Understanding Aggression

A Cumulative Model for Understanding Aggression

- Genetic Predisposition
- Physiological Influences
- Learning History
- Environmental Stressors
- Cognitive Reasoning
- Opportunity

Personal Tendency Toward Violence

Situational Tendency Toward Violence

Aggression Line

Opportunity
Reasoning
Stressors
Learning
Physiological
Genetic

Person A
Person B
Person C
Person D
Definition of Aggression

- Physical or verbal behavior intended to hurt someone
- Two types
  - Hostile (reactive) aggression; springs from anger, goal is to injure
  - Instrumental aggression - aim is to hurt as a means toward a goal

Facts to Consider

- Most people have thought about or fantasized about killing another person (Buss, 2005)
- People who kill once are very different than those who are habitually violent
- Few people kill more than once
  - Only 6% of paroled murderers were arrested for killing again (Lester, 1991)

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- Opportunity
- Personal Tendency Toward Violence
- Situational Tendency Toward Violence
Genetic Influences
Is Aggression Natural?

• Natural to humans as a species?
• Natural to certain groups?
• Natural to certain individuals?
  – Aggression gene
  – Heredity

Is Aggression Natural?
Humans as a Species

• Archeological findings
  – Olduvai Gorge
    • Northern Tanzania
    • Over 2 million years old

• Aggression as an instinct
  – All members of a species must do it
  – Cannot be the result of learning
  – Cannot be a reflex

Is Aggression Natural?
Aggression as a Drive

• Hydraulic Model
  – Aggression is a drive like other drives
  – Catharsis

Neutral  Target
Object  Person

Fantasy
Observation
Verbal
Physical
Is Aggression Natural?
Group Differences

- Gender
- Race
- Culture

Aggression is Caused by Sociobiology

- Individual Goals
  - Survival
  - Representation in the next gene pool
- Four Components
  - Reproductive fitness
  - Selfishness
  - Kin selection
  - Reciprocal altruism

Reproductive Fitness

- Strategy 1
  - Few offspring
  - High effort in maintaining
- Strategy 2
  - Many offspring
  - Low effort in maintaining
Selfishness

- Successful genes are ruthlessly selfish
- Examples
  - Blackhead gulls eat other gulls' babies
  - Emperor penguins in the Antarctic push each other into the water to see if there are Leopard Seals or killer whales

Reciprocal Altruism

<table>
<thead>
<tr>
<th>Partner’s Strategy</th>
<th>Remain</th>
<th>Silent</th>
<th>Testify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Strategy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remain silent</td>
<td>5 years</td>
<td>30 years</td>
<td></td>
</tr>
<tr>
<td>Testify</td>
<td>0 years</td>
<td>10 years</td>
<td></td>
</tr>
</tbody>
</table>

Kin Selection
Support for Sociobiology
Homicide

- Only 33% of victims are killed by relatives
- About 15% are killed by a spouse and 4% by blood relatives
- Nongenetic coresidents are 11 times more likely to be killed than are genetic coresidents
- Child abuse and homicide more 40 to 100 times more likely with stepparent than biological parent (Daly & Wilson, 1988, 1989)
  - Buss (2005) says that this eliminates resources spent on offspring that can’t pass on our genes
- Rates of violence are highest in men who are at their sexual peak; a time when competition makes evolutionary sense

Why Would Women Kill Their Children?

