In the mind of a psychopath

Mary ET Boyle, Ph. D.
Department of Cognitive Science
UCSD
Did you enjoy your reading? 😊
“You wanna know how I got these scars? My father, was a drinker, and a fiend. And one night, he goes off crazier than usual. Mommy gets the kitchen knife to defend herself. He doesn't like that. Not. One. Bit. So, me watching, he takes the knife to her, laughing while he does it. He turns to me and says, "Why so serious?" Comes at me with the knife. "WHY SO SERIOUS?" He sticks the blade in my mouth... "Let's put a smile on that face." And...Why so serious?” [kills Gambol]  

The Joker

http://www.imdb.com/
“Look for severe childhood disturbances associated with violence. Our Billy wasn't born a criminal, Clarice. He was made one through years of systematic abuse. Billy hates his own identity, you see, and he thinks that makes him a transsexual. But his pathology is a thousand times more savage and more terrifying.”

http://www.imdb.com/  Hannibal Lecker
What is Psychopathy?

- Special subtype of personality disorder
- "mania sans délire" "Madness without delirium"
- 19th century – Philippe Pinel
- Lack of morality and behavioral control

sociopath

- product of adverse environmental conditions
- interacting with genetic traits
- psychopath numbers are stable
- sociopath numbers change with environmental conditions
- lower social classes; dysfunctional families

psychopath

- Aristotle “brutish nature”
- preliterate cultures have psychopaths
- morally bankrupt but do not show signs of mental illness
- biological in origin
- psychopath may or may not engage in criminal behavior

antisocial personality disorder:

1. failure to conform to social norms
2. deceitfulness (lying, aliases, conning)
3. impulsivity and failing to plan ahead
4. irritability and aggressiveness
5. reckless disregard of safety for self and others
6. consistent irresponsibility
7. lack of remorse

Psychotic
Loss of contact with reality \(\rightarrow\) delusions, “insane”

Psychopathy
Innate?
Can plan crime
Organized
Successful

Sociopathy
Result of Environmental factor
More impulsive
Financially Unstable

Hervey Cleckley

- **The Mask of Sanity (1976)**
- **Characterization**
  - Antisocial lifestyle
  - Selfish
  - Domineering
  - Manipulative
  - Irresponsible
  - Impulsive
  - Fearless
  - Shallow
  - Callous
  - Lacking empathy and remorse
  - Not just criminal or deviant behavior
  - Can be socially well adjusted and successful individuals
Psychopathy Checklist-Revised (PCL-R)

A standardized semi-structured interview based on two factors

1. emotional detachment
2. antisocial behavior

http://www.hare.org/
Two factors influencing PCL-R score:

**Emotional detachment**
- Affective-interpersonal traits
- Callousness
- Manipulativeness
- Remorselessness

**Antisocial behavior**
- History of antisocial behavior
- Impulsive Violent
Distinction between PCL-R vs. DSM-IV – Antisocial Personality Disorder

**Psychopathy**

- a. Failure to conform to social norms (arrests)
- b. Irritability and aggressiveness (fights)
- c. Irresponsibility in work and financial matters
- d. Impulsivity (in actions) or failures to plan ahead
- e. Deceitfulness (cons, deceives)
- f. Reckless disregard for safety of self and others
- g. Lack of remorse, guilt, and indifference (absence of feelings)

**NOTE:**
Psychopath scores highly on both factors of the PCL-R, someone with an antisocial personality disorder will score highly on Factor 2.

Figure Adapted from: Weber et al (2008) Behav. Sci. Law 26: 7–28
Structural Brain Abnormalities in Psychopaths—a Review

Sabrina Weber, M.Sc., a Ute Habel, Ph.D., †
Katrin Amunts, M.D., †, ‡
and Frank Schneider, M.D., Ph.D. †

Unlike the concept of psychopathy as operationalized by Hare’s PCL-R, the DSM-IV criteria of an antisocial personality disorder are mostly restricted to the description of criminal and socially deviant behavior. Therefore, while a psychopath scores highly on both factors of the PCL-R, someone with an antisocial personality disorder will score highly on Factor 2 (antisocial behavior). The diagnosis of an antisocial personality disorder can hence be applied to the majority of prison inmates. Nearly 75% of prison inmates fit the DSM-IV criteria describing an antisocial personality disorder, while the prevalence of psychopathy is much lower, namely about one-quarter of the 75% prison inmates with APD (Hare, 1998). It is
Recall:

Aquired sociopathy - pseudopsychopathy?

