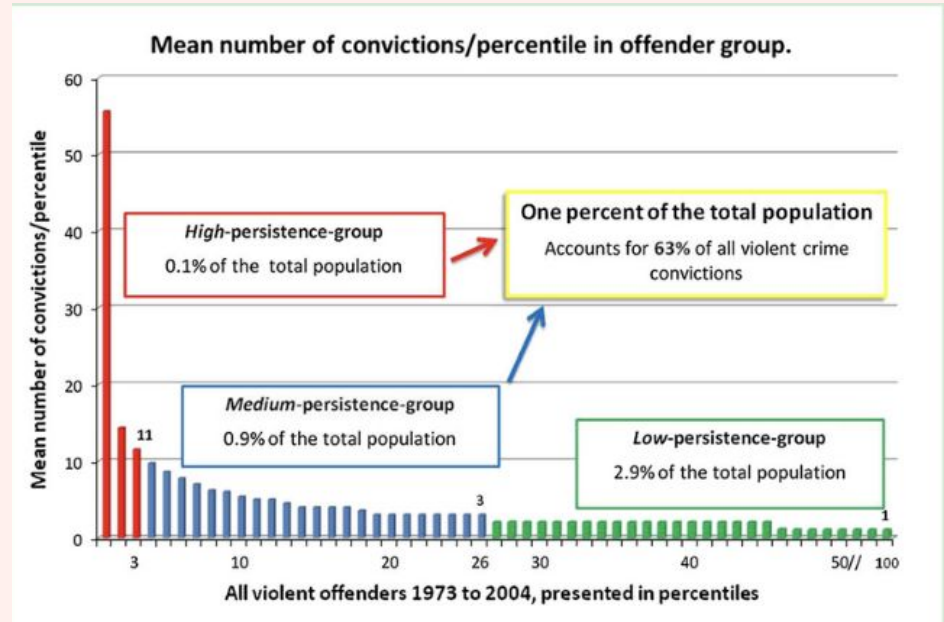


Potentiality of neurobiological  
markers associated with  
psychopathy being predictors of  
incarceration for violent crime

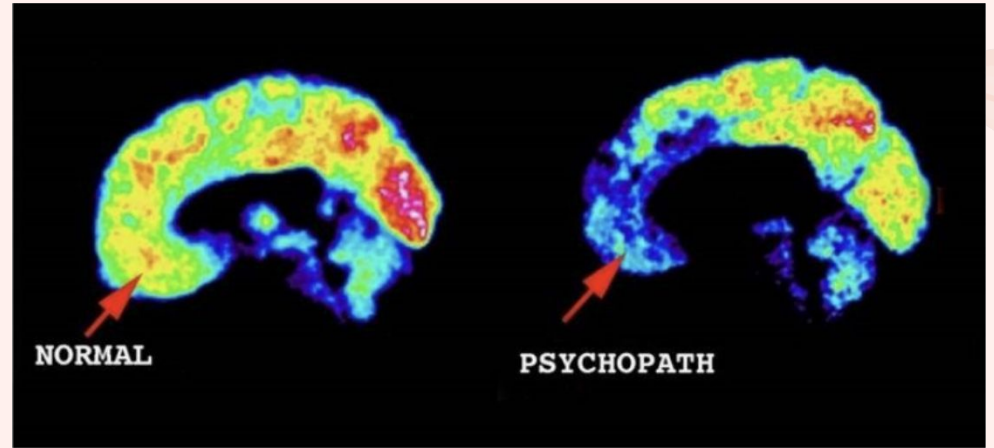
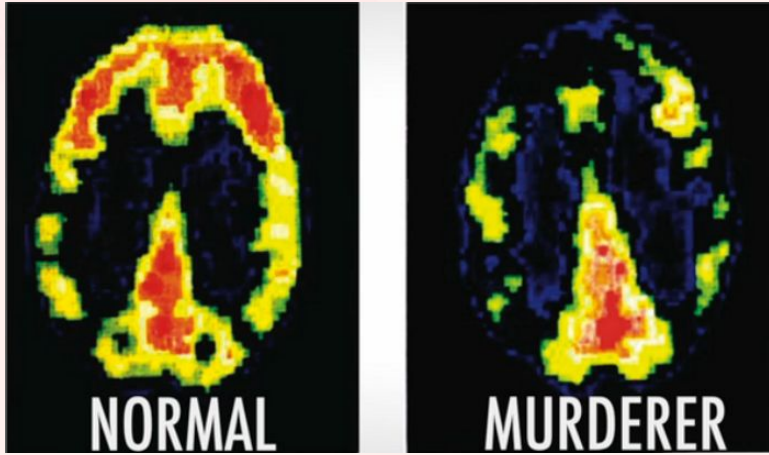
Amy Xia

# INTRODUCTION

- Skewed Violent Crime Distribution
- Who are the ones that commit more violent crimes?