- Evolutionary Reasons
  - Child has serious birth defect or illness
  - Mother has older children that need resources
    - Burying beetle
  - Mother does not have a mate
    - Child will not have the resources to survive
    - Mother will not be able to get a mate
- Psychological Illness

Support for Sociobiology
Rape

- Support
  - Rape victims tend to be young
  - Age distribution of victims mirrors fertility distribution
  - Rape is found in species such as scorpion fly
- Problems
  - Can’t explain oral sex or anal sex
  - Many rapists are married or of high status
Gender & Murder

<table>
<thead>
<tr>
<th>Sex</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males killing men</td>
<td>62%</td>
</tr>
<tr>
<td>Males killing women</td>
<td>22%</td>
</tr>
<tr>
<td>Women killing men</td>
<td>10%</td>
</tr>
<tr>
<td>Women killing women</td>
<td>3%</td>
</tr>
</tbody>
</table>

Why It’s Bad to Be Dead
(Buss, 2005)

• Genes can’t be passed on
• Victim’s wife is now available for mating
• Victim’s children are vulnerable
• Victim’s loses become others’ gains
  – Jobs
  – Money
  – Potential mates

Why It’s Good to Kill a Rival
(Buss, 2005)

• Prevent injury to self and family
• Prevent mate from being raped
• Acquire rival’s resources and territory
• Establish reputation to scare other rivals
• New opportunity to have sex with rival’s mate
• Eliminate an entire lineage of reproductive competitors
If Killing a Rival is Good, Why Don’t We? (Buss, 2005)

- Killing is risky
  - We might get killed
  - We might get caught and sent to prison
  - Potential mates might think poorly of us
  - Family of victim might retaliate against our family
- Alternatives
  - Form alliances to help against the rival
  - Get the rival to become part of the alliance
  - Ruin the reputation of the rival

Is Aggression Genetic?
Genetic Influences on Individuals
XYY Chromosome

- Statistics
  - 1 in 1000 people have an extra Y chromosome
  - 15 in 1,000 prison inmates have an extra Y
  - XYY is related to crime but not to homicide
- Alternative explanation: intelligence and height

Serial Killers with Genetic Disorders

<table>
<thead>
<tr>
<th>XYY</th>
<th>XYY</th>
<th>XXY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthur Shawcross</td>
<td>John Wayne Gacy</td>
<td>Bobby Joe Long</td>
</tr>
<tr>
<td>IQ = 95</td>
<td>IQ = 118</td>
<td>IQ = 118</td>
</tr>
</tbody>
</table>
Richard Speck

- Mass murdered of 8 nurses in Chicago
- Defense claimed he had the XYY
- Later testing found this not to be true

Genetics

- 90% of height
- 70% of major depression
- 60% of intelligence
- 50% of smoking
- 40% of personality
- 40% of job satisfaction
- 50% of criminality
- 50% of aggression
- Many mental health problems

Genetic Influences on Individuals

Genetic Predisposition

- Aggression is the result of a genetic predisposition passed on by parents
- Research Support (Tryon, 1940)
  - Rats were observed
  - Rats separated into docile and aggressive groups
  - Rats observed 26 generations later
    - offspring of aggressive rats were aggressive
    - offspring of docile rats were docile
Genetic Similarity

- 100.00 Identical twins
- 50.00 Fraternal twins
- 25.00 Grandparents
- 12.50 First cousins
- 6.25 Second cousins
- 0.00 Unrelated

Genetic Influences on Individuals
Genetic Predisposition

- Research Support (meta-analysis by Raine, 1993)
  - Concordance rates

<table>
<thead>
<tr>
<th>Genetic Relation</th>
<th>Biological Parent Together</th>
<th>Adopted Parent Together</th>
<th>Adopted Parent Separate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrelated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siblings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fraternal twins</td>
<td>20.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identical twins</td>
<td>51.5</td>
<td>41.0</td>
<td></td>
</tr>
</tbody>
</table>

Genetic Influences on Individuals
Genetic Predisposition

- DiLalla & Gottesman (1990)
- Concordance rates from 6 Studies

<table>
<thead>
<tr>
<th></th>
<th>Identical Twins</th>
<th>Fraternal Twins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescent delinquency</td>
<td>87%</td>
<td>72%</td>
</tr>
<tr>
<td>Adult criminality</td>
<td>51%</td>
<td>22%</td>
</tr>
</tbody>
</table>
Genetic Influences on Individuals
Genetic Predisposition

