



Health and criminal conviction among African Americans

A sibling study

Amber L. Beckley, Rohan H. Palmer, Michael Rocque, Keith E. Whitfield



Health and criminal conviction among African Americans

A sibling study

Amber L. Beckley

Stockholm University

Duke University

Rohan H. Palmer

Emory University

Michael Rocque

Bates College

Keith E. Whitfield

Wayne State University

Abstract: We examined the association between crime and poor health in a sample of African American twins. We combined health data from the Carolina African American Twin Study of Aging with criminal conviction data from North Carolina's Department of Public Safety. We analyzed both convicted Study members matched with non-convicted study members and siblings discordant for criminal conviction. Study members with a criminal conviction, compared to those without a criminal conviction, had poorer adult health outcomes. Poor childhood health could not explain poor adult health among convicted offenders. The results of our discordant sibling analysis showed that the association between criminal conviction and poor adult health was confounded by unobserved factors operating within families. High alcohol consumption and lacking a spouse were uniquely observed among those convicted of a crime. Criminal conviction does not appear to be causally related poor health. Convicted people may, however, have poor health behaviors and be at risk for early mortality.

Keywords: crime, public health, African American health disparity

Stockholm Research Reports in Demography 2017:30

ISSN 2002-617X

© Amber Beckley, Rohan Palmer, Michael Rocque, Keith Whitfield



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

Introduction

In the United States there are over 6 million people under correctional supervision; that is, serving a sentence for crime in prison or jail, or on probation or parole.^{1,2} This large group of people convicted of crime presents a significant concern for public health. For example, people convicted of crime are at a high risk of adverse health outcomes and early mortality.^{3–8} People convicted of crime are also likely to experience unemployment, economic instability, and lack a romantic partner, factors associated with poor long-term health prognoses.⁹ Criminal conviction could be responsible for health disparities experienced by African Americans, who are overrepresented in the criminal justice system.^{10–12} However, there is limited evidence to indicate a causal link between criminal conviction and poor health.^{13,14} Criminal conviction and poor health may both be parts of a suite of negative life outcomes that often cluster within families.^{15–17}

This study analyzes health and sociodemographic health risks in a sample of African American twins. This study aims to answer three questions. First, are African Americans who have been convicted of a crime in poorer health and at a higher sociodemographic risk for poor health than non-convicted African Americans? Second, can we trace health disparities between convicted versus non-convicted African Americans back to childhood risks? Third, is evidence of disparate health between convicted and non-convicted African Americans a function criminal conviction?

Methods

Data

Participants were members of the Carolina African American Twin Study of Aging (CAATSA, N = 706),¹⁸ which examines childhood characteristics and health status in a sample of African American twins born in North Carolina. Full details about the sample are reported elsewhere.¹⁹ Briefly, the CAATSA sample was drawn from records of twin births

between the years of 1913 and 1975 from 23 vital statistics offices in North Carolina counties, U.S.A. The 23 counties selected represented over 50% of the population and 50% of births in North Carolina. All records of twin births were entered into a computer database. Potential interviewees were located through voter registries and telephone directory searches. Interviewees were recruited and all in-person interviews were conducted between March 1999 and June 2003. A total of 706 interviews were conducted. Siblings of the twin pairs (31 pairs, 62 individuals) and surviving members of non-intact twin pairs (72 individuals) comprised approximately 19% of the interviews. All participants gave informed consent, and the study was approved by the Institutional Review Boards of the University of North Carolina Chapel Hill and Pennsylvania State University.

In 2017, public records on criminal conviction in North Carolina, kept by the North Carolina Department of Public Safety were searched for members of the CAATSA Study. The North Carolina Department of Public Safety maintains all records of criminal conviction for offenders sentenced to state prison, jail, and probation in North Carolina since 1972. The age of criminal responsibility in North Carolina is 16 years. Offenses committed prior to 16 years of age are tried in juvenile court. Juvenile court is distinct from criminal court. Juvenile offenders found guilty of an offense are considered “delinquent”, which does not result in a record of criminal conviction. Offenders younger than 16 years of age can, in cases of serious crime, have their offense transferred to criminal court where, if found guilty, they would have a record of criminal conviction. Public criminal conviction records were matched to the CAATSA data by first and last name and date of birth. The search yielded 49 (6.9%) of CAATSA Study members with a criminal conviction prior to the interview and complete information on all variables; 1 was a non-twin sibling who was retained in the analysis.