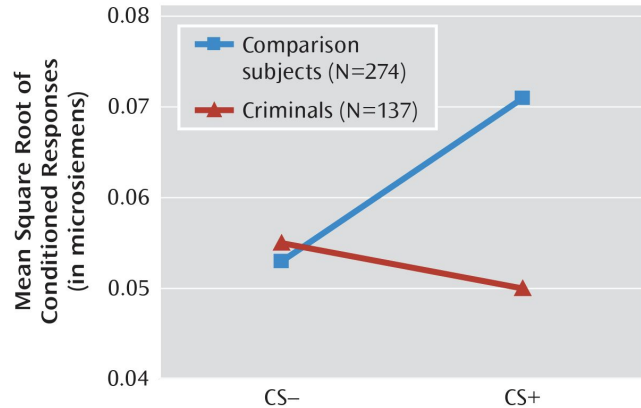


# High Risk Groups for Violent Crimes



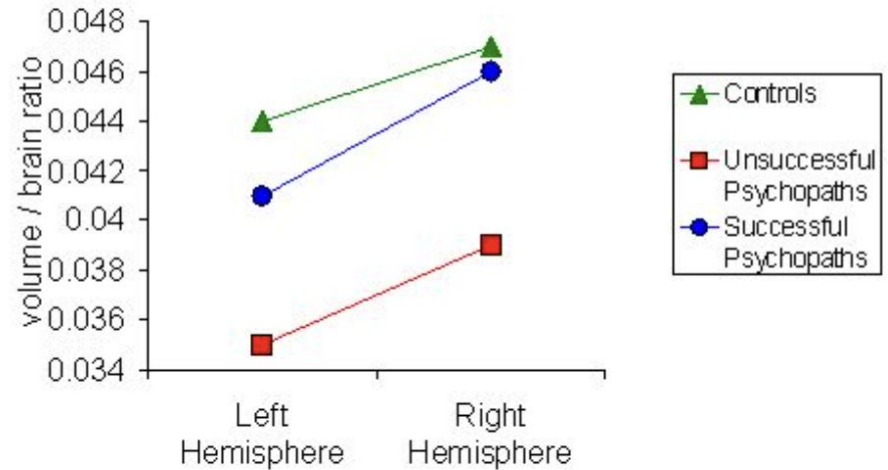
# Psychopath vs Normal Controls

FIGURE 2. Electrodermal Responses to Reinforced and Unreinforced Stimuli in Criminal Offenders and Comparison Subjects From a Large Birth Cohort<sup>a</sup>

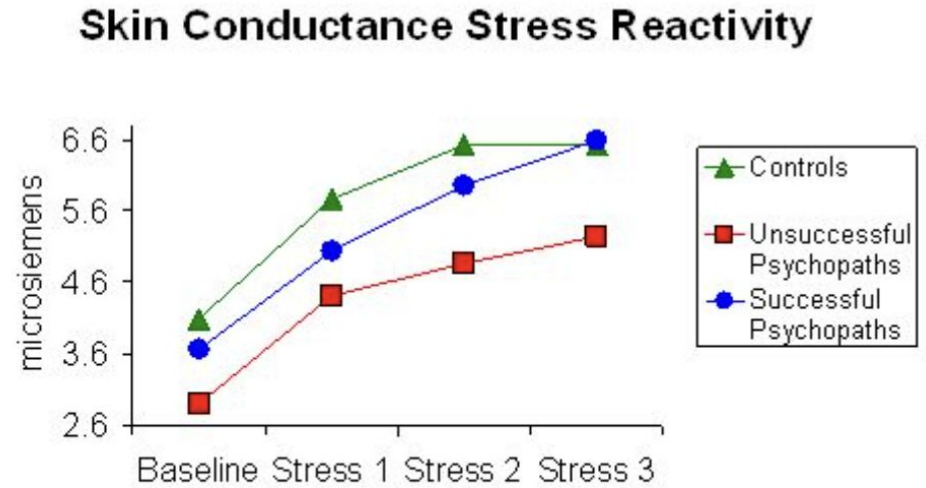
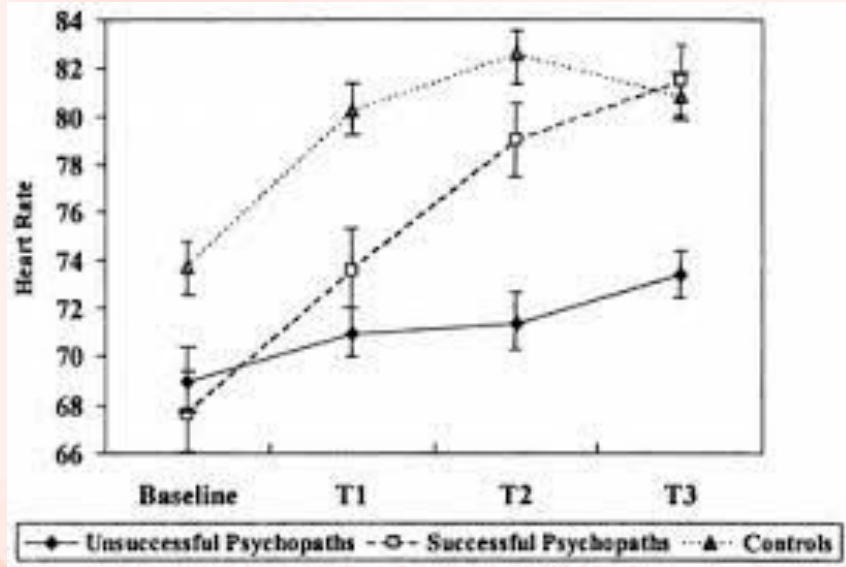



<sup>a</sup> CS+=reinforced stimulus; CS-=unreinforced stimulus. Results show conditioning (enhanced CS+) in comparison subjects but not in criminal offenders.