Neural Basis of Decision Making
Mary ET Boyle, Ph.D.
Department of Cognitive Science
UCSD

Phineas Gage:
- Sept. 13, 1848
- Working on the rail road
- Rod impaled his head
- 3.5" x 1.25"
- 13 pounds

Frontal lobe injuries, violence, and aggression:
A report of the Vietnam Head Injury Study
J. Gotman, MD; E. Schraub, MD; D. Warden, MD; A. Pijlman, MD; R. K. Brown, MD; et al.

Factors influencing PCL-R score:
- Emotional detachment
  - Affective interpersonal traits
  - Callousness
    - Manipulativeness
    - Remorselessness
  - History of antisocial behavior
- Antisocial behavior
  - Impulsive
  - Violent
Impulsive-reactive violence

Antisocial behavior

Allelic variations may be responsible for neurocognitive fcn

Predatory violence

Psychopath

Predisposition to violent behavior

Is there a biological bases to distinguish these two types of aggression?
Anomalies in the prefrontal cortex may handicap some individuals, making it difficult for them to show restraint. Some scientists hypothesize that the orbitofrontal cortex, an area involved in decision making, normally inhibits regions in the limbic system—specifically the hypothalamus and the amygdala, where fear and aggression arise. If a defect blocks this communication, a person might not be able to moderate his or her emotional reactions. Damage to the hippocampus may also impair the brain’s processing of emotional information. In some instances, a malfunction of the amygdala may underlie violent behavior. This theory could explain the lack of fear, empathy and regret that is characteristic of criminals who plan their acts and commit them in cold blood.

—D.S., M.L. and G.R.
Is the X-linked MAO-A gene associated with predisposition to violence?

Monoaminoxidase A – enzyme deaminates serotonin (and other monoamines)

Low expression (MAOA-L) associated with impulsive aggressive behavior.

Structural brain abnormalities – especially in the anterior cingulate cortex

and reduction in amygdala, insula and hypothalamus.

Nature and Nurture?

MAO-L
Low activity
(higher intracellular concentration of 5-HT)

“Genetic vulnerability to violence by MAOA-L only in the presence of environmental trigger of maltreatment.”

Increased serotonin availability is frequently associated with anxiety – therefore, MAOA-L carriers could have a predisposition toward neural hyper-reactivity to a threat and environmental maltreatment.

Viding and Frith (2006) PNAS vol. 103 no. 16 6085–6086
Neural mechanisms of genetic risk for impulsivity and violence in humans

Andreas Meyer-Lindenberg*, Joshua W. Buckholtz†, Bhaskar Kolachana‡, Ahmad R. Hariri‡, Lukas Pezawas‡, Giuseppe Blasio†*, Ashley Wabnitz†, Robyn Honea†, Beth Verchinski†, Joseph H. Callicott†, Michael Egan†, Venkata Mattay†, and Daniel R. Weinberger‡

*Unit for Systems Neuroscience in Psychiatry, †Neuroimaging Core Facility, and ‡Clinical Brain Disorders Branch, Genes, Cognition, and Psychosis Program, National Institute of Mental Health, National Institutes of Health, Department of Health and Human Services, 9000 Rockville Pike, Bethesda, MD 20892-1365

Edited by Marcus E. Raichle, Washington University School of Medicine, St. Louis, MO, and approved February 8, 2006 (received for review December 30, 2005)

Neurobiological factors contributing to violence in humans remain poorly understood. One approach to this question is examining allelic variation in the X-linked monoamine oxidase A (MAOA) gene, previously associated with impulsive aggression in animals and humans. Here, we have studied the impact of a common functional polymorphism in MAOA on brain structure and function assessed with MRI in a large sample of healthy human volunteers. We show that the low expression variant, associated with increased risk of violent behavior, predicted pronounced limbic volume reductions and hyperresponsive amygdala during emotional arousal, with diminished reactivity of regulatory prefrontal regions, compared with the high expression allele. In men, the low expression allele is also associated with changes in orbitofrontal volume, amygdala and hippocampus hyperreactivity during aversive recall, and impaired cingulate activation during cognitive inhibition. Our data identify differences in limbic circuitry for emotion regulation and cognitive control that may be involved in the association of MAOA with impulsive aggression, suggest neural systems-level effects of X-inactivation in human brain, and point toward potential targets for a biological approach toward violence.

