HUMAN DEVELOPMENT AND FAMILY STUDIES

DISSERTATION DEFENSE FOR

YAO ZHENG

TITLE: INVESTIGATING GENETIC MODERATION OF INTERVENTION EFFECTS ON ADOLESCENT SUBSTANCE USE AND DELINQUENCY WITH DYNAMICAL SYSTEMS ANALYSIS

Dissertation Committee:

H. Harrington Cleveland
Associate Professor of Human Development and Family Studies
Dissertation Advisor
Co-Chair of Committee

Peter C. M. Molenaar
Distinguished Professor of Human Development and Family Studies
Co-Chair of Committee

D. Wayne Osgood
Professor of Criminology and Sociology

Edward A. Smith
Director, Bennett Pierce Prevention Research Center for the Promotion of Human Development, and Associate Professor of Human Development and Family Studies

Sy-Miin Chow
Associate Professor of Human Development and Family Studies

Debashis Ghosh
Professor of Statistics and Public Health Sciences

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ABSTRACT

Adolescence as an important developmental period is characterized with exploration and experimentation in various psychological and behavioral development including substance use and delinquency. Conceptualizing human development as a highly complex and dynamic system that encompasses interplay and transactional influences within and between biological, psychological, behavioral, social, and ecological levels, dynamical systems approach offers the unique opportunity to understand and investigate the dynamical processes of adolescent substance use and delinquency and their structured patterns of change.

The present study aimed to understand and investigate genetic moderation of intervention effects on adolescent substance use and delinquency with dynamical systems approach using data from a large scale community-based universal preventive intervention program dissemination with randomized control trials (n = 561). Using latent differential structural equation modeling, results suggested that adolescent substance use and delinquency could be modeled and understood as damped linear oscillator with an amplifying amplitude. Adolescent substance use and delinquency shared common risk and protective factors in consistent with problem behavior theory. Furthermore, as suggested by differential susceptibility theory, DRD4 7+, DAT1 9+ and 5-HTTLPR s-allele moderated the intervention effects in that adolescents carrying susceptible genes benefited more from the intervention.

These findings suggest that dynamical system approach can inform developmental science and prevention science by examining the initiation, persistence, escalation, and desistence of substance use and delinquency across adolescence, exploring the reciprocal relationship between adolescent problem behaviors, and investigating genetic and exogenous influence (e.g., intervention) to the intrinsic dynamics of the system.