## Prefrontal Gray Volume



# Biological Traits of Psychopathy






# Measuring Psychopathy

Factor 1: Emotional Detachment superficial charm, manipulateness, shallow affectivity, absence of guilt or empathy


Factor 2: Antisocial behaviour deviance from an early age, aggression, impulsivity, irresponsibility, proneness to boredom

## PCL-R item


1. Glibness/superficial charm
  2. Grandiose sense of self worth
  3. Need for stimulation/proneness to boredom
  4. Pathological lying
  5. Conning/manipulative
  6. Lack of remorse or guilt
  7. Shallow affect
  8. Callous/lack of empathy
  9. Parasitic lifestyle
  10. Poor behavioral controls
  11. Promiscuous sexual behavior
  12. Early behavioral problems
  13. Lack of realistic, long-term goals
  14. Impulsivity
  15. Irresponsibility
  16. Failure to accept responsibility for own actions
  17. Many short-term marital relationships
  18. Juvenile delinquency
  19. Revocation of conditional release
  20. Criminal versatility
- 



# RESEARCH QUESTION





Are psychopathic traits that are linked to neurobiological abnormalities of the brain risk factors associated with disproportionate incarceration for serious violent crime between different sexes and age cohorts?







# Objective

## Short Term

1. Suggesting a correlation between biological traits behind a tendency towards violence, aggression, and violent crime
  2. Characterize the groups with statistically higher rates of violent crime offenses
- 
- 

## Long Term

1. Raise attention to the population of psychopathic individuals
  2. Further attention to the importance of psychopathy treatment
  3. Recognize the involvement of psychopathy in violent crime offenses
- 
- 




# Hypotheses



## Alternative Hypothesis 1:

There is a significantly higher rate of violent crimes committed by a) young age (12-17, 18-24) compared to older populations (age 25 and over); b) male sex compared to female sex

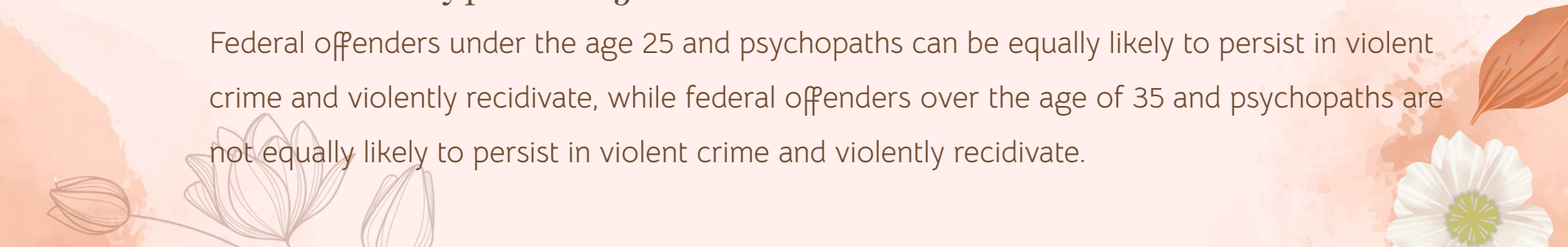


## Alternative Hypothesis 2:

Psychopaths commit significantly more violent recidivism than non-psychopaths

## Alternative Hypothesis 3:

Federal offenders under the age 25 and psychopaths can be equally likely to persist in violent crime and violently recidivate, while federal offenders over the age of 35 and psychopaths are not equally likely to persist in violent crime and violently recidivate.





# Variables

Independent

Number of convicted violent offenses/violent recidivism

Dependent

Young vs. Old, Males vs. Females, Psychopaths vs. Non-psychopaths,  
Psychopaths vs. Federal Offenders from different age cohorts

Constant

Sex constant (comparing age), vice versa

Confounding

Social and environmental influences

# PROCEDURES

## Hypothesis 1

- The number of violent crimes committed by young populations (12-24)
- The number of violent crimes committed by other age groups (25-34, 35-44)
- The number of violent crimes committed by males/females



Statistics  
Canada

Statistique  
Canada



# PROCEDURES

## Hypothesis 2

Data was extracted from Serin (1996)

The number of violent recidivism committed by a sample of 81 offenders (Serin 1996).

Data analysis was done in this literature, yet other literatures were looked at.