Measures

Criminal conviction was operationalized as present or absent. Adult health was

assessed using: self-rated health (with higher scores indicating better health), smoking behavior at the time of the interview, alcohol consumption in the year prior to the interview, body mass index (BMI), and systolic blood pressure. Childhood risks for poor adult health were assessed using: low childhood SES and childhood health, both retrospectively reported. Sociodemographic health risk was assessed using: unemployment/disability, low income, and being unmarried. We additionally measured demographic factors of age in years, male sex, and years lived outside of North Carolina. Complete details of the measures are included in Table 1.

[Insert Table 1 about here]

Analytic approach

We conducted bivariate analyses in which we compared measures, separately, across non-convicted and convicted study members. For all analyses we used paired sample t-tests and exact McNemar tests to test the statistical significance of group differences.

Results

Non-convicted Study members (N) differed from convicted Study members (N) on important demographic determinants of health and criminal conviction (age, sex, and years lived outside of North Carolina) (See Supplementary Material Table S.1). To ensure that any detected differences in health between convicted and non-convicted Study members was not due to demographic differences between the two groups, we used propensity score matching to match convicted Study members to non-convicted Study members. The match was based on the demographic variables of age, being male, and years lived outside North Carolina. We matched 2 non-convicted Study members for each convicted Study member. The resulting matched sample comprised 149 (21.3%) Study members with complete data on all variables, 100 without a conviction and 49 with a conviction, who were balanced on the demographic variables (see Table 2).

As a further means of controlling for differences in genetic and childhood environmental risks for poor health and criminal conviction, we created a sample of siblings discordant on criminal conviction (“discordant sibling sample”). The resulting discordant sibling sample comprised 74 Study members, thirty-seven sibling pairs, with complete data on all variables. Thirty-seven sibling pairs (32 twin pairs and 5 single-twin/non-twin sibling pairs) were discordant for criminal conviction. Of the 37 sibling pairs discordant for criminal conviction, 17 (46%) were opposite sex pairs. There were significantly more men among the convicted twins than the non-convicted twins (Table 2).

Are African Americans who have been convicted of a crime in poorer health and at a higher sociodemographic risk for poor health than non-convicted African Americans?

Our analysis first compared convicted Study members to non-convicted Study members (see top half of Table 2 [results for Matched Sample] and Figure 1). Convicted Study members, compared to non-convicted Study members, reported significantly poorer self-rated health, more tobacco use, and more alcohol use. Moreover, convicted Study members, compared to non-convicted Study members, were more likely to be unemployed, have needs that could not be met by their income, and be divorced, separated, or never married. BMI and systolic blood pressure did not significantly differ between convicted and non-convicted Study Members. See Table 2 and Figure 1.

In the analysis of the matched sample we found that convicted Study members, compared to non-convicted Study members, were more likely to have a low income and lack a spouse.

[Insert Table 2 and Figure 1 about here]

Can we trace evidence of health disparities between convicted and non-convicted African Americans to childhood?

One of the possible sources of poor health among convicted Study members may have

been poor childhood health or low childhood socioeconomic status (see lower half of Table 2 [results for Matched Sample]). We found that self-reports of childhood socioeconomic status and childhood health did not significantly differ between convicted Study members and non-convicted Study members. See Table 2.

Is evidence of disparate health between convicted and non-convicted African Americans a function of criminal conviction?

Our results showing poorer health among convicted Study members, compared to non-convicted Study members, still allowed for the possibility that criminal conviction was the cause of poor health. To control for the effect of unobserved familial factors on health we analyzed siblings discordant for criminal conviction. A discordant sibling design is a quasi-causal method that extends the controls included in the matched sample design to include unobserved factors such as family history of illness, childhood home environment, genes, and more. If we observe differences in health between siblings discordant for conviction we have a stronger basis for arguing for a causal relationship between criminal conviction and health. If we observe similar health between siblings discordant for criminal conviction, we can assume that unobserved factors shared between siblings (family history of illness, childhood home environment, genes) are, compared to criminal conviction, more important explanations of health.

