Selfishness

Adrian Raine

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Overview

1. Nature of Selfishness
2. The Selfishness Questionnaire
3. Neural Basis of Selfishness
4. Future Directions
Definition

“Exclusive focus on one’s own well-being without concern for others”

Three Forms of Selfishness

1. Egocentric Selfishness
2. Adaptive Selfishness
3. Pathological Selfishness

Selfishness Questionnaire

2 = Agree; 1 = Neither Agree nor Disagree; 0 = Disagree
Overview

1. Nature of Selfishness
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1. Egocentric Selfishness

I don't give to charities
68% vs 11%

Even when I see people in need, I don't feel urge to help them

When it comes to helping myself or others, I help myself
53% no vs 12% yes

I admit I'm quite a selfish person
51% no vs 19% yes

I care a lot about getting what I want

I like buying things for myself even though I have enough
21% no vs 56% yes

I have enough in life to live on, but there are times I just want more
2. Adaptive Selfishness

If there was only one space left on a lifeboat that a child needed, I’d honestly have to take it for myself and my family.
32% no, 29% yes

If the choice was between killing someone or being killed, I'd kill

I would not try to save a drowning person if I could drown too
51% no vs 17% yes

You need to help your own family first before you help others.

Having a focus on oneself can be very adaptive in life

People need to be a little selfish for positive social change to occur
27% no vs 33% yes

Dealing with my own needs, I can make the world a better place
38% no vs 23% yes
3. Pathological Selfishness

Now and again I've manipulated friends to gain an advantage

It’s not nice to exploit others, but sometimes you simply need to
  54% no 16% yes

It’s hard to get ahead in life unless you cut other people's corners here and there

I have to look after myself, even if it costs a loved one
  51% no vs 15% yes

I’ve sometimes dumped friends I don't need
  58% no vs 20% yes

Even if it would cause the other person to become depressed, I’d end the relationship if it’s in my best interest
  24% no vs 45% yes

I love rewards in life, even if there is a cost to others
Selfishness Scale

39 items
N = 230
Total score and three subscales

2 = Agree
1 = Neither Agree nor Disagree
0 = Disagree

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egocentric</td>
<td>10.62</td>
<td>4.56</td>
<td>1 - 22</td>
</tr>
<tr>
<td>Adaptive</td>
<td>12.38</td>
<td>4.66</td>
<td>1 - 25</td>
</tr>
<tr>
<td>Pathological</td>
<td>10.62</td>
<td>4.89</td>
<td>0 - 24</td>
</tr>
</tbody>
</table>

Total          | 33.60| 11.94| 6 - 64 |

Adaptive higher than Egocentric and Pathological
(d = .38, p < .0001)
Effect Sizes – Cohen’s d

Aspirin and reduction in death from heart attack   \( d = .04 \)
Smoking and lung cancer  \( d = .16 \)
SAT scores and later college GPA                \( d = .40 \)
Attention scores and Attention Deficit Disorder \( d = .60 \)

(Meyer, 2001)

Small effect size: \( d = .2 \)
Medium effect size: \( d = .5 \)
Large effect size:  \( d = .8 \)

Correlations (range 0 to 1): approximately half of \( d \)

Adaptive higher than Egocentric and Pathological  \( d = .38, \ p < .0001 \)
Construct Validity – Warmth & Altruism

Altruism

I go out of my way to help others if I can
I generally try to be thoughtful and considerate

Warmth

I’m known as a warm and friendly person
I have strong emotional attachments to my friends

Total Selfishness

\[
\begin{align*}
&\text{Altruism} & \text{Warmth} \\
\text{-.45} & \text{-.24}
\end{align*}
\]
Construct Validity - Empathy

Cognitive Empathy

When two people argue I can see each other’s point of view. When someone is disappointed, I can tell by how they look.

Affective Empathy

If I saw my friend being made a fool of, I would feel uncomfortable. Seeing people sad at a funeral would make me feel sad too.

Total Selfishness

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Cognitive Empathy</td>
<td>-.19</td>
</tr>
<tr>
<td>Affective Empathy</td>
<td>-.28</td>
</tr>
</tbody>
</table>
Construct Validity - Psychopathy

Psychopathy

I don't care much if what I do hurts others.

I get in trouble for not considering the consequences of my actions.

Total Selfishness

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Psychopathy</td>
<td>.38</td>
</tr>
</tbody>
</table>
Construct Validity – Proactive and Reactive Aggression

Proactive Aggression
Hurt others to get ahead.
Used physical force to get others to do what you want.

Reactive Aggression
Yelled at others when they have annoyed you.
Reacted angrily when provoked by others.

Total Selfishness

<table>
<thead>
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<tbody>
<tr>
<td>Proactive Aggression</td>
<td>.38</td>
</tr>
<tr>
<td>Reactive Aggression</td>
<td>.26</td>
</tr>
</tbody>
</table>
Construct Validity – Narcissism + Histrionic

Narcissistic
I expect other people to do favors for me even though I do not usually do favors for them.

People have often complained that I did not realize that they were upset.

Histrionic
I need to be the center of attention.
I have a flair for the dramatic.

<table>
<thead>
<tr>
<th></th>
<th>Total Selfishness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcissistic</td>
<td>0.44</td>
</tr>
<tr>
<td>Histrionic</td>
<td>0.29</td>
</tr>
</tbody>
</table>
Construct Validity - Antisocial and Machiavellian

**Antisocial**
I don’t care if others get hurt so long as I get what I want
I do a lot of things without considering the consequences

**Machiavellian**
I sometimes try to get others to “bend the rules” for me if I can’t change them any other way.
In school or at work, I sometimes try to “stretch” the rules a little bit just to see how much I can get away with.

| Total Selfishness |  
|-------------------|---|
| Antisocial        | .29 |
| Machiavellian     | .60 |
Discriminant Validity: Depression + Anxiety

**Depression**

Sometimes I feel completely worthless
Sometimes things look pretty bleak and hopeless to me

**Anxiety**

I often feel tense and jittery
Frightening thoughts sometime come into my head

<table>
<thead>
<tr>
<th>Total Selfishness</th>
<th>Depression</th>
<th>Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.10</td>
<td>.02</td>
</tr>
</tbody>
</table>
Discriminant Validity – Assertive + Schizotypy

Assertive
I have often been a leader of groups I have belonged to
Other people often look to me to make decisions

Schizotypal Personality (Odd Beliefs / Magical Thinking)
Do you believe in telepathy?
Can other people feel your feelings when they are not there?