“For males the MAOA-L genotype is associated with amygdala hyperresponsivity during emotional arousal, coupled with diminished reactivity of regulatory prefrontal regions, compared with the high-activity allele (MAOA-H)”

Viding and Frith (2006)
Fig. 2. Thresholded (P0.05, corrected for multiple comparisons in the ROI) statistical maps and plots of percent blood oxygen level-dependent (BOLD) signal change (mean 1 SEM) illustrate differential activation to angry and fearful facial expressions in MAOA-L individuals in several limbic and paralimbic regions (n 142): subgenual anterior cingulate (BA 25) (A), supragenual anterior cingulate (BA 32) (B), left lateral OFC (BA 47) (C), and left amygdala (D).

Meyer-Lindenberg et al. (2006) PNAS April 18, 2006 vol. 103 no. 16
Robert Alton Harris

• Looking for getaway for heist at San Diego Trust; Murdered John Mayeski, Michael Baker

• Was 25 years old. Harris taunted the victims before they died, laughed at them after he pulled the trigger, then calmly ate the hamburgers they had bought for lunch.

• Sociopath or Psychopath?
The Trial and the Controversy

• "As great as is my compassion for Robert Harris the child, I cannot excuse or forgive the choice made by Robert Harris the man." – Pete Wilson California Governor

• "You can be a king or a street sweeper, but everybody dances with the grim reaper." – Last Words, reference to Bill and Ted’s Bogus Journey
Who is the Psychopath?
Ted Bundy...

- American serial killer, rapist, kidnapper and necrophiliac
- More than a decade of denials
- Confessed shortly before his execution to 30 homicides
- Regarded as handsome and charismatic (especially by his victims)
- Lived with grandparents, no abuse, harassment etc.
Can you identify a psychopath by using linguistic analysis?

**Hungry like the wolf: A word-pattern analysis of the language of psychopaths**

Jeffrey T. Hancock¹ *, Michael T. Woodworth² and Stephen Porter²

¹Cornell University, New York, USA
²University of British Columbia – Okanagan, Canada

Affective dimensions of evaluation (positive vs. negative)

Activation (low vs. high intensity)

Imagery (low vs. high imagery)

Measure the emotional and affective tone of words.

Dictionary of Affect in Language Software

Score for the pleasantness and intensity of emotional language

Can language, which is an unconscious process, reveal differences in the underlying cognitive and emotional states of a psychopath?

Comparison of language used when describing their murder

Psychopath

- Use cause and effect language
  (because, since, as, so that)
- Basic physiological needs
  (eating, drinking, and monetary resources)
- Social needs
  (family, religion, and spirituality)

Non-psychopath

<table>
<thead>
<tr>
<th></th>
<th>Psychopaths</th>
<th></th>
<th>Controls</th>
<th></th>
<th>Log-likelihood</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
<td></td>
<td>ratio</td>
</tr>
<tr>
<td><strong>Physiological and safety needs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>89</td>
<td>.30</td>
<td>117</td>
<td>.12</td>
<td></td>
<td>40.03***</td>
</tr>
<tr>
<td>Drink</td>
<td>196</td>
<td>.66</td>
<td>370</td>
<td>.38</td>
<td></td>
<td>37.72***</td>
</tr>
<tr>
<td>Clothing</td>
<td>120</td>
<td>.41</td>
<td>266</td>
<td>.27</td>
<td></td>
<td>12.56**</td>
</tr>
<tr>
<td>Money</td>
<td>78</td>
<td>.26</td>
<td>160</td>
<td>.16</td>
<td></td>
<td>11.27**</td>
</tr>
<tr>
<td><strong>Social needs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>84</td>
<td>.28</td>
<td>555</td>
<td>.57</td>
<td></td>
<td>41.19***</td>
</tr>
<tr>
<td>Religion</td>
<td>36</td>
<td>.12</td>
<td>201</td>
<td>.21</td>
<td></td>
<td>9.41**</td>
</tr>
<tr>
<td><strong>Temporal construal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lexical verbs – past tense (e.g., gave, worked)</td>
<td>1,798</td>
<td>6.08</td>
<td>5,466</td>
<td>5.59</td>
<td></td>
<td>9.57**</td>
</tr>
<tr>
<td>Lexical verbs – present tense (e.g., give, work)</td>
<td>727</td>
<td>2.46</td>
<td>2,853</td>
<td>2.92</td>
<td></td>
<td>17.44**</td>
</tr>
<tr>
<td>Articles (e.g., a, the)</td>
<td>1,281</td>
<td>4.33</td>
<td>3,877</td>
<td>3.96</td>
<td></td>
<td>7.54**</td>
</tr>
</tbody>
</table>