Our results showed that self-rated health, tobacco use, and BMI did not significantly differ between convicted and non-convicted siblings in a pair. In the analysis of siblings discordant for criminal conviction, the likelihood of unemployment and low income did not significantly differ between convicted and non-convicted siblings. Convicted siblings did, however, have significantly higher alcohol use and were more likely to lack a spouse; the results were not a function of a sex imbalance in siblings discordant for conviction (See Supplementary Material Tables S.2 – S.3). See Table 2 and Figure 2.

Discussion

This study provides initial evidence on the relationship between adult health and criminal conviction in a sample of African American twins. Consistent with past research our findings showed that people with a criminal conviction, compared to those without a criminal conviction, indeed were in worse health during adulthood.³⁻⁸ Poor childhood health could not account for poor adult health among convicted offenders. Criminal conviction also did not appear to cause poor adult health among convicted offenders. Rather, our use of a sibling comparison design showed that criminal conviction and poor adult health seemed connected via similar unobserved factors operating within families.

Our finding that childhood health was similar between non-offenders and convicted offenders may be explained by Study members having generally positive recollections of childhood health and few reporting poor childhood health. It is possible that African American children who were in poor health during the mid-20th Century did not survive to adulthood, and were thus unable to participate in the CAATSA Study.

Alcohol use emerged as the primary health concern among offenders. Our results of the analysis of siblings discordant for criminal conviction showed that the association between criminal conviction and alcohol use was not induced by unobserved family factors. Our findings are congruent with results showing that high alcohol consumption poses a significant risk for early mortality among convicted offenders.^{8,20,21}

Our study has limitations. First, the proportion of offenders in our sample is low compared to the reported prevalence of criminal conviction in the African American community.²² Consequently, we could not evaluate the effect of many convictions versus few, or the effect of incarceration; both factors may play a role in health outcomes among offenders and population-wide health disparities.^{4,6-8,12-14,23-27} Self-reported offending, which has been tied to worse health over the life-course, was also not included as part of this

analysis.²⁸ Additionally, the small sample size means that the ability of the analysis to detect statistically significant differences in health between sibling pairs is sensitive to unknown, true population differences in health between convicted and non-convicted sibling pairs. Rather than focus on statistical significance, we point to the diminished difference in health between convicted and non-convicted Study members in the discordant sibling model, relative to the matched sample. Consistent with the idea that poor health operates at the familial level non-convicted siblings in the discordant sibling model have below-average health. Future research using a larger sibling sample is needed to test the robustness of this finding.

The sampling method for the CAATSA survey likely accounted for the low prevalence of offenders. Study members were located using two methods. The first method was through voter registration lists, which may systematically exclude offenders. Between 1996 and 2002, about 40% of African Americans in North Carolina were not registered to vote.²⁹ This figure includes North Carolinians who were under state supervision (incarceration, parole, or probation) and ineligible to vote. The second method was through printed telephone directories. Disadvantaged individuals, who are overrepresented in the criminal justice system, may not have a telephone or may be transient and not listed in the telephone directory. Since interviews were conducted during 1999-2003, the proliferation of mobile telephones and the lack of a directory listing were not as big of problems as they would be if the interviews had been conducted in the present day. Finally, the CAATSA study did gather information on deceased individuals (who may have been likely to be offenders) or interview incarcerated individuals.

Second, our criminal conviction search was restricted to the state of North Carolina. It is possible that some Study members were convicted outside of North Carolina. Third, our analysis was of twin families, which may differ from non-twin families. Despite these

limitations, we believe that this study provides a valuable initial contribution to the understudied topic of African American offending and health disparities.¹⁰ Future efforts should be made to replicate the results of this study while overcoming its limitations.

Public health implications

Our findings have a number of public health implications. First, high alcohol consumption should be recognized as a problem among convicted offenders. Screening for alcoholism and alcohol abuse should be routine for convicted offenders. We caution against punitive measures for violating alcohol restrictions that may be part of a criminal sentence and instead advocate for evidence-based treatments for alcoholism and alcohol abuse. Treatment for alcoholism can be a requirement of correctional supervision (incarceration, probation, parole).