- These additional literatures are presented in Discussion.
- 



# PROCEDURES

## Hypothesis 3

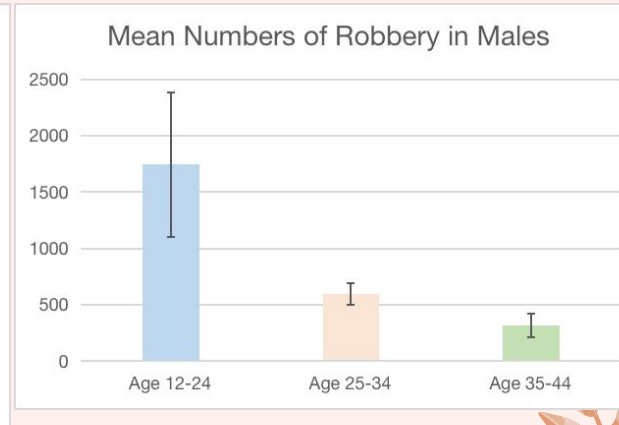
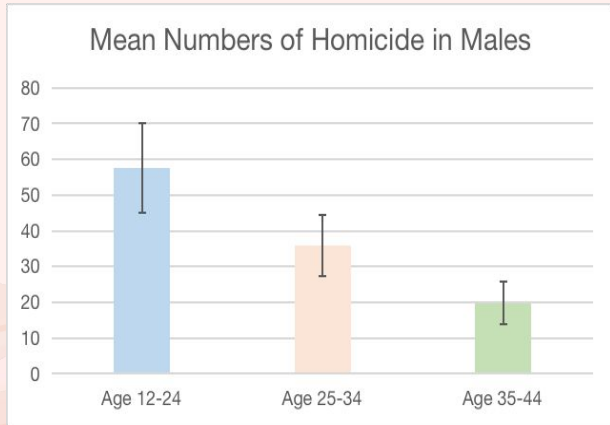
- The rate of violent recidivism committed by **federal offenders** aged <25 and 30 - 35 (Stewart et al. 2019).
- Rate of violent recidivism for psychopaths: means of previous literature statistics
  - a. Rate of violent recidivism by
    - i. **male psychopathic offenders** (Hart et al. 1988; Hodgins et al.; Serin and Amos 1995).
    - ii. **psychopathic offenders in general** (Grann et al. 1999).
    - iii. **Female psychopathic offenders** (Hemphill et al.; Loucks et al. 2001).

# ANOVA Results: Males in Violent Crime

Summary: Homicide in males from different age cohorts	
F Ratio Value	68.55115
P Value	<.00001
Significance	Yes

Summary: Attempted Murder in males from different age cohorts	
F Ratio Value	28.33439
P Value	<.00001
Significance	Yes

Summary: Robbery in males from different age cohorts	
F Ratio Value	67.62597
P Value	<.00001
Significance	Yes



# ANOVA Results: Females In Violent Crime

Summary: Homicide in females from different age cohorts

F Ratio Value	4.57143
P Value	0.01523
Significance	Yes

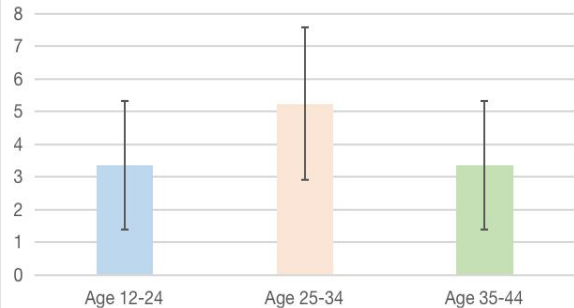
Summary: Attempted Murder in females from different age cohorts

F Ratio Value	1.33333
P Value	0.273183
Significance	No

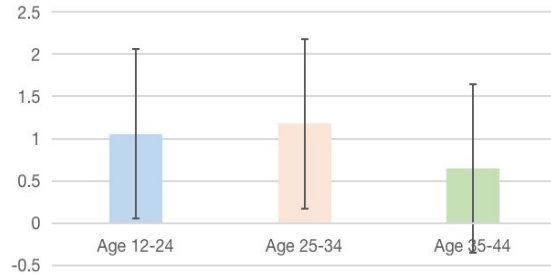
Summary: Robbery in females from different age cohorts

F Ratio Value	47.11447
P Value	<.00001
Significance	Yes

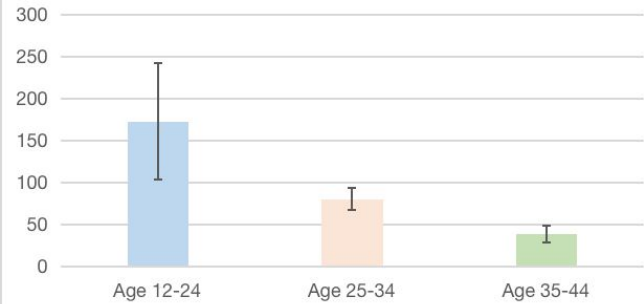
Mean Number of Homicide in Females



Mean Number of Attempted Murder in Females



Mean Number of Robbery in Females



# ANOVA Results: Males in Violent Crime

Summary: Homicide in males from different age cohorts

F Ratio Value	68.55115
P Value	<.00001
Significance	Yes

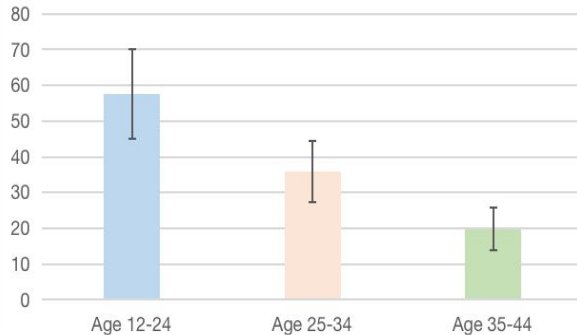
Summary: Attempted Murder in males from different age cohorts