**Note.** **p < .01, ***p < .001.**

Table 2. Discourse examples by category from psychopathic offenders

<table>
<thead>
<tr>
<th>Language category</th>
<th>Language example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subordinating conjunctives</td>
<td>I said I have to do something <em>because</em> there is no way I want to end up losing all my life in prison</td>
</tr>
<tr>
<td>Lower level needs</td>
<td>The <em>money</em> was excellent and the little girls wanting to hang with me was even better.</td>
</tr>
<tr>
<td>Callousness and lack of empathy</td>
<td>... then we left to go get some more, some more <em>booze</em> and some more <em>drugs</em>.</td>
</tr>
<tr>
<td>Disfluencies</td>
<td>... I just turned around and looked at him and I just stabbed him and I said, ‘None of your fucking business’.</td>
</tr>
<tr>
<td></td>
<td>We got <em>uh</em>, we got high, and had a few beer, I like whiskey so I bought some whiskey, we had some of that, and then we <em>uh</em>, went for a swim.</td>
</tr>
</tbody>
</table>

We predicted that they would show unique linguistic patterns relating to their instrumental world view, primitive physiological (vs. higher level) needs, and profound affective deficit, when describing a major autobiographical event – a homicide for which they were responsible. The findings were generally consistent with our predictions; narratives by psychopaths included a higher level of instrumentality and more explanation themes, focused on self-preservation and bodily needs, and were more disfluent, past oriented, and had less emotional intensity relative to non-psychopathic offenders. Importantly, such stylistic differences likely are beyond conscious control and are difficult to alter intentionally in one’s speech.

Empirical basis and forensic application of affective and predatory violence

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Classification of violent behavior

**affective**
- Preceded by high autonomic arousal
- Characterized by emotions of anger and/or fear
- Response to a perceived imminent threat

**predatory**
- Not preceded by autonomic arousal
- Absence of emotion or threat
- Cognitively planned, premeditated, proactive, cold blooded

Meloy, JR (2006)
Table 1.  Forensic criteria for determining affective or predatory violence (Meloy [2,57,58])

<table>
<thead>
<tr>
<th>Affective violence</th>
<th>Predatory violence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intense autonomic arousal</td>
<td>Minimal or absent autonomic arousal</td>
</tr>
<tr>
<td>2. Subjective experience of emotion</td>
<td>No conscious emotion</td>
</tr>
<tr>
<td>3. Reactive and immediate violence</td>
<td>Planned or purposeful violence</td>
</tr>
<tr>
<td>4. Internal or external perceived threat</td>
<td>No imminent perceived threat</td>
</tr>
<tr>
<td>5. Goal is threat reduction</td>
<td>Variable goals</td>
</tr>
<tr>
<td>6. Possible displacement of target</td>
<td>No displacement of target</td>
</tr>
<tr>
<td>7. Time-limited behavioural sequence</td>
<td>No time limited sequence</td>
</tr>
<tr>
<td>8. Preceded by public posturing</td>
<td>Preceded by private ritual</td>
</tr>
<tr>
<td>9. Primarily emotional/defensive</td>
<td>Primarily cognitive/attack</td>
</tr>
<tr>
<td>10. Heightened and diffuse awareness</td>
<td>Heightened and focused awareness</td>
</tr>
</tbody>
</table>
Psychopathic Personality Inventory...

