beyond locating and identifying genes to learning how genes work, the field of functional genomics. Although functional genomics is usually viewed in terms of the bottom-up strategy of molecular biology that begins with understanding the protein products of genes (proteomics), a top-down psychological level of analysis that considers the behavior of the whole organism might also pay off both scientifically and clinically. Among the issues that can be addressed with a top-down approach are how genetic effects interact and correlate with experience, how genes contribute to change and continuity in development, and how genetic effects contribute to comorbidity between disorders and heterogeneity within disorders. If involvement in these areas of research seems out of character to nonpsychologists, we simply note that today's research psychologist may well also self-identify as a neuroscientist, as a statistician, or even as a geneticist. Old disciplinary boundaries have changed considerably.

In summary, the role of research psychologists is to understand mind, brain, and behavior, and research psychologists have the responsibility to learn those concepts and use those tools that allow them to best play this role, including modern genetics and genomics. Perhaps recognizing this, the American Psychological Association has recently convened a Working Group on Genetic Research Issues to explore ways for psychological scientists to be active participants in the genetics revolution.

References

- Patenaude AF, Guttmacher AE, Collins FS. Genetic testing and psychology: New roles, new responsibilities. *American Psychologist*. 2002; 57:271–282. [PubMed: 11975377]