F Ratio Value	28.33439
P Value	<.00001
Significance	Yes

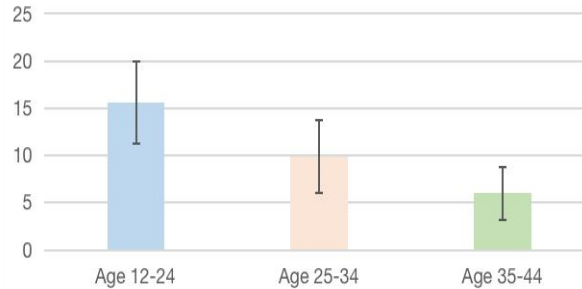
Summary: Robbery in males from different age cohorts

F Ratio Value	67.62597
P Value	<.00001
Significance	Yes

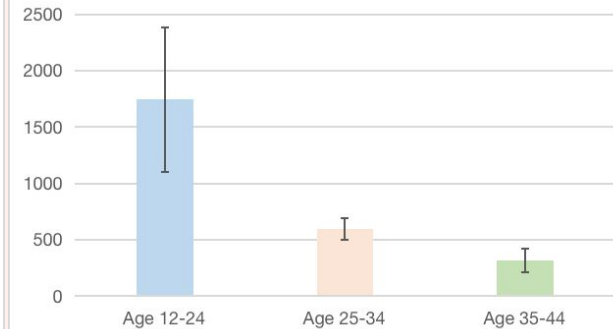
Mean Numbers of Homicide in Males



Mean Numbers of Attempted Murder in Males



Mean Numbers of Robbery in Males





# ANOVA Results: Males vs. Females

Summary: Homicide in youths 12-24 from different sexes

F Ratio Value	303.75059
P Value	<.00001
Significance	Yes

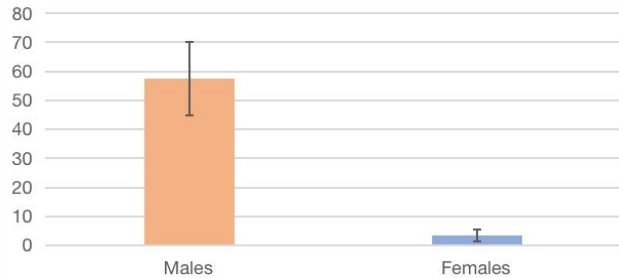
Summary: Attempted Murder in youths 12-24 from different sexes

F Ratio Value	174.49839
P Value	<.00001
Significance	Yes

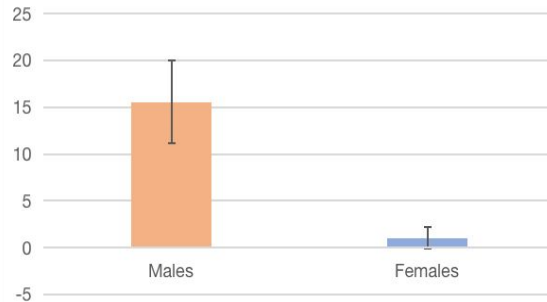
Summary: Robbery in youths 12-24 from different sexes

F Ratio Value	100.7288
P Value	<.00001
Significance	Yes

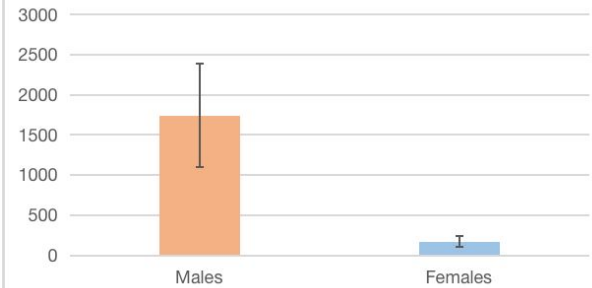
Mean Number of Homicide by Age 12-24 Males and Females



Mean Number of Attempted Murder by Age 12-24 Males and Females



Mean Number of Robbery by Age 12-24 Males and Females



# Fisher's Exact Test Results: Psychopaths vs. Non-psychopaths

	VIOLENT RECIDIVISM	NO RECIDIVISM	MARGINAL ROW TOTALS
NONPSYCHOPATH	0	20	20
PSYCHOPATH	5	15	20
MARGINAL COLUMN TOTALS	5	35	40 (GRAND TOTAL)

The Fisher exact test statistic value is 0.0471. The result is significant at  $p < .05$ . Null hypothesis is rejected.

# Fisher's Exact Test Results: Psychopaths vs. Federal Offenders <25

	VIOLENTLY FAIL	NO FAIL	MARGINAL ROW TOTALS
PSYCHOPATHS	67	33	100
TOTAL FEDERAL OFFENDERS	63	37	100
MARGINAL COLUMN TOTALS	130	70	200 (GRAND TOTAL)

The Fisher exact test statistic value is 0.6567.

The result is not significant at  $p < .05$ . Null hypothesis cannot be rejected.

Federal offenders under the age of 25 and psychopaths can be equally likely to violently recidivate.

## Results: Psychopaths vs. Federal Offenders 25 - < 30

	VIOLENTLY FAIL	NO FAIL	MARGINAL ROW TOTALS
PSYCHOPATHS	67	33	100
TOTAL FEDERAL OFFENDERS	61	39	100
MARGINAL COLUMN TOTALS	128	72	200 (GRAND TOTAL)

The Fisher exact test statistic value is 0.4615. The result is not significant at  $p < .05$ . Null hypothesis cannot be rejected.

Federal offenders between age 25 to < 30 and psychopaths can be equally likely to violently recidivate.