<table>
<thead>
<tr>
<th>Total Selfishness</th>
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</tr>
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<tbody>
<tr>
<td>Assertiveness</td>
<td>.00</td>
</tr>
<tr>
<td>Schizotypy</td>
<td>.10</td>
</tr>
</tbody>
</table>
Discriminant Validity – “Too Good”

I sometimes get upset.
Occasionally I talk about people behind their backs
There are some people that I don’t like
I have never told a lie

Total Selfishness

“Too Good” 0.08
<table>
<thead>
<tr>
<th></th>
<th>Ego</th>
<th>Pathol.</th>
<th>Adapt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altruism</td>
<td>-.45</td>
<td>-.40</td>
<td>-.27</td>
</tr>
<tr>
<td>Warmth</td>
<td>-.20</td>
<td>-.19</td>
<td>-.17</td>
</tr>
<tr>
<td>Cognitive Empathy</td>
<td>-.15</td>
<td>-.19</td>
<td>-.12</td>
</tr>
<tr>
<td>Affective Empathy</td>
<td>-.25</td>
<td>-.27</td>
<td>-.14</td>
</tr>
<tr>
<td>Psychopathy</td>
<td>.32</td>
<td>.47</td>
<td>.15</td>
</tr>
<tr>
<td>Proactive Aggression</td>
<td>.32</td>
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<td>Antisocial</td>
<td>.25</td>
<td>.36</td>
<td>.15</td>
</tr>
<tr>
<td>Machiavellian</td>
<td>.51</td>
<td>.58</td>
<td>.45</td>
</tr>
</tbody>
</table>
Sex Differences

- Females: p = .02, d = .33
- Males: p = .04, d = .30

Bar chart showing the comparison between females and males across different categories:
- Ego: Females - Males
- Adaptive: Females - Males
- Pathological: Females - Males
- Total: Females - Males
Asians more selfish than Caucasians ($p < .008$, $d = .44$)
Ethnic Differences – Selfishness Subtypes

Adaptive Selfishness

Asians (p = .003, d = .47) more Adaptively Selfish than Caucasians

Ego Selfishness

Latinos (p = .017) and Asians (p = .005) more Ego Selfish than Caucasians
Family Income and Adaptive Selfishness

Adaptive Selfishness

25k – 75k more Adaptively Selfish than all others (d = .48 to .81)
Engineering / Natural Sciences Majors more Adaptively Selfish than all others (d = .43 to .66)
Overview

1. Nature of Selfishness
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4. Future Directions
9. ACQUISITIVENESS:

*Economy*: the disposition to save and accumulate property.

*Excess*: Miserly avarice; theft; extreme selfishness.

*Deficiency*: Prodigality; inability to appreciate the true value of property; lavish and wasteful
Amygdala and Psychopathy

Yang et al., (2009).
Archives of General Psychiatry

27 psychopaths vs. 32 non-psychopaths
Psychopathy and Rewards; Striatum

**Striatum**

9.6% volume *increase* in psychopaths

- **Ventral Striatum**
  - Psychopathic traits: Reward hypersensitivity

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**Glenn et al. (2010)**
*Biol. Psychiatry, 67, 52-58*

**Buckholtz et al. (2010)**
*Nat. Neuro. 13, 419-421*
Giving Activates Ventral Striatum

Harbaugh et al. (2007)
Reflecting on Self vs Others

Jenkins & Mitchell (2011)

self-referential: anterior dorsal MPFC
perspective-taking: posterior dorsal MPFC

Argembeau et al. (2007)
Future Directions

Immediate:

Behavioral Validation
- E.g., Dictator Game
- Behavioral reflection of selfishness through cooperation
- Different dimensions of SQ

Cross-cultural: Dharamsala, India
- Emory-Tibet Science Initiative
- Tibetan monks at monasteries
- Compassion-meditation lifestyle change selfishness?

Long-term:

Does mindfulness reduce excessive selfishness in US populations?
Psychopathy

Psychopathy: Constellation of Interpersonal, Affective, Lifestyle, and Antisocial characteristics (Hare, 1999)

**Total Psychopathy**

- **Factor 1**
  - Facet 1: Interpersonal
    - Superficial charm, manipulative, grandiosity
  - Facet 2: Affective
    - Lack remorse/guilt, shallow affect, callous, lack empathy

- **Factor 2**
  - Facet 3: Lifestyle
    - Impulsive, parasitic, irresponsible
  - Facet 4: Antisocial
    - Early behavioral problems, juvenile delinquency
# Factors of Psychopathy

**Hare Psychopathy Checklist – Revised (Hare, 2003)**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Details</th>
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</table>
| **1. Arrogant / deceitful**                 | Glib  
                                          | Grandiose  
                                          | Pathological lying  
                                          | Conning / manipulative |
| **2. Deficient affect**                     | Lacks remorse / guilt  
                                          | Shallow affect  
                                          | Callous / lacks empathy  
                                          | Fails to accept responsibility |
| **3. Impulsive – unstable**                 | Need for stimulation  
                                          | Parasitic lifestyle  
                                          | Lacks realistic, long-term goals  
                                          | Impulsivity  
                                          | Irresponsibility |
| **4. Antisocial**                           | Poor behavioral controls  
                                          | Early behavior problems  
                                          | Juvenile delinquency  
                                          | Revokes conditional release  
                                          | Criminal versatility |
## Construct Validity

