INNOVATION MENTALITY

Q&A WITH DR. CLINT KILTS, UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES (UAMS)

By AMP Staff

Disorders of mental health — such as depression, dementia, addiction and suicide — represent major sources of suffering and death worldwide and are associated with immense economic costs in the form of lost potential and productivity.

Treatment and prevention, however, represent a daunting task. Our behaviors and thoughts are the products of organized information processing by more than 30 billion cells (neurons) capable of making more than 100 quadrillion connections (synapses) that are dynamically reorganized by our experiences across life.

Dr. Clint Kilts, Arkansas Research Alliance (ARA) Academy Member and director of the Brain Imaging Research Center (BIRC) at the UAMS Psychiatric Research Institute, researches the use of non-invasive functional brain imaging technology to explore the complex and changing relationship between the organization of information processing in the brain and human behavior and thought.


Dr. Clint Kilts

AMP: What inspired you to devote your career to psychiatry and human neuroscience?

Dr. Kilts: I've long been fascinated by the complexity and variance of human behavior and the potential of its biological understanding to define the origins and foundations of human mental health and illness. Envision a future world in which science-based prevention and treatment strategies have dramatically reduced the profound disabilities associated with depression, Alzheimer's disease, autism, drug addiction and the tragic loss of life to suicide.

AMP: What can we learn about human behavior through brain imaging and its changes over time?

Dr. Kilts: It was with the advent of brain imaging technology such as electroencephalography (EEG), positron emission tomography (PET) and magnetic resonance imaging (MRI) that scientists were first able to explore brain activity related to ongoing human behavior and thought. Perhaps the most amazing thing we have learned as scientists using these technologies is that human brain structure and function are dynamically reorganized in the processes of brain development and aging, but most dramatically in the service of biologically embedding our unique life experiences.

The brain in its functional organization that you have now is not the same one you had last year or even yesterday. This poses an enormous challenge to brain imaging science to understand the biology of human variation and that variation related to mental health disorders. I often think that we have evolved as intelligent human beings to the point where we have developed technology capable of understanding the very intelligence that created it.

AMP: Like all states, Arkansas has unique social and health challenges. Are there any such areas in which you are focusing your research?

Dr. Kilts: My recent research focus has shifted from a commitment to understand the brain biology associated with the consequences of mental health problems to that biology related to the causes of such problems. While the people of Arkansas suffer from the same mental health issues that plague individuals and communities across the United States, we suffer disproportionately in the areas of poor child health.

Across the United States, children in Arkansas rank 46th in health status with high rates of known risk factors for poor mental health outcomes, such as child poverty, childhood abuse and neglect and adverse childhood experience. We know that most mental health disorders have their origins in early human development and that early childhood (ages 1-5) represents the major developmental "sensitive period" for the robust association of adversity and trauma with lifelong mental health problems. This age group shift in research focus is complicated by the significant challenges posed by children related to the functional MRI environment.

At this point, I need to acknowledge that major impact the Arkansas Research Alliance has had not only on this shift in my research focus but also in enabling the availability of new functional brain imaging technology to support it. As a member of the ARA Academy of Scholars and Fellows, I was encouraged to think bigger but also have had access to funding support to aid the purchase of child-friendly functional near infrared spectroscopy (fNIRS) technology to enable this strategic research and training growth area in the UAMS BIRC.

AMP: How can we best increase knowledge and understanding through research and make sure research benefits the larger community?

Dr. Kilts: First, ask the right questions of a significant problem and seek the greatest impact. Second, in my opinion, academic research institutions have not focused sufficiently on the problems of the communities that surround and support them. Community-informed research is a priority and an obligation of such institutions due to the largely public-funding model of research.

To that end, we have, through both the BIRC and NIDA training programs focused on research translation to the Arkansas community rather than the more conventional focus on clinical translation. For instance, our NIDA T32 training program has added training faculty and prioritized the recruitment and appointment of trainees that focus on major community-level problems, such as women in the criminal justice system and disproportionate gun violence in young Black men. The BIRC has similarly added research focus on community issues such as the mental health impact of poverty and family disadvantage.

AMP: What should the Arkansas business community and public officials know about your research and how it's making a difference?

Dr. Kilts: I would like the business community to think of the seemingly indecipherable aspects of mental health disorders such as addiction, suicide, autism and schizophrenia as being solvable. I would like others to envision a future in which the immense social, personal, family and economic costs of such disorders are greatly diminished or eliminated, a future in which being at risk for such disorders triggers a science-based intervention that removes the future burden before it occurs.

My belief is that understanding the biological bases of mental health and illness, like all other fields of medicine, holds the promise to such futures. As the director of the only academic center of excellence in human brain imaging research in Arkansas, I feel a sense of profound duty to contribute meaningfully to that future.

The ARA Academy of Scholars and Fellow is a community of strategic research leaders who strive to maximize the value of discovery and progress in the state. Recently, ARA launched an Impact Grants program that helps researchers like Dr. Kilts push viable projects to fruition. Learn more at ARAlliance.org.