# Fisher's Exact Test Results: Psychopaths vs. Federal Offenders 30 - 35

	VIOLENTLY FAIL	NO FAIL	MARGINAL ROW TOTALS
PSYCHOPATHS	67	33	100
TOTAL FEDERAL OFFENDERS	31	69	100
MARGINAL COLUMN TOTALS	98	102	200 (GRAND TOTAL)

The Fisher exact test statistic value is  $< 0.00001$ . The result is significant at  $p < .05$ . Null hypothesis is rejected.

Federal offenders between age 30 to 35 and psychopaths are not equally likely to violently recidivate.

## Results: Psychopaths vs. Federal Offenders 35 - < 40

	VIOLENTLY FAIL	NO FAIL	MARGINAL ROW TOTALS
PSYCHOPATHS	67	33	100
TOTAL FEDERAL OFFENDERS	50	50	100
MARGINAL COLUMN TOTALS	117	83	200 (GRAND TOTAL)

The Fisher exact test statistic value is 0.0214. The result is significant at  $p < .05$ . Null hypothesis is rejected.

Federal offenders between age 35 to < 40 and psychopaths are not equally likely to violently recidivate.

## Results: Psychopaths vs. Federal Offenders 40 - < 45

	VIOLENTLY FAIL	NO FAIL	MARGINAL ROW TOTALS
PSYCHOPATHS	67	33	100
TOTAL FEDERAL OFFENDERS	23	77	100
MARGINAL COLUMN TOTALS	90	110	200 (GRAND TOTAL)

The Fisher exact test statistic value is  $< 0.00001$ . The result is significant at  $p < .05$ .

Null hypothesis is rejected.

Federal offenders between age 40 to < 45 and psychopaths are not equally likely to violently recidivate.

## Results: Psychopaths vs. Federal Offenders 45 - < 50

	VIOLENTLY FAIL	NO FAIL	MARGINAL ROW TOTALS
PSYCHOPATHS	67	33	100
TOTAL FEDERAL OFFENDERS	19	81	100
MARGINAL COLUMN TOTALS	86	114	200 (GRAND TOTAL)

The Fisher exact test statistic value is  $< 0.00001$ . The result is significant at  $p < .05$ .

Null hypothesis is rejected.

Federal offenders between age 45 to < 50 and psychopaths are not equally likely to violently recidivate.

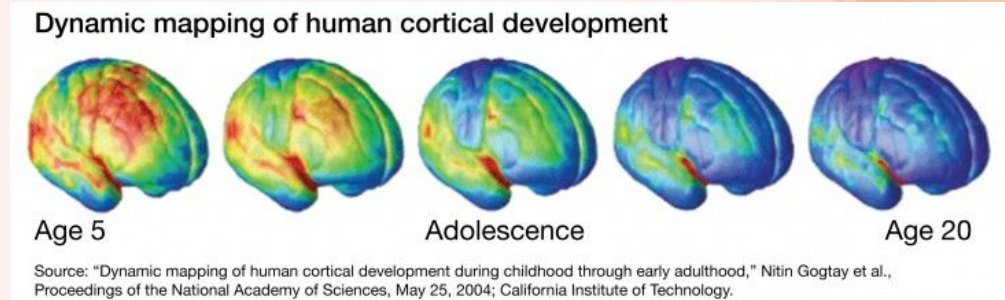


# Discussion

"Hart, Kropp, & Hare, 1988"	231 male offenders. <u>81%</u> of offenders with high PCL-R failed
"Hodgins, Cote, and Ross (1992)"	97 male offenders. The failure rate for offenders with high PCL-R scores was <u>60%</u> .
Serin and Amos (1995)	299 male offenders. Rate of violent reoffending was <u>40%</u> for high PCL-R score
Grann, Langström, Tengström, Kullgren (1999)	352 personality disordered offenders. Recidivism rate in four years was <u>68%</u> for offenders with high PCL-R scores.
Hemphill, Strachan, & Hare, 1999	<u>60%</u> of female psychopaths reoffended within 1 year of release.
Loucks & Zamble (2000)	100 female offenders. Reconviction rate for those with high PCL-R scores was <u>79%</u> .