Second, efforts should be made to compensate for the lack of support offered by a spouse. Spouses play an important role in preventing social isolation and loneliness, both of which have been tied to poor health.^{30,31} A meta-analysis showed that the most effective loneliness-prevention programs are targeted at maladaptive social cognitions, which entails negative automatic thinking about the social context.³² Offenders under community supervision (those on probation or parole) are typically required to regularly check-in with a social worker. Cognitive behavioral therapy (CBT) has already been recommended as a means of improving supervision of offenders in the community.³³ Addressing maladaptive social cognitions during CBT may also be beneficial.

Third, our study indicates that the criminal justice system is not the source of the population-wide health disparity between African Americans and Caucasians but the criminal justice system may still offer an effective means of reducing the disparity. Our results demonstrated that criminal justice system involvement does not have an impact on most health outcomes. Yet, the criminal justice system may represent a means of delivering

healthcare and improving health knowledge and behavior. Our results support recent calls for the criminal justice system to become more involved in efforts to decrease health disparities.¹⁰

Acknowledgements

The project was funded by the National Institute on Aging (#RO1-AG13662). Beckley is grateful for salary support from the 2015-01189 – FORTE & Marie Curie Actions, EU Framework Programme, Horizon 2020.

References

1. Minton TD, Zeng Z. *Jail Inmates in 2015*. Washington, DC: Bureau of Justice Statistics; 2016.
2. Kaebler D, Glaze L. *Correctional Populations in the United States, 2015*. Washington, DC: Bureau of Justice Statistics; 2016.
3. Binswanger IA, Stern MF, Deyo RA, et al. Release from Prison — A High Risk of Death for Former Inmates. *N Engl J Med*. 2007;356(2):157-165. doi:10.1056/NEJMsa064115.
4. Kjelsberg E, Laake P. Is the high mortality risk in sentenced offenders independent of previous imprisonment? *Eur J Epidemiol*. 2010;25(4):237-243. doi:10.1007/s10654-010-9436-6.
5. Nieuwebeerta P, Piquero AR. Mortality Rates and Causes of Death of Convicted Dutch Criminals 25 Years Later. *J Res Crime Delinquency*. 2008;45(3):256-286. doi:10.1177/0022427808317573.
6. Piquero AR, Daigle LE, Gibson C, Piquero NL, Tibbetts SG. Research Note: Are Life-Course-Persistent Offenders At Risk for Adverse Health Outcomes? *J Res Crime Delinquency*. 2007;44(2):185-207. doi:10.1177/0022427806297739.
7. Piquero AR, Shepherd I, Shepherd JP, Farrington DP. Impact of offending trajectories on health: disability, hospitalisation and death in middle-aged men in the Cambridge Study in Delinquent Development. *Crim Behav Ment Health*. 2011;21(3):189-201. doi:10.1002/cbm.810.
8. Rosen DL, Schoenbach VJ, Wohl DA. All-Cause and Cause-Specific Mortality Among Men Released From State Prison, 1980–2005. *Am J Public Health*. 2008;98(12):2278-2284. doi:10.2105/AJPH.2007.121855.
9. Sampson RJ, Laub JH. *Crime in the Making: Pathways and Turning Points through Life*. Cambridge, MA: Harvard University Press; 1993.
10. Binswanger IA, Redmond N, Steiner JF, Hicks LS. Health Disparities and the Criminal Justice System: An Agenda for Further Research and Action. *J Urban Health Bull NY Acad Med*. 2012;89(1):98-107. doi:10.1007/s11524-011-9614-1.
11. Wildeman C, Muller C. Mass Imprisonment and Inequality in Health and Family Life. *Annu Rev Law Soc Sci*. 2012;8(1):11-30. doi:10.1146/annurev-lawsocsci-102510-105459.
12. Wildeman C, Wang EA. Mass incarceration, public health, and widening inequality in the USA. *The Lancet*. 2017;389(10077):1464-1474. doi:10.1016/S0140-6736(17)30259-3.