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Discriminant Validity – Assertive + Schizotypy

**Assertive**
I have often been a leader of groups I have belonged to

Other people often look to me to make decisions

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<td>“Too Good”</td>
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<td>Schizotypy</td>
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Narcissistic Personality Disorder: DSM 5 Definition

Pervasive grandiosity, need for admiration, lack of empathy

A. 5 or more of:

1. grandiose sense of self-importance (exaggerates talents)
2. fantasizes unlimited success/power/brilliance/beauty/love
3. believes special/unique; only understood by high status
4. requires excessive admiration
5. sense of entitlement (favorable treatment)
6. interpersonally exploitive (takes advantage or others)
7. lacks empathy (won’t recognize feelings / needs of others)
8. often envious of others / believes others envious of them
9. arrogant / haughty behavior or attitudes
Borderline Personality Disorder: DSM 5 Definition

Pervasively instability of relationships, self-image, affect & marked impulsivity; begins early adulthood, multiple contexts

A. 5 or more of:

(1) frantic effort to avoid real / imagined abandonment
(2) unstable / intense interpersonal relationships
(3) identity disturbance (unstable self-image)
(4) impulsivity in 2 areas (spending/sex/drugs/binges/driving)
(5) recurrent suicidal behavior / gestures / threats / mutilation
(6) affective instability (dysphoria, irritability, anxiety)
(7) chronic feelings of emptiness
(8) inappropriate, intense anger (temper/anger displays/fights)
(9) transient, stress-related paranoia or dissociation
Psychopathy

Facet 1: Interpersonal
  Superficial charm, manipulative, grandiosity

Facet 2: Affective
  lack remorse/guilt, shallow affect, callous, lack empathy

Facet 3: Lifestyle
  impulsive, parasitic, irresponsible

Facet 4: Antisocial
  early behavioral problems, juvenile delinquency

Total Psychopathy

Psychopathy: clinical construct of a constellation of interpersonal, affective, lifestyle, and antisocial characteristics (Hare, 1999)
1. Pathological Selfishness

Sometimes need to take advantage of others before they do of you
Times when I put myself first, even if it's someone's loss
Have to look after myself even if cost to my loved one
   Go out of my way to exploit situations for own advantage
Now and again I've manipulated friends to gain advantage
   Hard to get ahead unless you cut other people's corners
Not nice to exploit others but sometimes you have to
   Giving my kids unfair advantage over others
      I like voicing my opinions even if they offend
I like having "me" time even if others disappointed
   End a relationship even if causes person to be depressed
I love rewards in life even if there is a cost to others
Sometimes dump friends I don't need anymore
2. Adaptive Selfishness

Choice between killing someone or being killed, I'd kill
Need to help own family first

People need to be selfish for positive change
Take one space for myself and family
in lifeboat even if child needed it

Not try to save drowning person if I could drown too

It's not good to be too modest
Not always honest because honesty can harm myself and others
Focus on my concerns first, better able to help others
Better to save for a rainy day

Sometimes lie to others for my own good, and theirs too

Having a focus on oneself can be adaptive
Deal with my own needs, can make the world better place

Don't give to charities because I need to help my family and myself more

Not always honest because honesty can harm myself and others
3. Egocentric Selfishness

Don't feel urge to help people I see in need
Care for myself much more than for others
When it comes to helping myself or others, I help myself
I care a lot about getting what I want
Really want things, even when I don't need them
I don't like paying for friends meals
  Rarely give money to homeless
  I admit I'm quite a selfish person
I don't give to charities
Have enough in life to live on but times I just want more
Discuss my own life rather than theirs
Like buying things even when I have enough
I don't think I give to others as much as I receive
1. Clinical manifestation

2. Etiology:
   - Parental bonding
   - Mind-body connection
   - Temperament
   - Brain mechanisms

3. “Successful” vs. “Unsuccessful psychopaths”
Introduction to Psychopathy

• Cleckley
  “The Mask of Sanity”

• Terminology
  - “moral insanity” Pritchard (1837)
  - “sociopathy” DSM (1952)
  - “psychopathy” (“Psychopathic inferiority, Koch 1888)

• Relationship to APD and “sociopathy”

• Base-rate in society

• Demographics
  - gender
  - ethnicity
  - age
David Krueger: Features of Psychopathy

(1) lack of remorse / guilt: lacks sense of shame
(2) callous / lacks empathy: disregard for others’ suffering
(3) conning / manipulative: persuaded another to help kill
(4) deception: deceived lover to walk in grounds
(5) need for stimulation: curious about what it feels like to kill
(6) glib: quick and clever comeback to Q on prior killings
(7) revokes conditional release: killing on 1st day-pass
(8) grandiose: spurned lover, wants to be on top
(9) shallow affect / sexuality: no sense of deep love
PSYCHOPATHY

1. Clinical manifestation

2. Etiology:
   - Parental bonding
   - Mind-body connection
   - Temperament
   - Brain mechanisms

3. “Successful” vs. “Unsuccessful psychopaths”
Parental Bonding and Psychopathy


Concurrent design
- 330 male and female community participants, aged 28
- Parental Bonding Instrument aged 28 (retrospective bonding)
- Hare’s self-report psychopathy scale age 28

Longitudinal Design
- 6 participants separated from both parents before age 3
- Parental Bonding Instrument aged 28 (retrospective bonding)
- Hare’s self-report psychopathy scale age 28

Warmth scale
- “Was affectionate to me”

Overprotection scale
- “Was overprotective of me”
Loss of Parents at Age 3 and Parental Bonding

Gao et al., (2010)

z score

Lacking parents (N = 6)  With Parents (N = 327)

Mothers's Care

Father's Overprotection

\[ d = 0.90 \quad \text{p} = 0.02 \]

\[ d = 0.72 \quad \text{p} = 0.08 \]
Parental Separation at 3 and Psychopathy at 28
Gao et al., (2010)

Concurrent Design
Maternal Care – Adult Psychopathy:  \( r = -0.38, p < 0.001 \)

Longitudinal Design
\[ p = 0.007 \]
\[ d = 0.95 \]

- Lacking parents (N = 6)
- With Parents (N = 327)
PSYCHOPATHY

1. Clinical manifestation

2. Etiology:
   - Parental bonding
   - Mind-body connection
   - Temperament
   - Brain mechanisms

3. “Successful” vs. “Unsuccessful psychopaths”
Mind-Body Connectedness

“We feel sorry because we cry, angry because we strike, afraid because we tremble”.