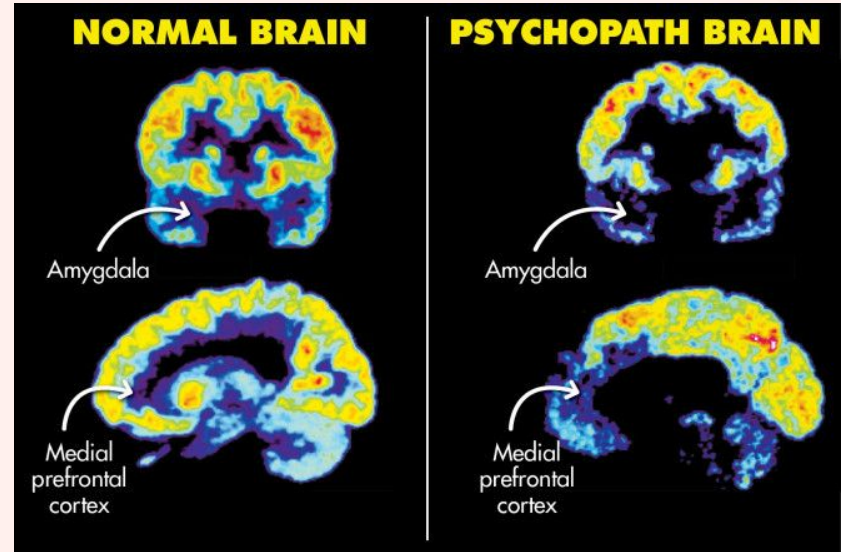
# Conclusion

- Males commit more violent crimes
- Young people (<25 year old) commit more violent crimes compared to older people (>25 years old)
- Psychopaths are more likely to persist in violent crimes compared to non-psychopaths
- Similarity between psychopathy and young age (<35)
- Psychopathy as an accurate predictor of violent crime and violent crime persistence (recidivism)
- Indications/Suggestions: Biological reasons for crime
  - neurobiological markers (underdevelopment of prefrontal cortex, for example) can be effective in identifying tendency towards crime



# Significance

- Lack of statistics and scholarly attention
- This study suggests there are many potential connections between certain biological traits and psychopathy and violence.



# Limitations

## **A Comprehensive Study of Recidivism Rates among Canadian Federal Offenders**

Lynn A Stewart

Geoff Wilton

Sebastian Baglole

&

Ryan Miller



Correctional Service of Canada

August 2019

- Hypothesis 3
- Only violent recidivism data about psychopaths could be found
- Lack of raw data
- Lack of statistics on psychopathy
- Only measured the persistence of violent crime by psychopaths and non psychopaths (federal offenders from different age cohorts)