13. Massoglia M. Incarceration, Health, and Racial Disparities in Health. *Law Soc Rev.* 2008;42(2):275-306.
14. Massoglia M. Incarceration as Exposure: The Prison, Infectious Disease, and Other Stress-Related Illnesses. *J Health Soc Behav.* 2008;49(1):56-71. doi:10.1177/002214650804900105.
15. Belsky DW, Moffitt TE, Corcoran DL, et al. The genetics of success how single-nucleotide polymorphisms associated with educational attainment relate to life-course development. *Psychol Sci.* June 2016;0956797616643070. doi:10.1177/0956797616643070.
16. D'Onofrio BM, Singh AL, Iliadou A, et al. Familial Confounding of the Association Between Maternal Smoking During Pregnancy and Offspring Criminality: A Population-Based Study in Sweden. *Arch Gen Psychiatry.* 2010;67(5):529-538. doi:10.1001/archgenpsychiatry.2010.33.
17. Forsman M, Långström N. Child maltreatment and adult violent offending: population-based twin study addressing the "cycle of violence" hypothesis. *Psychol Med.* 2012;42(9):1977-1983. doi:10.1017/S0033291711003060.
18. Whitfield KE, Brandon DT, Wiggins S, Vogler G, McClearn G. Does Intact Pair Status Matter in the Study of African American Twins? The Carolina African American Twin Study of Aging. *Exp Aging Res.* 2003;29(4):407-423. doi:10.1080/03610730303699.
19. Whitfield KE. A Registry of Adult African American Twins: The Carolina African American Twin Study of Aging. *Twin Research and Human Genetics.* /core/journals/twin-research-and-human-genetics/article/div-classtitlea-registry-of-adult-african-american-twins-the-carolina-african-american-twin-study-of-agingdiv/55D5214ED4327618303F907B516B98C0. Published February 2013. Accessed March 19, 2017.
20. Laub JH, Vaillant GE. Delinquency and Mortality: A 50-Year Follow-Up Study of 1,000 Delinquent and Nondelinquent Boys. *Am J Psychiatry.* 2000;157(1):96-102. doi:10.1176/ajp.157.1.96.
21. Stattin H, Romelsjö A. Adult mortality in the light of criminality, substance abuse, and behavioural and family-risk factors in adolescence. *Crim Behav Ment Health.* 1995;5(4):279-311. doi:10.1002/cbm.1995.5.4.279.
22. Brame R, Turner MG, Paternoster R, Bushway SD. Cumulative Prevalence of Arrest From Ages 8 to 23 in a National Sample. *Pediatrics.* 2012;129(1):21-27. doi:10.1542/peds.2010-3710.
23. Lee H, Wildeman C, Wang EA, Matusko N, Jackson JS. A Heavy Burden: The Cardiovascular Health Consequences of Having a Family Member Incarcerated. *Am J Public Health.* 2014;104(3):421-427. doi:10.2105/AJPH.2013.301504.
24. Schnittker J, John A. Enduring Stigma: The Long-Term Effects of Incarceration on Health. *J Health Soc Behav.* 2007;48(2):115-130. doi:10.1177/002214650704800202.
25. Wang EA, Pletcher M, Lin F, et al. Incarceration, Incident Hypertension, and Access to Health Care: Findings From the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Arch Intern Med.* 2009;169(7):687-693. doi:10.1001/archinternmed.2009.26.
26. Wang EA, Green J. Incarceration as a key variable in racial disparities of asthma prevalence. *BMC Public Health.* 2010;10:290. doi:10.1186/1471-2458-10-290.
27. Wildeman C. Incarceration and Population Health in Wealthy Democracies*. *Criminology.* 2016;54(2):360-382. doi:10.1111/1745-9125.12107.
28. Odgers CL, Caspi A, Broadbent JM, et al. Prediction of Differential Adult Health Burden by Conduct Problem Subtypes in Males. *Arch Gen Psychiatry.* 2007;64(4):476-484. doi:10.1001/archpsyc.64.4.476.
29. Voting HotReport.

http://thedataweb.rm.census.gov/TheDataWeb_HotReport2/voting/voting.hrml?GESTFIPS=35&INSTANCE=Nov+2002. Accessed April 3, 2017.

30. Cacioppo JT, Hawkley LC, Crawford LE, et al. Loneliness and Health: Potential Mechanisms. *Psychosom Med*. 2002;64(3):407-417.

31. Hawkley LC, Cacioppo JT. Loneliness Matters: A Theoretical and Empirical Review of Consequences and Mechanisms. *Ann Behav Med*. 2010;40(2):218-227.

doi:10.1007/s12160-010-9210-8.