(James, 1884)

• Emotional experiences arise directly from perception of bodily change
SOMATIC MARKER HYPOTHESIS AND PSYCHOPATHY
(Bechara et al. 1997)

Patients with ventromedial lesions:

(a) don’t give SCRs to socially disturbing pictures

(b) perform poorly on decision-making (gambling) task

(c) don’t give anticipatory SCRs before making risky decision

(d) make bad life decisions

(e) exhibit psychopathic-like behavior

Unresolved Question: Do psychopaths have deficits in accurate perception of somatic (bodily) sensations?
Somatic Aphasia in Psychopaths
Gao et al. (2012) *Biological Psychology, 90, 28 – 233*

**Social Stressor Task**

- **Rest**
- **Speech Preparation**
- **Speech Presentation**
- **Rest**

1 minute 2 minutes 2 minutes 1 minute

**Psychophysiological Recording**

**Bodily sensation measure**

Gao et al. (2012) *Biological Psychology, 90, 28 – 233*
Bodily Sensation Measure

“How much did you experience the following body feelings when preparing and giving your speech?”

(1= not at all, 2 = a little, 3 = sometimes, 4 = often, 5 = very often)

- lump in throat
- breathing changes
- stomach sensations
- feel cold
- feel hot
- heart pounding
- tense muscles
- perspiration
- goose pimples
- facial blushing
- jelly legs
- hands tremble
- voice trembling
- eyes well with tears
Heart Rate

Psychopathy x Body Group interaction (p < .05)

- High bodily sensation group: p < .01
- Low bodily sensation group: p > .45

Heart Rate

- High bodily sensation group
- Low bodily sensation group
Skin Conductance

**Nonpsychopaths**

- High bodily sensation group
- Low bodily sensation group

$p < .01$

**Psychopaths**

- High bodily sensation group
- Low bodily sensation group

n.s.d
PSYCHOPATHY

1. Clinical manifestation

2. Etiology:
   - Parental bonding
   - Mind-body connection
   - Temperament
   - Brain mechanisms

3. “Successful” vs. “Unsuccessful psychopaths”
Age 3 Temperament and age 28 Psychopathy

N = 330

Fearlessness
Stimulation Seeking

d=.40                  d=.32

High psychopathy (age 28)
Low psychopathy (age 28)

Tommy Lynn Sells
PSYCHOPATHY

1. Clinical manifestation

2. Etiology:
   - Parental bonding
   - Mind-body connection
   - Temperament
   - Brain mechanisms

3. “Successful” vs. “Unsuccessful psychopaths”
Psychopathy and Rewards; Striatum

Striatum

9.6% volume *increase* in psychopaths

Ventral Striatum

Psychopathic traits: Reward hypersensitivity

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*Biol. Psychiatry*, 67, 52-58

Buckholtz et al. (2010)
*Nat. Neuro.*, 13, 419-421
Amygdala and Psychopathy

Yang et al., (2009).
*Archives of General Psychiatry*

27 psychopaths vs. 32 non-psychopaths
Reduced Amygdala in Callous-Unemotional Children (N = 300)

- **Left Amygdala:**
  - Controls: 7.4%
  - Callous-Unemotional: 8.1%
  - *p = .003*

- **Right Amygdala:**
  - Controls: 6.5%
  - Callous-Unemotional: 6.1%
  - *p = .07*

- **Total Amygdala:**
  - Controls: 7.4%
  - Callous-Unemotional: 8.1%
  - *p = .007*
Reduced Amygdala Volumes in Chinese Murderers

Amygdala Volume

<table>
<thead>
<tr>
<th>Category</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Schizoprenia</td>
<td>8.8%</td>
</tr>
<tr>
<td>Murderers</td>
<td></td>
</tr>
<tr>
<td>Schizophrenic</td>
<td>8.8%</td>
</tr>
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</table>

p = .034
Psychopathy - Amygdala Correlations in Each Group

<table>
<thead>
<tr>
<th>Correlation (r)</th>
<th>CONTROLS</th>
<th>SCHIZOPHRENIA</th>
<th>HOMICIDE</th>
<th>SCHIZ-HOMICIDE</th>
</tr>
</thead>
</table>
Cavum Septum Pellucidum is associated with:

- higher psychopathy scores
- increased proactive aggression
- diagnosis of disruptive behavior disorder
CAUSES OF PSYCHOPATHY

Evolution
Genetics
Maternal bonding
Family environment
Stimulation-seeking & low arousal
Classical conditioning
Lack of anticipatory fear
Neurodevelopmental - CSP

Hormones:

- Lower cortisol in prison psychopaths
  (Holi et al. 2006; O’Leary et al. 2007; Cima et al. 2009)
- Increased testosterone to cortisol ratio in psychopaths
  (Glenn et al. 2011)
1. Clinical manifestation

2. Etiology:
   - Parental bonding
   - Mind-body connection
   - Temperament
   - Brain mechanisms

3. “Successful” vs. “Unsuccessful psychopaths”
Successful vs Unsuccessful Psychopaths
(Ishikawa et al., 2001)

91 males from Temp. Agencies assessed on:

- Psychopathy Checklist - Revised
- Interpersonal Measure of Psychopathy
- Self-Report Crime
- Court Records
- SCID-I
- SCID-II

