

Concept Paper Form

Provisional Paper Title: Criminal Justice Contact, Mental Health, and Genetics
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P.I. Sponsor: Terrie Moffitt and Avshalom Caspi (if the proposing author is a student or colleague of an original PI)
Today's Date: 10/15/2019

Please describe your proposal in 2-3 pages with sufficient detail for helpful review.

Objective of the study:

This study integrates developmental and life-course criminology, sociological stress research, and genomic studies to investigate how social and genetic factors jointly influence depression. In particular, we focus on the influence of criminal justice (CJ) contact (e.g., arrest, conviction, and incarceration), a major life event consistently found to be associated with mental health problems.

Criminological and sociological studies have shown that compared to their counterparts, individuals who have contact with the CJ system are more likely to experience depression and other mental health problems later in life (Massoglia 2008; Schnittker *et al.* 2012; Western *et al.* 2015; Sugie and Turney 2017; Porter and DeMarco 2019). The causal ordering of the CJ contact-mental health relationship can be reversed, however, as individuals with some mental problems have been found to have higher risks of delinquency, violence, and recidivism (Link *et al.* 1992; Arseneault *et al.* 2000; Coid *et al.* 2006; Fazel *et al.* 2009; Yu *et al.* 2017). Because the genetic sequence is fixed at conception, genetic measures can be employed to better understand the complex relationship between CJ contact and depression free from the biasing influences of reverse causation.

Methodological developments have resulted in increased applications of genetically-informed methods. In particular, polygenic risk scores (PRSs) have been developed to model the collective effect of multiple genetic variants. The PRS approach is especially useful in research of complex human traits such as depression that are affected by a large number of genetic variants. Recent

availability of massive genotyped data in large-scale social science studies have tremendously expanded the applicability of PRSs in social science research (Belsky and Israel 2014; Liu and Guo 2016; Freese 2018). In this study, we propose to leverage these advanced data and methods to study the complex relationship between CJ contact and depression.

We hypothesize that higher polygenic risk of depression is associated with elevated risk of CJ contact, which in turn, exacerbates depression risk in later life. In other words, experience with the CJ system partially mediates the genetic influence on depression.

Data analysis methods:

We propose to conduct a polygenic risk score (PRS) analysis using data from the Dunedin Multidisciplinary Health and Development Study. To examine the mediating effect of CJ contact on the genetic association with depression, we will perform a formal mediation analysis. We will analyze the data using statistical models that are appropriate for the distribution of the focal variables (e.g., logistic regression if the outcome is binary).

Variables needed at which ages:

Concept	Variable or questionnaire name	Phase
Depression	Diagnosis of Depression, ages 15-45 Depressive symptom scale, ages 15-45	P15 onward
Criminal justice contact	Age at first incarceration Incarceration duration Age at first arrest (police-recorded) Age at first conviction	All available phases
Child mental health before criminal justice contact	An Externalizing score, and an internalizing score from parent and teacher reports in first decade of life	P5-11
Delinquency	Self-report delinquency, matched for item content, SRDcom	P13 onward
Genetics	Polygenic risk score for depressive symptoms (Okbay et al. 2016) Polygenic risk score for major depression (Wray et al. 2018)	
Demographics	Sex Childhood SES	

Significance of the Study (for theory, research methods or clinical practice):

This study can make important contributions to criminology and research of mental health. First, criminologists have long been interested in the relationship between mental health and criminal justice contact. Yet one of the biggest challenges is to provide convincing evidence for a causal relationship. In this study, we take on the challenge to investigate the CJ contact-depression relationship by leveraging the longitudinal designs and genomic data in the Dunedin Study. Second, this study will demonstrate how social science and genomic research can benefit from and contribute to each other. On the one hand, genetic data can be exploited to strengthen causal inference in observational research. On the other hand, social science provides the theoretical guidance to understand the complex relationships between genes and outcomes.

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Data Security Agreement

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<input checked="" type="checkbox"/>	I am current on Human Subjects Training (CITI (www.citiprogram.org) or equivalent)
<input checked="" type="checkbox"/>	My project is covered by the Duke ethics committee OR I have /will obtain ethical approval from my home institution.
<input checked="" type="checkbox"/>	<p>I will treat all data as "restricted" and store in a secure fashion. My computer or laptop is:</p> <p>a) encrypted (recommended programs are FileVault2 for Macs, and Bitlocker for Windows machines) b) password-protected c) configured to lock-out after 15 minutes of inactivity AND d) has an antivirus client installed as well as being patched regularly.</p>
<input checked="" type="checkbox"/>	I will not "sync" the data to a mobile device.
<input checked="" type="checkbox"/>	In the event that my laptop with data on it is lost, stolen or hacked, I will immediately contact Moffitt or Caspi.
<input checked="" type="checkbox"/>	I will not share the data with anyone, including my students or other collaborators not specifically listed on this concept paper.
<input checked="" type="checkbox"/>	<p>I will not post data online or submit the data file to a journal for them to post.</p> <p><i>Some journals are now requesting the data file as part of the manuscript submission process. Study participants have not given informed consent for unrestricted open access, so we have a managed-access process. Speak to Temi or Avshalom for strategies for achieving compliance with data-sharing policies of journals.</i></p>
<input checked="" type="checkbox"/>	<p>I will delete all data files from my computer after the project is complete. Collaborators and trainees may not take a data file away from the office.</p> <p>This data remains the property of the Study and cannot be used for further analyses without an approved concept paper for new analyses.</p>

Signature: *Hexuan Liu*