32. Masi CM, Chen H-Y, Hawkley LC, Cacioppo JT. A Meta-Analysis of Interventions to Reduce Loneliness. *Personal Soc Psychol Rev*. 2011;15(3):219-266.

doi:10.1177/1088868310377394.

33. Cullen FT, Jonson CL, Mears DP. Reinventing Community Corrections. *Crime Justice*. November 2016:000-000. doi:10.1086/688457.

Table 1. Variable descriptions and descriptive statistics

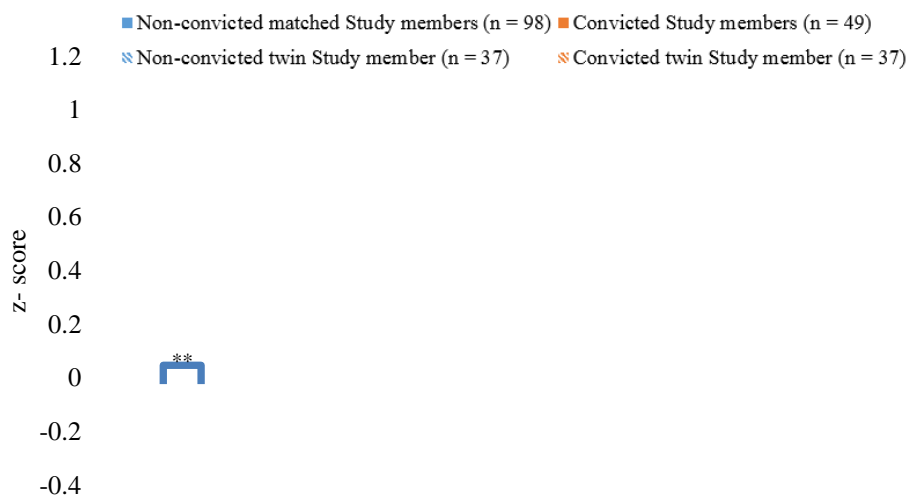
Variable	Description
Criminal conviction	Offense as recorded by the North Carolina Department of Public Safety (DPS). The DPS maintains all records of criminal conviction for offenders sentenced to state prison and probation in North Carolina since 1972. The age of criminal responsibility in North Carolina is 16 years.
Adult health	
Self-rated health	Study member rating of health at time of interview. Range 1 (very poor) to 5 (very good).
Smoking	Study member report of smoking at time of interview. 1 – never smoked, 2 – Past smoker, 3 – Smoker at time of interview.
Alcohol use	Study member report of alcohol consumption in the year prior to interview. 0 – never drink, 1 – no drinking in past year, 2 – few times per year, 3 – once or twice per month, 4 – once per week, 5 – two to three times per week, 6 – daily/almost daily drinker.
Body mass index (BMI)	Body mass index (BMI) as measured by interviewers at time of interview.
Systolic blood pressure	Systolic blood pressure as measured by interviewers at time of interview.
Adult sociodemographic health risks	
Unemployed/disabled	Response of “unemployed”, “disabled”, “not seeking work” to the question, “Are you working at the present time?” Other response options included any type of employment (e.g., full-, part-time), retired, and homemaker.
Low income	Response of “poorly but I get by” or “not very well” to the question “How well does your income cover your needs?”
Unmarried	Unmarried (divorced, married, separated) at time of interview. (2 individuals in the full matched sample and 1 individual in the discordant twin sample were widowed; these individuals were considered to be married).
Retrospectively reported childhood characteristics	
Low childhood socioeconomic status	Response of “barely getting by – had just enough money for food and bills and couldn’t buy anything extra” or “not getting by – didn’t have enough money for bills and food and couldn’t buy anything extra” to the question, “How well-off was your family when you were growing up?”
Childhood health	Study member rating of childhood health. Range 1 (poor) to 5 (excellent).
Demographics	
Age	Age of study member at time of interview
Male, N (%)	Dichotomous indicator of male sex as reported by study member
Years lived outside North Carolina	Number of years lived outside of North Carolina.

Table 2. Retrospective reports of adult health, childhood health, and adult sociodemographic health risks between non-convicted and convicted study members in the Matched Sample and the Discordant Twin Sample.