<table>
<thead>
<tr>
<th></th>
<th>PCL-R Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 Successful Psychopaths</td>
<td>27.7</td>
</tr>
<tr>
<td>16 Unsuccessful Psychopaths</td>
<td>31.5</td>
</tr>
<tr>
<td>26 Controls</td>
<td>10.8</td>
</tr>
</tbody>
</table>
**Prefrontal Structure / Function**

(a) **Prefrontal Gray Volume**
- Left Hemisphere
- Right Hemisphere

(b) **Executive Functioning**

**Autonomic Stress Reactivity**

(c) **Heart Rate**
- Controls
- Unsuccessful Psychopaths
- Successful Psychopaths

(d) **Skin Conductance**
- Controls
- Unsuccessful Psychopaths
- Successful Psychopaths
Unsuccessful Psychopaths:
- poor frontal functioning
- low autonomic reactivity
- reduced prefrontal gray

Successful Psychopaths:
- better frontal functioning
- high autonomic reactivity
- increased prefrontal gray

Heightened autonomic and frontal functions promote good decision-making and sensitivity to cues of risky situations that help some psychopaths avoid detection.
1. Clinical manifestation: four main factors

2. Etiology: early bonding; mind-body disconnect; temperament; amygdala – striatum.

3. “Successful” vs. “Unsuccessful psychopaths”: executive functions; arousal, PFC gray
Lateral nucleus

Basolateral nucleus

Anterior View

(a)

Superior

Medial

Left Amygdala

Right Amygdala
Add Marsh 2011 on OFC-amyg connectivity in moral decisions in kids
Psychopathy and Rewards; Striatum

Striatum

9.6% volume *increase* in psychopaths

Ventral Striatum

Psychopathic traits: Reward hypersensitivity

Glenn et al. (2010)  
*Biol. Psychiatry, 67*, 52-58

Buckholtz et al. (2010)  
*Nat. Neuro. 13*, 419-421
Psychopathy and Rewards

Striatum

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Nat. Neuro. 13, 419-421
Psychopathic individuals: striatal hyper-responsivity to anticipation of monetary rewards (Buckholtz et al. 2010)

Striatal functions:
- reward sensitivity: enhanced learning to rewards
- dramatic response to drugs of abuse
- impulsivity
- preference for immediate vs. delayed rewards
- dense connections to amygdala and VMPFC
- high psychopathy scorers need less money to violate a moral principle (Glenn et al. 2009)

Neurodevelopmental? Lack of synaptic pruning?
## Concurrent Design – Maternal and Paternal Bonding

<table>
<thead>
<tr>
<th>Parental Bonding</th>
<th>Psychopathy scores at 28 years</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Interpersonal</td>
<td>Antisocial</td>
</tr>
<tr>
<td>Maternal Care</td>
<td>-0.38</td>
<td>-0.19</td>
<td>-0.34</td>
</tr>
<tr>
<td></td>
<td>p &lt; .001</td>
<td>p &lt; .05</td>
<td>p &lt; .001</td>
</tr>
<tr>
<td>Paternal Overprotection</td>
<td>-0.12</td>
<td>-0.23</td>
<td>-0.09</td>
</tr>
<tr>
<td></td>
<td>p &lt; .05</td>
<td>p &lt; .001</td>
<td>p &lt; .05</td>
</tr>
</tbody>
</table>
Parental Separation at 3 and Psychopathy at 28

Gao et al., (in preparation)

Lacking parents (N = 6)  
With Parents (N = 327)

- Total: $p = .007$
- Interpersonal: $p = .44$
- Antisocial: $p = .09$
\[ \beta = 0.53, p = 0.03 \]
Implications

- differences between successful and unsuccessful psychopaths questions the external validity of research on imprisoned, failed psychopaths.

- different etiological pathways (neurobiological vs. psychosocial) to different forms of psychopathy?

- research on community samples must grapple with another source of heterogeneity
• Are there precursors to adult psychopathy very early in life?

Temperament - adult psychopaths are disinhibited, fearless, and stimulation seeking

Psychophysiology - adult psychopaths show lower arousal, reduced orienting responses, and longer half recovery time to aversive stimuli
Temperament (age 3) and Psychopathy

Inhibition / Disinhibition

Fearfulness

Stimulation seeking / sociability

Psychopathy: Hare’s Self-Report Psychopathy scale (SRP-II)

Autonomic Measures (age 3)

Heart Rate, SC levels, nonspecific SCR

Amplitude to orienting stimuli

Half-recovery time to aversive stimuli
Age 28

- Comparisons using high/low psychopathy split (above and below 1SD from the mean)
Stimulation-seeking / sociability

- 3 of the 4 components of the measure were indices of sociability:
  - Verbalizations
  - Friendliness toward experimenter
  - Social involvement

- Sociability found to be significantly higher in the higher-scoring psychopathy group
Age 3 Temperament and age 28 Psychopathy


Age 3 y
z score

Fearfulness  Stimulation Seeking / Sociability  Inhibition

d=.40  d=.32  d=.46
Arousal-first minute

- No difference in mean heart rate
- No difference in initial skin conductance levels

\[ d = .41 \]

Nonspecific skin conductance fluctuations
Aversive stimuli

Half recovery time

High psychopathy
Low psychopathy

d = .53
Overall

• Individuals with a psychopathic-like personality at age 28 are characterized at age 3 by:
  – Less inhibition, less fear, more sociable
  – *Increased* arousal and orienting
  – Longer half recovery time to aversive stimuli
Fear and inhibition

- Fearfulness and inhibition contribute to the development of moral emotions such as guilt, shame, and empathy (Kochanska, 1993)
- Children who are less fearful and inhibited are more likely to develop psychopathic traits in adulthood
Stimulation seeking / sociability

- The sociability aspect of the measure seems to be the most significant.
- Sociability in childhood may translate into traits such as glibness, superficial charm, conning, and manipulativeness observed in adult psychopaths.
- We do not know what might morph normal sociability into the deviant psychopathic form.
Why increased orienting and arousal?