Fearless Dominance
- Fearlessness
- Emotional and interpersonal deficits

Impulsive antisociality
- Rebellious nonconformity
- Crime
- Violence

Cold-heartedness
- Mainly dependent on scores of other two
- Lack of moral facts

Lilienfeld and Widows (2005)
Emotional-Social Deficits

Reduced response to threatening or fear inducing stimuli, as measured by skin conductance.

Moreover, individuals with psychopathy show difficulties in emotional learning.

Moral Transgressions v Conventional Transgressions Eg. Hair Pulling.
“Psychopathy is—among other things—related to impairments in the medial region of the orbitofrontal cortex, which is extensively interconnected with the amygdala and involved in instrumental learning and response reversal.”

Theoretical models of psychopathy:

<table>
<thead>
<tr>
<th><strong>Somatic marker</strong></th>
<th><strong>Violence inhibition mechanism</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Damasio (1994)</td>
<td>• Blair (1995)</td>
</tr>
<tr>
<td>• VMPF damage</td>
<td>• Stresses the role of empathy</td>
</tr>
<tr>
<td>• Impaired decision making</td>
<td>for moral socialization.</td>
</tr>
<tr>
<td>• Insensitive to reward and punishment</td>
<td>• Amygdala dysfunction – cannot control aggression.</td>
</tr>
<tr>
<td>• Poor access to social rules and potential outcomes.</td>
<td>• Submission of aggression response with distress cues.</td>
</tr>
<tr>
<td>• Iowa gambling task</td>
<td>• Dysfunction of autonomic arousal could result in lack of empathy.</td>
</tr>
</tbody>
</table>
Recall, adult VMPF damage...

For adult onset, recall last lecture...

Frontal lobe dysfunction can cause one to dissociate social cognition and moral knowledge.

...is it the same for early VMPF damage?
... what happens if there is early damage to PFC?

Impairment of social and moral behavior related to early damage in human prefrontal cortex

Steven W. Anderson, Antoine Bechara, Hanna Damasio, Daniel Tranel and Antonio R. Damasio

The long-term consequences of early prefrontal cortex lesions occurring before 16 months were investigated in two adults. As is the case when such damage occurs in adulthood, the two early-onset patients had severely impaired social behavior despite normal basic cognitive abilities, and showed insensitivity to future consequences of decisions, defective autonomic responses to punishment contingencies and failure to respond to behavioral interventions. Unlike adult-onset patients, however, the two patients had defective social and moral reasoning, suggesting that the acquisition of complex social conventions and moral rules had been impaired. Thus early-onset prefrontal damage resulted in a syndrome resembling psychopathy.
Knowing how to behave

Behaving in a socially desirable way

Dis-associaction
The first patient (subject A) was 20 years old at the time of these studies and was ambidextrous. **She had been run over by a vehicle at age 15 months.** At the time of the accident, she appeared to recover fully within days. **No behavioral abnormalities were observed until the age of three years,** when she was first noted to be largely unresponsive to verbal or physical punishment. Her behavior became progressively disruptive, so much so that, by age 14, she required placement in the first of several treatment facilities. Her teachers considered her to be **intelligent and academically capable,** but she routinely failed to complete assigned tasks.

Her adolescence was marked by disruptive behavior in school and at home (for example, failure to comply with rules, frequent loud confrontations with peers and adults). She stole from her family and from other children and shoppedlifted frequently, leading to multiple arrests. She was verbally and physically abusive to others. She lied chronically. Her lack of friends was conspicuous. She ran away from home and from treatment facilities. She exhibited early and risky sexual behavior leading to a pregnancy at age 18. Contingency management in residential treatment facilities and the use of psychotropic medication were of no help. After repeatedly putting herself at physical and financial risk, she became entirely dependent on her parents and on social agencies for financial support and oversight of her personal affairs. She did not formulate any plans for her future and she sought no employment. Whenever employment was arranged, she was unable to hold the job due to lack of dependability and gross infractions of rules.

Affect was labile and often poorly matched to the situation, but superficial social behavior was unremarkable.

She never expressed guilt or remorse for her misbehavior. There was little or no evidence that she experienced empathy, and her maternal behavior was marked by dangerous insensitivity to the infant’s needs.

She blamed her misdeeds and social difficulties on other people, and she denied any difficulties with cognition or behavior.

Impairment in the ability to experience certain moral emotions