- Christiansen and Mednick (1977) study of adopted Danish children
- Percentage of children becoming criminals
  - 13.5% neither parent criminal
  - 14.7% adopted parent criminal
  - 20.0% biological parent criminal
  - 24.5% adopted & biological parents were criminals

A Cumulative Model for Understanding Aggression

Genetic Predisposition

Personal Tendency Toward Violence
- Physiological Influences
  - Learning History

Situational Tendency Toward Violence
- Environmental Stressors
- Cognitive Reasoning
- Opportunity

Physiological Influences
The Amygdala

[Diagram of the brain with the amygdala highlighted]
Physiological Influences
The Amygdala

• Thought to be the “aggression center”
• Is involved with associating stimuli with reward and punishment
• Removal of amygdala reduces antisocial behavior
  – 39% marked reduction
  – 35% some reduction
  – 21% no reduction
  – 5% increase

Charles Whitman
August 1, 1966

• 12:00 a.m. – killed mom
• 3:00 a.m. – killed wife
• 11:30
  – Killed receptionist
  – Killed two couples
  – Shooting Spree
  • 16 dead
  • 30 wounded

Physiological Influences
Hormones

• Aggression increases after an injection of male hormones
• Testosterone levels higher in people committing unprovoked violent crimes than in non-violent crimes
• After age 25
  – androgen levels decrease
  – violent crime rates decrease
Testosterone
Dabbs & Morris (1990)

- Studied 1,496 Vietnam Vets
- Vets with high testosterone levels and low social integration (e.g., low SES, unmarried) most likely to be delinquent

<table>
<thead>
<tr>
<th>Social Class</th>
<th>Testosterone Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>14.7%</td>
</tr>
<tr>
<td>High</td>
<td>30.7%</td>
</tr>
<tr>
<td>Low</td>
<td>14.7%</td>
</tr>
<tr>
<td>High</td>
<td>30.7%</td>
</tr>
<tr>
<td>Low</td>
<td>14.7%</td>
</tr>
<tr>
<td>High</td>
<td>30.7%</td>
</tr>
</tbody>
</table>

Physiological Influences
Blood Sugar

- Aggressive behavior increases when blood sugar levels are low
- Hypoglycemia
  - 46% of arsonists
  - 17% of controls
- 11:00 a.m. - 11:30 a.m.
  - Hypoglycemic symptoms peak
  - Assaults in jails and prisons peak

Physiological Influences
Neurotransmitters
Physiological Influences

**Neurotransmitters**

- Meta-analysis by Raine (1993)
  - Low levels of serotonin (5-HT) are related to aggression ($d=-.47$)
    - non-alcoholics ($d=-1.23$)
    - borderline personalities ($d=-1.02$)
  - No relationship for norepinephrine or dopamine
- Asperg (1997)
  - Low levels of serotonin associated with suicide attempts and completed suicides
- Fuller (1996)
  - Low levels of serotonin associated with violent criminals

Physiological Influences

**Neurotransmitters**

- Serotonin levels
  - Low in spinal fluid (Raine, 1993)
  - High in blood platelet cells (Moffitt et al., 1998)
  - Violent people seem to have serotonin in the synaptic terminal but it does not get released to the synaptic cleft
- Nutrition is important. Serotonin is reduced by diets low in
  - tryptophan (precursor of serotonin)
  - tyrosine (precursor of norepinephrine)

Physiological Influences

**Physiological Arousal**

- Antisocial personalities have lower resting heart rates (Raine, 1993)
- Ortiz and Raine (2003) Meta-analysis
  - Anti-social behavior in children
  - 40 studies, $n=5,868$, $d=-.44$
- Theories
  - reduced fear
  - autonomic underarousal
    - optimal level of arousal
    - extroverts and introverts
    - Jim Turner’s theory
Physiological Influences
Complications During Birth