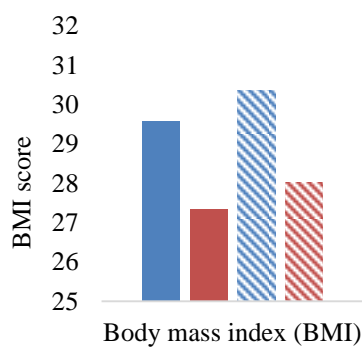
	Matched sample				Discordant twin sample			
	Matched sample (N = 147)	Non-convicted matched study members (N = 98)	Convicted study members (N = 49)	<i>p</i>	Discordant twin sample (N = 74)	Non-convicted twin (N = 37)	Convicted twin (N = 37)	<i>p</i>
Adult health								
Self-rated health (z-score), mean (SD)	3.86 (0.99)	0.28 (0.98)	-0.22 (1.03)	0.006	3.64 (1.00)	-0.08 (1.00)	-0.16 (1.07)	0.730
Tobacco use (z-score), mean (SD)	1.86 (0.86)	0.00 (1.00)	0.52 (1.15)	0.008	2.15 (0.91)	0.38 (1.17)	0.65 (1.13)	0.311
Alcohol use (z-score), mean (SD)	2.51 (2.05)	0.21 (1.09)	0.86 (1.13)	0.001	2.76 (2.10)	0.04 (1.00)	1.10 (1.12)	<0.001
Body mass index (BMI), mean (SD)	28.83 (7.10)	29.57 (6.66)	27.34 (7.77)	0.090	29.12 (7.78)	30.35 (8.39)	28.03 (7.08)	0.205
Systolic blood pressure (BP), mean (SD)	131.80 (18.95)	132.17 (18.61)	131.05 (19.80)	0.743	130.99 (17.73)	128.61 (15.89)	133.75 (19.36)	0.216
Adult sociodemographic health risks								
Unemployed/disabled, N (%)	25 (17.0%)	8 (7.3%)	13 (23.6%)	0.052	16 (21.3%)	6 (16.2%)	10 (27.0%)	0.397
Low income, N (%)	47 (32.0%)	22 (22.4%)	25 (51.0%)	0.001	27 (36.49%)	10 (27.8%)	16 (43.2%)	0.256
Divorced/separated/never married, N (%)	80 (54.4%)	42 (42.9%)	38 (77.6%)	<0.001	49 (65.3%)	19 (51.4%)	29 (78.4%)	0.028
Retrospectively reported childhood characteristics								
Low childhood socioeconomic status, N (%)	27 (18.4%)	17 (17.3%)	10 (20.4%)	0.821	16 (21.3%)	7 (18.9%)	9 (24.3%)	0.778
Childhood health (z-score), mean (SD)	4.13 (0.95)	0.21 (0.79)	0.07 (0.92)	0.355	4.13 (0.96)	0.15 (0.77)	0.17 (0.93)	0.905
Demographics								
Age, mean (SD)	42.87 (11.84)	42.99 (12.35)	42.63 (10.87)	0.858	42.52 (9.96)	42.54 (10.19)	42.51 (10.00)	0.991
Male, N (%)	95 (64.6%)	62 (63.3%)	33 (67.3%)	0.760	44 (58.7%)	16 (43.2%)	27 (73.0%)	0.018
Years lived outside North Carolina, mean (SD)								

Note: *p*-values for discordant twin sample are based on paired-sample t-tests for continuous values, exact McNemar test for proportion difference tests.

a. Z-scores for self-rated health, tobacco use, and alcohol use



b. Body mass index (BMI)



c. Systolic blood pressure (BP)

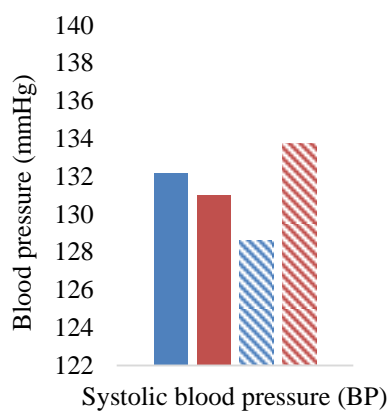


Figure 1. Adult health in convicted versus non-convicted Study members. ** $p < .01$, *** $p < .001$