• We expected lower autonomic arousal and orienting as is seen in adult psychopaths.

• However, adult group is not incarcerated psychopaths, but are community individuals with psychopathic traits.

• Perhaps high arousal and orienting is a factor that helps prevent these individuals from being caught and convicted, despite their psychopathic traits.
Why increased arousal and orienting?

• Our sample may resemble “successful” psychopaths who are not caught and convicted yet demonstrate psychopathic traits.
• Successful psychopaths have been shown to have higher autonomic stress reactivity (Ishikawa, 2001).
• Individuals who are antisocial in adolescence but desist from crime in adulthood also show increased arousal and orienting (Raine, 1995).
Why is increased arousal and orienting helpful?

- Reflects greater attentional processing, so they may be more aware of environmental cues of punishment and consequences.
- Reflects better processing of the prefrontal cortex which may be essential in some of the more “adaptive” features of psychopathy such as the ability to be verbally facile, and to lie, con, and manipulate.
 Longer Half-recovery time

- Consistent with the adult literature
- $t_2$ is important in learning appropriate moral behavior
- Long $t_2$ has been associated with deficits or lesions in the amygdala, which is implicated in psychopathy
Limitations

• Self-report measure, not PCL-R
• Results can only be applied to community samples with psychopathic traits
Conclusions

• Adults with psychopathic traits show differential temperamental and psychophysiological characteristics as early as age 3

• These factors may be influential throughout one’s lifetime and can predispose one for the development of psychopathic features
Conclusions

• Increased arousal and orienting may help to prevent certain individuals with psychopathic traits from being caught and convicted

• Long half-recovery time may be present throughout the lifetime in psychopathic individuals
Features of Psychopathy

1. Arrogant and deceitful interpersonal style
   - Glib / superfluous
   - Grandiose
   - Pathological lying
   - Conning / manipulative

2. Deficient affect
   - Lacks remorse / guilt
   - Shallow affect
   - Callous / lacks empathy
   - Fails to accept responsibility

3. Impulsive – unstable
   - Need for stimulation
   - Parasitic lifestyle
   - Lacks realistic, long-term goals
   - Impulsivity
   - Irresponsibility
Prefrontal Structure / Function

Prefrontal Gray Volume

Heart Rate

Executive Functioning

Skin Conductance

Controls
Unsuccessful Psychopaths
Successful Psychopaths

Baseline
Stress 1
Stress 2
Stress 3

b.p.m.

Controls
Unsuccessful Psychopaths
Successful Psychopaths

Baseline
Stress 1
Stress 2
Stress 3

microsiemens

Controls
Unsuccessful Psychopaths
Successful Psychopaths

Scaled score

Controls
Successful Psychopaths
Unsuccessful Psychopaths

Heart Rate

-1.3
-0.9
-0.5
-0.1
0.1
0.3
0.5
1.1
1.5

Skin Conductance

2.6
3.6
4.6
5.6
6.6

Controls
Unsuccessful Psychopaths
Successful Psychopaths

Prefrontal Structure / Function

Autonomic Stress Reactivity
Executive Functioning

- Controls
- Successful Psychopaths
- Unsuccessful Psychopaths
Heart Rate Stress Reactivity

b.p.m.

Baseline  Stress 1  Stress 2  Stress 3

Controls
Unsuccessful Psychopaths
Successful Psychopaths
Skin Conductance Stress Reactivity

- Baseline
- Stress 1
- Stress 2
- Stress 3

- Controls
- Unsuccessful Psychopaths
- Successful Psychopaths

Skin Conductance in microsiemens
Prefrontal Gray Volume

- **Controls**
- **Unsuccessful Psychopaths**
- **Successful Psychopaths**
### Prefrontal Gray Volume

<table>
<thead>
<tr>
<th>Hemisphere</th>
<th>Controls</th>
<th>Unsuccessful Psychopaths</th>
<th>Successful Psychopaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left</td>
<td>0.034</td>
<td>0.036</td>
<td>0.038</td>
</tr>
<tr>
<td>Right</td>
<td>0.038</td>
<td>0.044</td>
<td>0.048</td>
</tr>
</tbody>
</table>

### Heart Rate Stress Reactivity

<table>
<thead>
<tr>
<th>Condition</th>
<th>Baseline</th>
<th>Stress 1</th>
<th>Stress 2</th>
<th>Stress 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>66</td>
<td>68</td>
<td>70</td>
<td>72</td>
</tr>
<tr>
<td>Unsuccessful Psychopaths</td>
<td>74</td>
<td>76</td>
<td>78</td>
<td>80</td>
</tr>
<tr>
<td>Successful Psychopaths</td>
<td>82</td>
<td>80</td>
<td>78</td>
<td>76</td>
</tr>
</tbody>
</table>

### Executive Functioning

<table>
<thead>
<tr>
<th>Task</th>
<th>Controls</th>
<th>Unsuccessful Psychopaths</th>
<th>Successful Psychopaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>-1.3</td>
<td>-0.9</td>
<td>-0.5</td>
</tr>
<tr>
<td>Stress 1</td>
<td>-0.1</td>
<td>0.3</td>
<td>0.7</td>
</tr>
<tr>
<td>Stress 2</td>
<td>0.3</td>
<td>1.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Stress 3</td>
<td>1.5</td>
<td>1.9</td>
<td>2.3</td>
</tr>
</tbody>
</table>

### Skin Conductance Stress Reactivity

<table>
<thead>
<tr>
<th>Condition</th>
<th>Baseline</th>
<th>Stress 1</th>
<th>Stress 2</th>
<th>Stress 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>2.6</td>
<td>5.6</td>
<td>6.6</td>
<td>6.6</td>
</tr>
<tr>
<td>Unsuccessful Psychopaths</td>
<td>4.6</td>
<td>5.6</td>
<td>6.6</td>
<td>6.6</td>
</tr>
<tr>
<td>Successful Psychopaths</td>
<td>6.6</td>
<td>6.6</td>
<td>6.6</td>
<td>6.6</td>
</tr>
</tbody>
</table>
Verbal / Spatial Ability

- Controls
- Psychopaths

- Verbal: p = .62
- Spatial: p = .03
Does SC hyporesponsivity precede psychopathy?