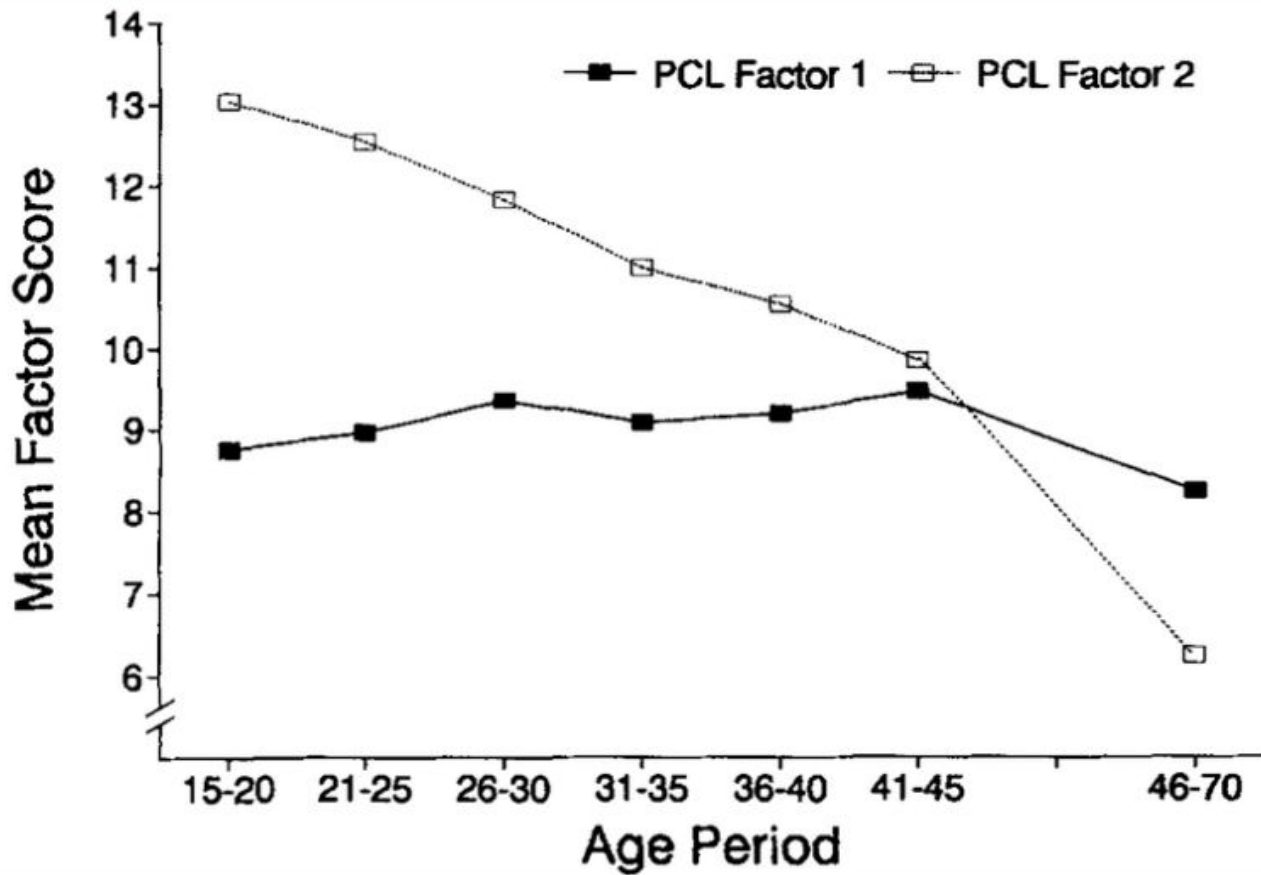


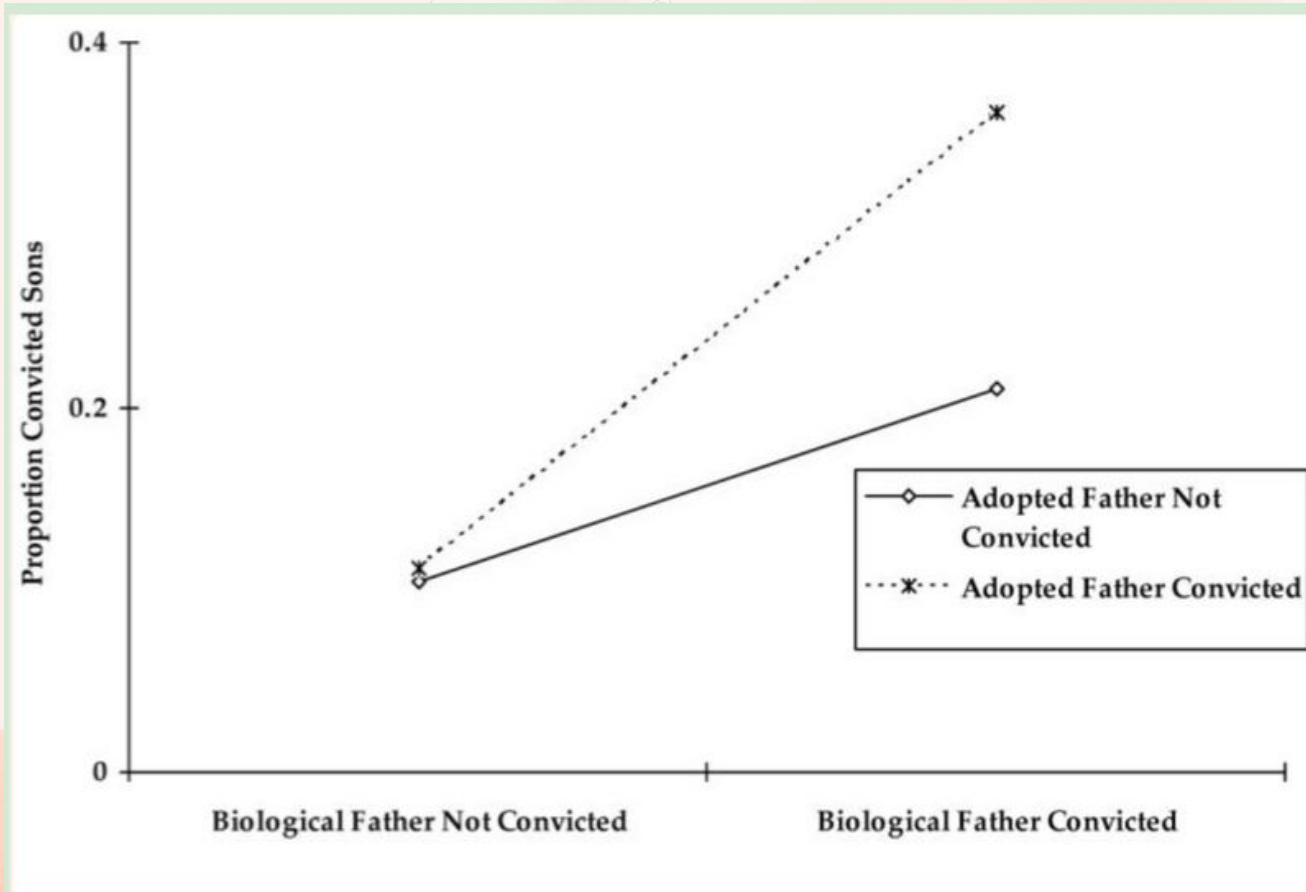
# Future Directions

- Research in the treatment of psychopathy
    - Current treatments (behavioural) vs. Future (biological)
  - Social applications of the results of this study
    - Offender Risk Assessment
    - Adding PCL-R (or psychopathy) as a factor/variable in Offender Risk Assessment
      - May be costly
- 
- 

Major risk/need factor	Indicators	Intervention goals
Antisocial personality pattern	Impulsive, adventurous pleasure seeking, restlessly aggressive and irritable	Build self-management skills, teach anger management
Procriminal attitudes	Rationalizations for crime, negative attitudes towards the law	Counter rationalizations with prosocial attitudes; build up a prosocial identity
Social supports for crime	Criminal friends, isolation from prosocial others	Replace procriminal friends and associates with prosocial friends and associates
Substance abuse	Abuse of alcohol and/or drugs	Reduce substance abuse, enhance alternatives to substance use
Family/marital relationships	Inappropriate parental monitoring and disciplining, poor family relationships	Teaching parenting skills, enhance warmth and caring
School/work	Poor performance, low levels of satisfactions	Enhance work/study skills, nurture interpersonal relationships within the context of work and school

Prosocial recreational activities	Lack of involvement in prosocial recreational/leisure activities	Encourage participation in prosocial recreational activities, teach prosocial hobbies and sports
Non-criminogenic, minor needs		Indicators
Self-esteem	Poor feelings of self-esteem, self-worth	
Vague feelings of personal distress	Anxious, feeling blue	
Major mental disorder	Schizophrenia, manic-depression	
Physical health	Physical deformity, nutrient deficiency	









# THANKS

Do you have any questions?

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