- Violent offenders more likely than nonviolent or non-criminals to have had a complicated birth
- Likelihood of violence increases with complicated birth and
  - parental psychiatric illness or
  - minor physical anomalies

Brain Damage

- Congenital
- Head Injury
- Substance abuse
- Disease

Brain Damage → Functional Impact

Self-Report
Medical Records
EEG
Neuroimaging
- MRI, PET
Neuropsych Testing

Collecting Head Injury Data

- Self Reports
  - Honest?
  - Accurate?
- What is a Head Injury?
  - Any head injury?
  - Loss of consciousness?
  - Hospitalization?
  - How many blows to the head?
- When Did it Occur?
  - Prior to being aggressive
  - Because they were aggressive (e.g., fight)
  - After they were already aggressive
Physiological Influences

Head Injuries

- **Study of death-row inmates (Lewis, 1986)**
  - All 15 claimed a history of head injury
  - 12 of 15 showed neurological impairment

- **Study of 14 death-row juvenile offenders (Lewis et al., 1988)**
  - All 14 had history of head injury
  - 8 of 14 severe enough to be hospitalized

- **Study of 16 death row inmates (Freedman & Hemenway, 2000)**
  - 88% (14) had history of head injury
  - 88% had been physically or sexually abused
  - 88% had parents who abused drugs and alcohol

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Neuroimaging

![Neuroimaging](NORMAL.png) ![Neuroimaging](MURDERER.png)

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Neuroimaging

![Neuroimaging](CONTROLS.png) ![Neuroimaging](SZ.png)
Physiological Influences
Head Injuries

• Domestic Violence (Rosenbaum, 1991; Rosenbaum & Hodge, 1989)
  – 61% of males with violent dating/marital behavior
  – 52% of wife batters
  – 22% of non-batters

Hawley (2001)

• Studied 563 adults with head injuries
• 381 drove before their injury
• 139 drive after their injury
  – Half of these report increased anger, aggression, & irritability
  – Symptoms of road rage


Arthur Shawcross
Genesee River Killer

• Killed 2 children, 11 prostitutes
• Head injuries
  – 09 Hit in head with stone
  – 10 Hit head jumping into lake
  – 16 Hit in head with discuss hammer
  – 17 Hit in head with sledge hammer
  – 23 Fell 40' from ladder and hit his head, was unconscious
David Berkowitz  
“Son of Sam”
• Killed 6, started over a thousand fires
• Head injuries
  – 7 Hit by a car, suffered head injuries
  – 7 Ran into a wall and suffered head injuries
  – 8 Hit in the head with a pipe, 4-inch gash in forehead

Richard Ramirez  
“The Night Stalker”
• Killed 14
• Head injuries
  – 02 Dresser fell on his head, received 30 stitches, almost died
  – 06 Hit by a swing, knocked unconscious, caused a deep gash
  – 11 Diagnosed with epilepsy

Robert Garrow
• Killed 7 people
• Head injuries
  – 2 years old: Mother splits his head open with a crowbar during a beating
  – 5 years old: Knocked unconscious when mother hits him in the head with a piece of wood
  – 6 Years old: Beaten unconscious by his father
  – 36: Receives head injury in auto accident
Robert Anthony Carter
- Killed 2 people by 17 in robberies
  - Sentenced to death
- Head Injuries
  - 5 years old: Hit on head with a brick
  - 5 years old: Mother hits him on head with a dinner plate
  - 10 years old: Hit on the head so hard with a baseball bat that the bat broke
  - 16 years old: Shot in the head by his brother – bullet lodged near his temple

Raymond Fernandez
- Killed 17 people in the late 1940s
- History
  - Normal, friendly personality prior to injury
  - Was climbing stairs on a ship to America when a steel hatch cover hit him in the head
  - In coma for a week
  - Complete personality change when he came out of coma
  - Killed 17 women over next few years
  - Executed in Sing Sing in 1951