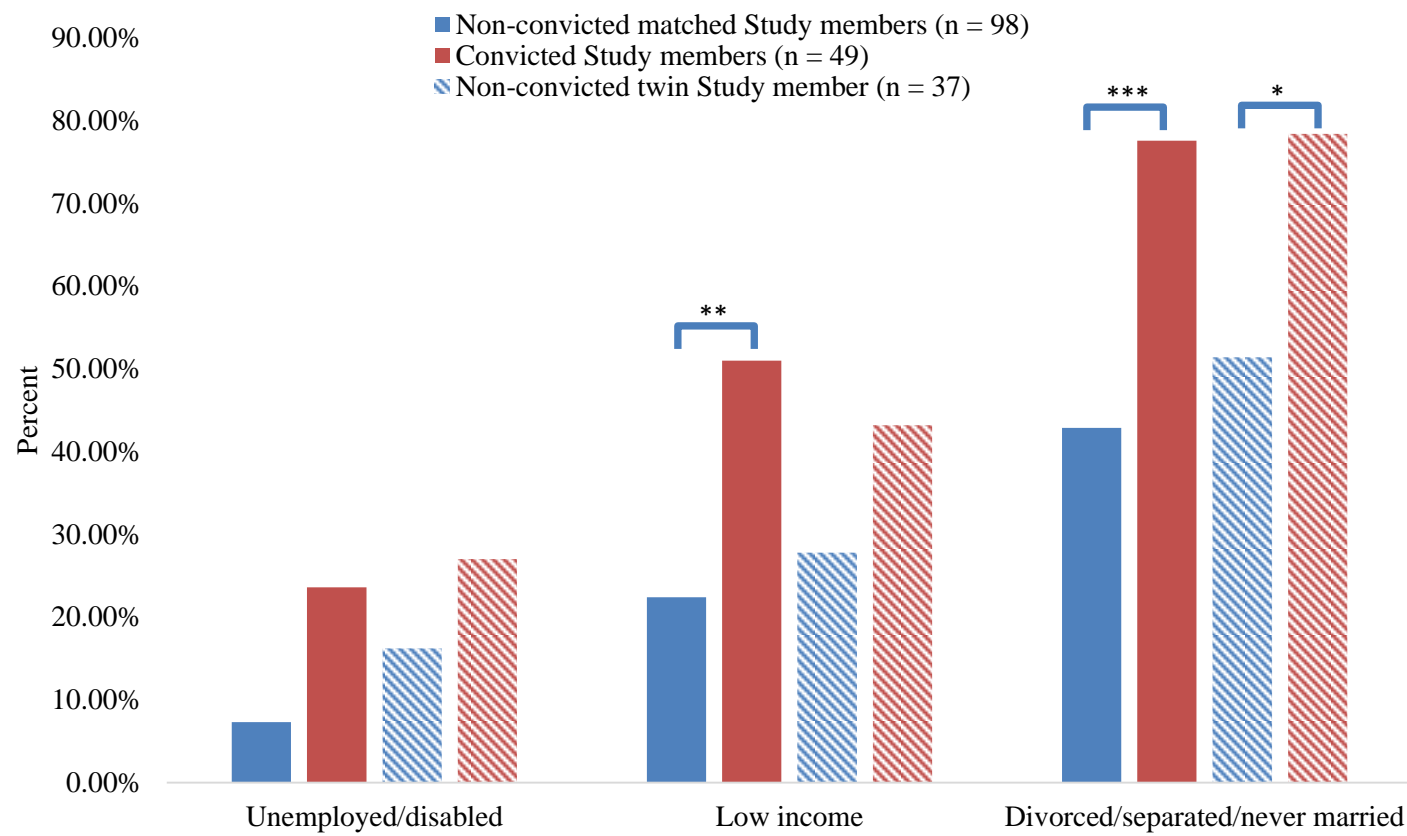


Figure 2. Sociodemographic health risks in convicted versus non-convicted Study members. * $p < .05$, ** $p < .01$, *** $p < .001$

Stockholm Research Reports in Demography

Stockholm University, 106 91 Stockholm, Sweden
www.su.se | info@su.se | ISSN 2002-617X



Stockholm
University

Demography Unit