Aging & Crime:
Biological Age and its Role in the Criminal Career

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Background

Adverse childhood experiences, such as victimization experiences, are associated with increased morbidity and mortality. Aging, as measured by biological age, has been suggested as a key mediator in this association.

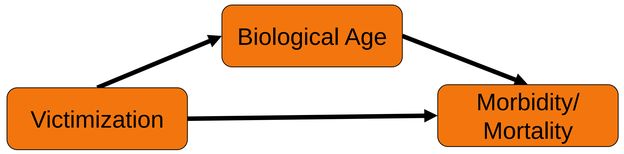

***Figure 1**. Theoretical model of victimization and aging.*

Aging is defined as the:

"…progressive, generalized impairment of function, resulting in an increasing vulnerability to environmental challenge and a growing risk of disease and death."[1]

Recently, measures of biological age have been developed, including biomarker indices and epigenetic clocks. Using these measures, recent studies have found that victimization experiences are associated with accelerated biological aging[2].

Shifting the focus, criminologists have begun to document associations between the offending and morbidity[3] and mortality[4], but these investigations have not yet incorporated biological age.

This study maintains a focus offenders and examines what impact the commission of crime might have on biological aging.

Does offending age the offender?

The current study examines the impact of criminal convictions received by age 26 on biological aging throughout later adulthood.

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Methods

Data

Data was drawn from the Dunedin Longitudinal Study, a prospective birth cohort of *N*=1037 New Zealanders.

Measures

Dependent Variables

Pace of Aging[5] is a biomarker index that was constructed by combining the linear slopes of 19 biomarkers across four phases of data collection from age 26-45. Pace of Aging was centered at 1 so that the average score is interpreted as the linear decline in physiological integrity that is expected for a single chronological year.

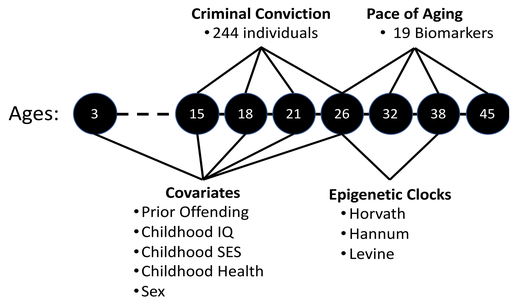

***Figure 2**. Timeline of data collection for the Dunedin Longitudinal Study.*

Three epigenetic clocks (Horvath, Hannum, and Levine) were calculated at two phases of data collection (i.e., age 26 and 38) using previously published algorithms[6-8]. The difference between the two measurements was used to assess epigenetic aging.

Independent Variable

Criminal conviction data for cohort members were obtained by accessing the central computer system of the New Zealand Police.

*All analyses adjust for prior self-reported offending, sex, and childhood SES, IQ, and Health.

Findings

After adjusting for covariates, only Pace of Aging was statistically associated with receipt of a criminal conviction by age 26. Residualizing the biomarkers for smoking during adulthood did not change the result.

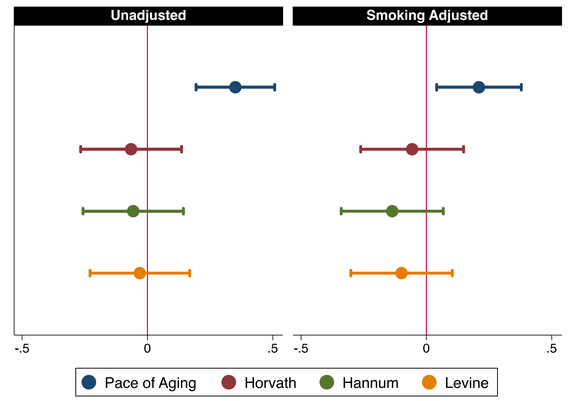

***Figure 3**. Partially standardized regression coefficients of biomarkers of aging on criminal conviction by age 26.*

Next, we stratified the observed association between conviction and Pace of Aging by crime type. The association varied across crime type with drug- and theft-related crimes demonstrating the largest associations.

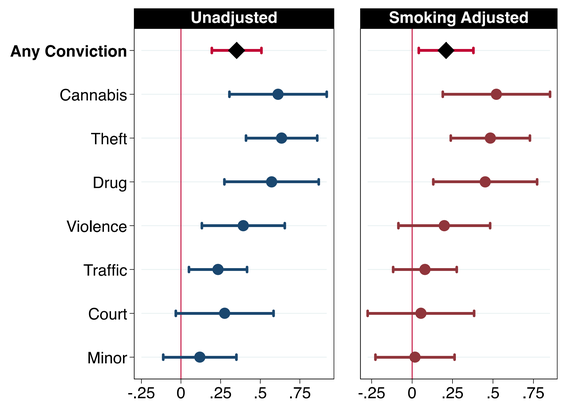

***Figure 4**. Pace of Aging on criminal conviction, stratified by crime type.*

References:
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Findings, cont.

Finally, we tested the dependence of the association between conviction and Pace of Aging on later offending. While the formal test interaction was not statistically significant, there were suggestive results indicating that early criminal conviction had a disproportionate impact on Pace of Aging when criminal convictions were also received later in adulthood.

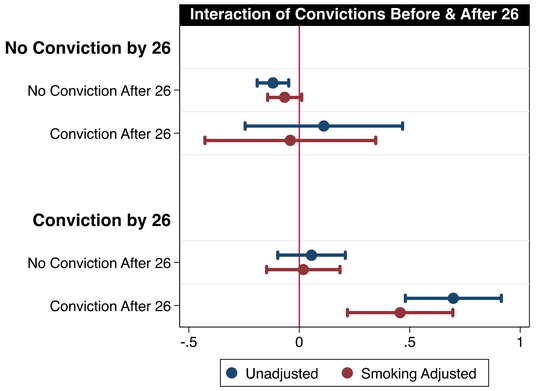

***Figure 5**. Marginal effects from the interaction of criminal conviction before and after age 26 predicting Pace of Aging.*

Next Steps

1. Phase 45 epigenetic clock data will be sought in order to model the true slopes of epigenetic aging in the Dunedin Cohort.
2. Explore the primary and secondary stressors that mediate the above associations[9].

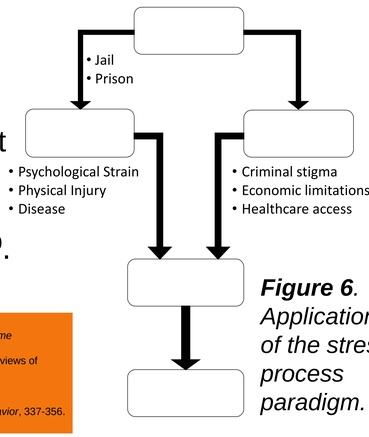

***Figure 6**. Application of the stress process paradigm.*