Phineas Gage
- September 13, 1848
- Cavendish, Vermont
- Gage was a foreman for a railway construction gang
- An explosion sent a 3’ 7” tamping iron through his skull, landing 25 yards behind him
Phineas Gage

- Went back to work several months later, but his personality had changed
- He worked taking care of horses and working on a farm for the next 11 years
- In February, 1860, he began to have epileptic seizures and died May 21, 1860
- His body was exhumed in 1867 so scientists could study his skull

Brain Abnormality/Head Injury

<table>
<thead>
<tr>
<th>Aggression Group</th>
<th>Brain Abnormality Measure</th>
<th>Neuroimaging</th>
<th>Neuropsych Testing</th>
<th>Self-report</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitually Aggressive</td>
<td></td>
<td>52%</td>
<td>47%</td>
<td>45%</td>
<td>51%</td>
</tr>
<tr>
<td>Single aggressive</td>
<td></td>
<td>25%</td>
<td>14%</td>
<td></td>
<td>22%</td>
</tr>
<tr>
<td>Non-aggressive criminal</td>
<td></td>
<td>23%</td>
<td>20%</td>
<td>64%</td>
<td>50%</td>
</tr>
<tr>
<td>Inmates</td>
<td></td>
<td>27%</td>
<td>13%</td>
<td>38%</td>
<td>32%</td>
</tr>
<tr>
<td>Non-aggressive control</td>
<td></td>
<td>15%</td>
<td>11%</td>
<td>6%</td>
<td>9%</td>
</tr>
</tbody>
</table>
Physiological Influences
Study of 64 Murderers

<table>
<thead>
<tr>
<th>Group</th>
<th>Abnormal EEG Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychotic</td>
<td>86%</td>
</tr>
<tr>
<td>No motivation or provocation</td>
<td>73%</td>
</tr>
<tr>
<td>Accidental while committing other crime</td>
<td>25%</td>
</tr>
<tr>
<td>Extensive provocation</td>
<td>17%</td>
</tr>
</tbody>
</table>

Physical Attractiveness

- Facial defects (Masters and Graves, 1967)
  - 60% of criminals
  - 20% of controls
- Thompson (1990)
  - reviewed 9 studies
  - 6 showed reduction in recidivism following plastic surgery

Premenstrual Syndrome (PMS)

- Dalton (1961)
  - Study of 156 convicted women
  - 46% of crimes occurred within 4 days of menstruation
  - 26% would have been expected by chance
Heavy Metals

• Significant relationship between acting-out and violent behavior and exposure to:
  – lead
  – cadmium
  – manganese

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Three Types of Learning

• Classical Conditioning
• Social Learning
• Operant Conditioning
Social Learning
We Model

- Parents
- Siblings
- People in our environment
- People in the public eye (e.g., sports, media)

Violence in the Media - Frequency

- Average Child (Nielsen Media Research, 2000)
  - Watches 1,023 hours of TV each year (20 hours per week)
  - Goes to school 900 hours per year
- Media Violence
  - 61% of television shows contain violence
  - Prime time shows average 5 violent acts per hour
  - Cartoons average 25 violent acts per hour
  - 75% of violent acts are not immediately punished or condemned
  - 89% of top-selling video games contain violence
- By age 18, average person will have viewed 200,000 acts of violence and 16,000 murders

Violence in the Media - Effects

- Study of 208 inmates
  - 90% watch TV to learn new tricks
  - 40% have tried specific crimes seen on TV
- Research consensus
  - Moderate correlation
  - Some cause/effect
We tend to model people

- Similar to us
  - Sex
  - Race
  - Age
  - Background
- That are successful
- That have status

Through operant conditioning, we learn

- Consequences
- How to be reinforced
- Anger and resentment
- Social needs and skills
- Attachment to the community
- Coping skills
  - stress
  - anger
  - frustration