Temperament

Kagan (1994): uninhibited children: low HR and increased left frontal EEG activation

Scarpa et al. (1997): uninhibited children: low resting HR + SC

Fowles et al. (2000): fearless temperament: reduced SC lability

Psychopathy

Blair (1999; 2002): reduced SCRs to distress cues

Crowley (2002):
- increased left hemisphere EEG in child “psychopaths”
- no effect for startle modulation (threat)
REWARD DOMINANCE

Quay (1985): CD children overactivated reward system

Newman et al. (1985): Psychopaths difficulty in inhibiting rewarded responses

Shapiro (1988):
• card-playing task
• at beginning, 90% of cards turned over are rewarded; by end only 10% rewarded
• conduct disordered adolescents play more cards than controls : fail to inhibit responses
Scerbo et al. (1990)
• passive avoidance learning task
• learn to respond to cards associated with money and avoid cards associated with money loss
• adolescents psychopaths responded more to reward cards
• also learn task more efficiently

• not supported by Colder & O’Connor (2004)

Are psychopaths more sensitive to rewards and may show superior learning when motivated by rewards?
Brain circuits involved in emotional learning in antisocial behavior and social phobia in humans

Ralf Veit\textsuperscript{a}, Herta Flor\textsuperscript{b}, Michael Erb\textsuperscript{c}, Christiane Hermann\textsuperscript{b}, Martin Lotze\textsuperscript{a}, Wolfgang Grodd\textsuperscript{c}, Niels Birbaumer\textsuperscript{a,d,*}

Anterior insula  

OFC  

Amygdala

Controls: limbic + prefrontal

Social Phobics

Psychopaths: amygdala
Narcissistic Personality Disorder: DSM-IV Definition

Pervasive grandiosity, need for admiration, lack of empathy

A. 5 or more of:

(1) grandiose sense of self-importance (exaggerates talents)
(2) fantasizes unlimited success/power/brilliance/beauty/love
(3) believes special/unique; only understood by high status
(4) requires excessive admiration
(5) sense of entitlement (favorable treatment)
(6) interpersonally exploitive (takes advantage or others)
(7) lacks empathy (won’t recognize feelings / needs of others)
(8) often envious of others / believes others envious of them
(9) arrogant / haughty behavior or attitudes
Psychopathy may be neurodevelopmental in nature (Raine et al. 1995)

- psychopathy rooted early in life
- unfolds relatively consistently in childhood / adolescence
- relatively impervious to conventional treatments
- in part genetically determined
- psychosocial influences don’t explain relationship
- neurodevelopmental disorders have increased callosal size (schizophrenia, schizotypy, dyslexia, velocardiofacial syndrome, developmental language disorder)
- morphological changes complex: dictate against simple environmental trauma / disease processes
**DICHOTIC LISTENING AND PSYCHOPATHY**

- present CV (consonant-vowel) stimuli (e.g. ba, da) to left and right ears simultaneously

- right ear projects to left (verbal) hemisphere; left ear to right hemisphere

- normals show right ear (left hemisphere) advantage

- Hare and McPherson (1984): psychopaths show reduced laterality

- Raine et al. (1990): replicate findings in adolescent psychopaths
Hare & McPherson (1984)

Stimuli Recalled

- Psychopaths
- Non-Psychopaths

Ear

Left

Right
Stimuli Recalled

- Psychopaths
- Non-Psychopaths

Hare & McPherson (1984)

Raine et al. (1990)
• language less lateralized to left hemisphere and has more representation in right hemisphere
• psychopaths show unusual use of language
• dissociation between what they say and what they do
• reduced role of language in regulating behavior?
• *increased* interhemispheric transfer?

Raine et al. (2003), *Archives of General Psychiatry* 60, 1134-1142)
Antisocial Psychopaths show:

- 22.6% increased volume \( (p = .0001, \ d = 1.8) \)
- 15.3% thinner \( (p = .002, \ d = 0.81) \)
- 6.9% longer \( (p = .043, \ d = 1.1) \)

Control for:

- alcohol / Substance Abuse \( (p < .004, \ \eta^2 = .51) \)
- alcohol usage \( (p < .0001, \ \eta^2 = .57) \)
- schizophrenia-spectrum \( (p < .003, \ \eta^2 = .52) \)
- 10 psychosocial risks \( (p < .009, \ \eta^2 = .59) \)
- groups don’t differ on head injury

Psychosocial: 32.7% variance explained
Calllosal addition: 81.5% variance explained
Psychopathy may be neurodevelopmental in nature (Raine et al. 1995; 2003)

- psychopathy rooted early in life
- unfolds relatively consistently in childhood / adolescence
- relatively impervious to conventional treatments
- in part genetically determined
- psychosocial influences don’t explain relationship
- morphological changes to CC complex: dictate against simple environmental trauma / disease processes
FAMILY FACTORS

- Family Dysfunction: p < .0001
- Marital Conflict: p = .12
- Parental Rejection: p < .005
Successful psychopaths have better executive functions.
PREFRONタル GRAY (p < .001)
Yang et al. (2005) Biological Psychiatry

Vol. / Brain Ratio

Left Hemisphere

右 Hemisphere

CONTROLS

UNSUCCESSFUL PSYCHOPATHS

SUCCESSFUL PSYCHOPATHS
Yang et al. (2005): Liars / Malingerers
Brit. J. Psychiat. 187 320-325

DSM-IV APD

23 Normal Controls 0 %
16 Antisocial Controls 50 %
12 Liars 66 %
- Adult values of white matter at 10-12 years (Paus et al. 2001)

- Age-related increases in white matter accompanied by decreases in gray matter (Sowell et al. 1999)

- Children become adept liars c. 10 years (McCann, 1998)

- Neurodevelopmental increase in prefrontal white matter as a predisposition to deceitful personality?

