The Mind of a Psychopath
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Readings for this lecture are posted! Go to “Additional Readings” on class website.
...Hollywood

"With some fava beans and a nice chianti."
What is Psychopathy?

- Special subtype of personality disorder
- 19th century – Philippe Pinel
  - “mania sans de´lire” → “Madness without delirium”
- Lack of morality and behavioral control
Some Background

- 20-25% of convicts fit criteria for Psychopathy
- 80% of recidivism as opposed to 50% of normal convicts
- Hare – 1% of all population (Canada)
- Net annual burden of US crime > $1 Trillion
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)

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

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

**Antisocial behavior**
- History of antisocial behavior
- Impulsive Violent
How do you know?

**Psychotic**
Loss of contact with reality eg delusions, “insane”

**Psychopathy**
More of an innate phenomena
Can plan crime
Organized
Successful

**Sociopathy**
Result of Environmental factor
More impulsive
Financially Unstable

Antisocial
Crime
Violent

Slide from Victor Guerra
Distinction between PCL-R vs. DSM-IV – Antisocial Personality Disorder

Dissocial Behaviors

Personality Disorders

Psychopathy

Need 3 of the following characteristics

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

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

Sabrina Weber, M.Sc.,* 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
Aquired sociopathy - pseudopsychopathy?

Recall:

**Neural Basis of Decision Making**

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UCSD

**Frontal lobe injuries, violence, and aggression:**

A report of the Vietnam Head Injury Study


**Factors influencing PCL-R score:**

- Emotional detachment
- Antisocial behavior

- Affective-interpersonal traits
- History of antisocial behavior
- Callousness
- Manipulativeness
- Remorselessness
- Impulsive Violent

**Phineas Gage:**

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

Antisocial behavior

Allelic variations may be responsible for neurocognitive function

Predatory

Psychopath

Predisposition to violent behavior
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 in the catabolism of 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 or 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.”

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 Blasi††**, 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 hyper-responsivity 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 ($P_{0.05}$, corrected for multiple comparisons in the ROI) statistical maps and plots of percent blood oxygen level-dependent (BOLD) signal change (mean $\pm$ 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).
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
Which 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.

Slide from Victor Guerra
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>
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</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>

Meloy, JR (2006)
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
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
Recall:

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

For adult onset, recall last lecture...

...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

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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.
Subject A – Case Report

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.

A little bit more about the precuneus

Self Representation vs. Self Awareness:
- medial prefrontal area cxn precuneus
- relates personal identity with past personal experiences
- Causal links between one’s own intentions and actions (intentional causality)
- Theory of Mind – Empathy & Forgivability


Rotating image from Wikipedia Commons
What does this mean?

- Amygdala
  - Underlie aspects of emotion regulation, aggression, and stimulus reinforcement associations.

- Precuneus
  - Underlies aspects of reflective processing and empathy, especially when it comes to decision making.

Slide from Victor Guerra
The two theories may not be exclusive:

**Ventromedial prefrontal cortex** (Raine et al., 2000; Yang et al., 2005)
- Impaired impulse control and emotional learning, impaired adaptation of behavior to changes in reinforcement contingencies, impaired decision-making and planning

**Amygdala** (Tiihonen et al., 2000)
- Impaired processing of emotional material

**Corpus callosum** (Raine et al., 2003)
- Increased functional inter-hemispheric connectivity, reduced inter-hemispheric asymmetries of function

**Hippocampus** (Laakso et al., 2001; Raine et al., 2004)
- Impaired retrieval of emotional memories and contextual fear conditioning; impaired associative learning

**Superior temporal gyrus** (Müller et al., 2007)
- Impaired processing of abstract material, lack of perspective awareness and empathy

Figure 6. Affected brain regions in psychopathy (findings of the reviewed structural neuroimaging studies).
### The Amygdala

| Kiehl and colleagues found reduced amygdala activity in psychopathic criminals in response to emotionally charged words | Children with callous unemotional traits have less amygdala activity than other children when viewing photos of fearful expressions | “Once they start paying attention to some goal they want, they ignore cues that would otherwise activate the amygdala” |

Miller 2008
Temporal lobe abnormalities in semantic processing by criminal psychopaths as revealed by functional magnetic resonance imaging

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Psychopaths are impaired cognitively

**Right anterior superior temporal gyrus – fMRI and structural abnormalities in psychopaths**

The abnormalities could relate to problems with complex social emotions – love, empathy, guilt and remorse.

Kiehl et al., 2004; Muller et al. (2007)
Social and Moral Reasoning

**Level 3: Postconventional**

**Stage 6:** Personal commitment to universal moral principles. Achieved by a minority of adults. One of 6 adult-onset patients at this level.

**Stage 5:** Recognition that moral perspective may conflict with law. Consider rights and welfare of all.

**Level 2: Conventional**

**Stage 4:** Recognition of obligations to society. Characteristic of most adults and adolescents. Five of 6 adult-onset patients at this level.
The individual is viewed within the system.

**Stage 3:** Reliance on the Golden Rule. Be a good person in your own eyes and those of others.

**Level 1: Preconventional**

**Stage 2:** Concrete reasoning that, to serve one’s own needs, you must recognize other’s rights. Characteristic of most children under age 9.

**Stage 1:** Egocentric perspective with decisions based on avoidance of punishment. Both early-onset patients at this level.

Performed similarly in decision-making tasks eg Iowa Card Gambling Task

But “...their performance was in stark contrast to that of patients with adult onset who can access the facts...”
... patients failed in both emotionally-related and factual modes of retrieval, it is possible that they never acquired socially relevant knowledge either in emotional or factual modes.... They may have never acquired such knowledge...
THE RESPONSIBILITY OF THE PSYCHOPATH REVISITED

NEIL LEVY

ABSTRACT: The question of the psychopath’s responsibility for his or her wrongdoing has received considerable attention. Much of this attention has been directed toward whether psychopaths are a counterexample to motivational internalism (MI): Do they possess normal moral beliefs, which fail to motivate them? In this paper, I argue that this is a question that remains conceptually and empirically intractable, and that we ought to settle the psychopath’s responsibility in some other way. I argue that recent empirical work on the moral judgments of psychopaths provides us with good reason to think that they are not fully responsible agents, because their actions cannot express the kinds of ill-will toward others that grounds attributions of distinctively moral responsibility. I defend this view against objections, especially those due to an influential account of moral responsibility that holds that moral knowledge is not necessary for responsibility.

KEYWORDS: responsibility, moral knowledge, mental

Psychopaths also present us with an all too practical challenge. They are (causally) responsible for a disproportionately large percentage of crimes: more than fifty percent of violent crimes, and a very large percentage of petty thefts, frauds, and other relatively minor crimes (Reznek 1997, pp. 136–40). Many psychopaths have long records of convictions for offences followed by short prison sentences and, often, stays at psychiatric institutions. Most do not go on to become murderers, but some do, in spectacular fashion. “Psychopath” is far from synonymous with “serial killer,” but most serial killers are probably psychopathic. Ought we to hold the psychopath morally responsible for these crimes? Or should we excuse them, as we (typically) excuse those suffering from psychoses and some impulse-control disorders?
## Aggressive narcissism

- Continual devaluation (aggressive) of others in order to pump up own self-esteem
- Glibness, grandiose, pathological lying, manipulative, lack of empathy and sadistic.

## Antisocial behavior

- Long-term offensive and sometimes criminal behavior
- Prone to boredom, parasitic lifestyle, poor impulse control, irresponsible, promiscuous sexual behavior.

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**Psychopaths have abnormal standards!**