Peer Rejection

- Children who are liked are less likely to become antisocial (Dodge & Pettit, 2003)
  - 50% of children rejected by peers display conduct problems later in life
  - 9% of children not rejected display future conduct problems
- Children with ADHD
  - Less popular with peers
  - More likely to engage in antisocial behavior
- Social Skills
  - Emmers-Sommer et al. (2004) meta-analysis
  - Sexual offenders had lower social skills than controls ($r = .33$)
Exposure to Community Violence

- Sample
  - 27 studies, 37 independent samples
  - 17,322 adolescents
- Findings
  - Exposure to violence was related to psychological distress ($r = .25$)
  - This correlation is similar to that found with child sexual abuse and depression ($r = .21$)
  - Especially true:
    - In urban areas
    - With African Americans
    - When exposure was both victimization and witnessing

Effects of the Family

Child Abuse

<table>
<thead>
<tr>
<th>Type of Abuse</th>
<th>General Population</th>
<th>Serial Killers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>6%</td>
<td>36%</td>
</tr>
<tr>
<td>Sexual</td>
<td>3%</td>
<td>26%</td>
</tr>
<tr>
<td>Psychological</td>
<td>2%</td>
<td>50%</td>
</tr>
<tr>
<td>Neglect</td>
<td>18%</td>
<td>18%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
<td>Not applicable</td>
</tr>
<tr>
<td>No Abuse Reported</td>
<td>70%</td>
<td>32%</td>
</tr>
</tbody>
</table>

Mental Health

- Paolucci, Genois, & Violato (2001) meta-analysis
  - Children who were sexually abused were more depressed than controls ($d = .44; r = .21$)
- Widom (1989) study
  - 28.6% crime rate for victims
  - 21.1% crime rate for nonvictims
  - Effect greatest if abuse was physical or emotional but not both
Effects of the Family
Broken Homes

- No effects for the death of a parent
- Effects of Divorce Meta-Analysis (Price & Kunz, 2003)
  - 72 studies
  - 75% of incarcerated adolescents experienced divorced parents
  - Children of divorced parents more likely to engage in delinquency (d = -.16).
  - This is especially true:
    - In more recent studies
    - When the divorce occurred when the child was age 12 or younger
    - When the child is African American
  - Children of divorce are less likely to abuse alcohol (k = 7, d = .21)
- Divorces that result in changes in family relationships (including remarriage) have greatest effect

Effects of the Family

- Poor parental supervision
- Inconsistent use of discipline
- Lack of parental warmth, acceptance, and affect
- Low frequency of joint child/parent activities
- Large families related to juvenile delinquency
  - affects only lower income families
  - affect is only for number of male children
- Low SES

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Personal Tendency Toward Violence

Situational Tendency Toward Violence
Environmental Stressors

Frustration-Aggression Hypothesis

• Frustration
  – increases the probability of aggression
  – is not the same as deprivation
• “Taste of success” leads to riots and violence
• We adapt to levels of success and failure
• Frustration has greatest effect when violent cues are present

Environmental Stressors

Physical or Verbal Assaults

• People do not “turn the other cheek”
• They use an “arm for arm, tooth for tooth” philosophy

Environmental Stressors

Other Causes

• Uncomfortable heat
• Unpleasant noise
• Crowding
• Darkness
• Heightened physiological arousal
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Cognitive Ability
- IQ
  - Mean = 100
  - SD = 15
- Delinquents score 8 points lower than non delinquents

Cognitive Reasoning
Expectancy Theory
- Developed by Victor Vroom
- Aggression = E * I * V
  - E = Expectancy
  - I = Instrumentality
  - V = Valence
Cognitive Reasoning
Reasoning is Affected by
- Alcohol
- Drugs
- Anger
- Stress
- Emotion
- Intelligence
- Knowledge
- Experience
- Age

A Cumulative Model for Understanding Aggression

Opportunity
- Presence of law enforcement
- Presence of others
- Available victim
- Available weapon
- Appropriate social context