**Question:** are psychopaths skilled liars with *good* executive functions?
SIGNALED TRAILS

SC

0

SECONDS

12

ANTICIPATORY FEAR

UNSIGNALED TRAILS

SC

0

SECONDS

12

NOISE BLAST

NOISE BLAST
Fung et al. (2005)


- 330 16y-old schoolboys
- SC responsivity during countdown task:
  (a) Signaled and unsignaled trials
  (b) Anticipatory vs. responsivity
- Responding – nonresponding dichotomy
- Psychopathy: top 20% on Childhood Psychopathy Scale
Fung et al. (2005)

Unsignaled Trials

![Bar chart showing anticipatory and responsivity in psychopaths and nonpsychopaths for unsignaled trials.]

Signaled Trials

![Bar chart showing anticipatory and responsivity in psychopaths and nonpsychopaths for signaled trials.]
27 psychopaths vs. 32 non-psychopaths

Yang et al., *Archives of General Psychiatry* (2009)
## Amygdala – Callous-Unemotional Correlations

### Parent-Reported CU Traits (N = 298):

<table>
<thead>
<tr>
<th>Amygdala</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Amygdala</td>
<td>-0.13</td>
<td>0.002</td>
</tr>
<tr>
<td>Right Amygdala</td>
<td>-0.07</td>
<td>0.22</td>
</tr>
<tr>
<td>Total Amygdala</td>
<td>-0.12</td>
<td>0.031</td>
</tr>
</tbody>
</table>

### Child-Reported CU Traits (N = 298):

<table>
<thead>
<tr>
<th>Amygdala</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Amygdala</td>
<td>-0.18</td>
<td>0.001</td>
</tr>
<tr>
<td>Right Amygdala</td>
<td>-0.09</td>
<td>0.13</td>
</tr>
<tr>
<td>Total Amygdala</td>
<td>-0.15</td>
<td>0.01</td>
</tr>
</tbody>
</table>

### Parent + Child CU Traits (N = 298):

<table>
<thead>
<tr>
<th>Amygdala</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Amygdala</td>
<td>-0.20</td>
<td>0.000</td>
</tr>
<tr>
<td>Right Amygdala</td>
<td>-0.10</td>
<td>0.09</td>
</tr>
<tr>
<td>Total Amygdala</td>
<td>-0.17</td>
<td>0.004</td>
</tr>
</tbody>
</table>
Study Design

- 11-12 year old community-residing children
- N = 300 (145 male, 159 female)
- Amygdala volume: aMRI
- Callous – Unemotional traits
  (Antisocial Personality Screening Device)
- CD and ODD (DSM-IV – DISC)
  19.33% ODD
  14.1% CD
  24.9% DBD
- Social Adversity (18 item scale)
<table>
<thead>
<tr>
<th></th>
<th>Psychosocial Adversity Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mother’s uneducated</td>
</tr>
<tr>
<td>2.</td>
<td>Father’s uneducated</td>
</tr>
<tr>
<td>3.</td>
<td>Parental unemployment</td>
</tr>
<tr>
<td>4.</td>
<td>Teenage mother</td>
</tr>
<tr>
<td>5.</td>
<td>Many siblings</td>
</tr>
<tr>
<td>6.</td>
<td>Bad housing</td>
</tr>
<tr>
<td>7.</td>
<td>Large family size</td>
</tr>
<tr>
<td>8.</td>
<td>Maternal deprivation</td>
</tr>
<tr>
<td>9.</td>
<td>Child uncared for</td>
</tr>
<tr>
<td>10.</td>
<td>Government housing</td>
</tr>
<tr>
<td>11.</td>
<td>Overcrowded home</td>
</tr>
<tr>
<td>12.</td>
<td>Multiple house moves</td>
</tr>
<tr>
<td>13.</td>
<td>Maternal physical illness</td>
</tr>
<tr>
<td>14.</td>
<td>Paternal physical illness</td>
</tr>
<tr>
<td>15.</td>
<td>Maternal mental illness</td>
</tr>
<tr>
<td>16.</td>
<td>Paternal mental illness</td>
</tr>
<tr>
<td>17.</td>
<td>Father arrested</td>
</tr>
<tr>
<td>18.</td>
<td>Mother arrested</td>
</tr>
</tbody>
</table>
### Amygdala – Callous-Unemotional Correlations

#### Parent-Reported CU Traits (N = 298):

- **Left Amygdala**  \( r = -0.13, p = 0.002 \)
- **Right Amygdala**  \( r = -0.07, p = 0.22 \)
- **Total Amygdala**  \( r = -0.12, p = 0.031 \)

#### Child-Reported CU Traits (N = 298):

- **Left Amygdala**  \( r = -0.18, p = 0.001 \)
- **Right Amygdala**  \( r = -0.09, p = 0.13 \)
- **Total Amygdala**  \( r = -0.15, p = 0.01 \)

#### Parent + Child CU Traits (N = 298):

- **Left Amygdala**  \( r = -0.20, p = 0.000 \)
- **Right Amygdala**  \( r = -0.10, p = 0.09 \)
- **Total Amygdala**  \( r = -0.17, p = 0.004 \)
Striatum

9.6% volume *increase* in psychopaths

Glenn et al. (2009), *Biol. Psychiatry*, 67, 52-58
Psychopathic individuals: striatal hyper-responsivity to anticipation of monetary rewards (Buckholtz et al. 2010)

Striatal functions:

- reward sensitivity: enhanced learning to rewards
- dramatic response to drugs of abuse
- preference for immediate vs. delayed rewards
- dense connections to amygdala and VMPFC
- neurodevelopmental?