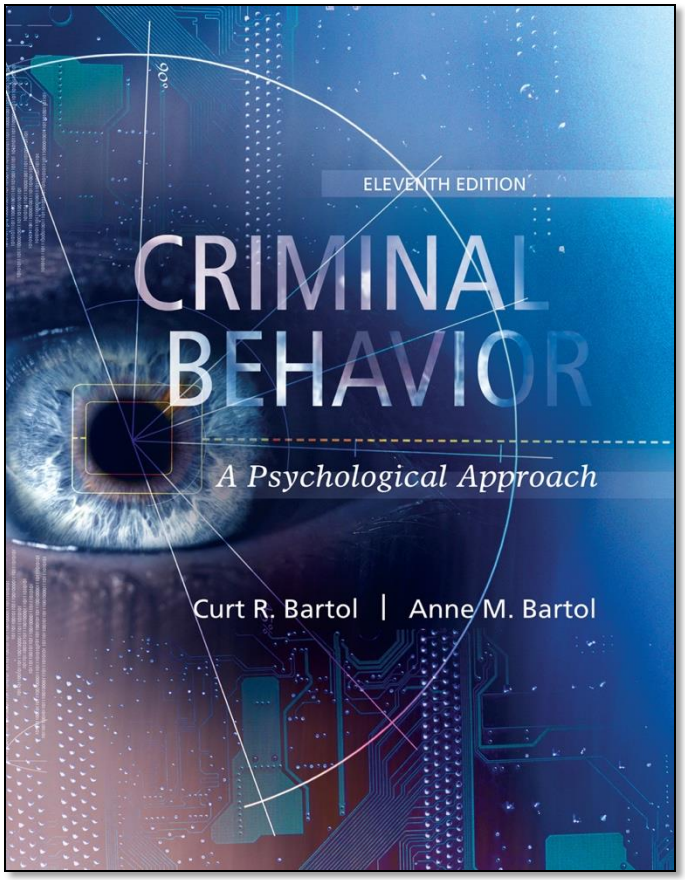
Criminal Behavior
A Psychological Approach

Eleventh Edition



CHAPTER 3

Origins of Criminal Behavior: Biological Factors

Chapter Objectives

- Explore the genetic and biological aspects of criminal behavior.
- Provide an overview of behavior genetics and molecular genetics as they pertain to antisocial behavior.
- Provide an overview of twin and adoption studies and their relation to theories of crime.

Chapter Objectives

- Discuss temperament and its effects on the behavior of children and their caretakers.
- Identify environmental risk factors that play a role in the psychobiological aspects of criminal behavior.

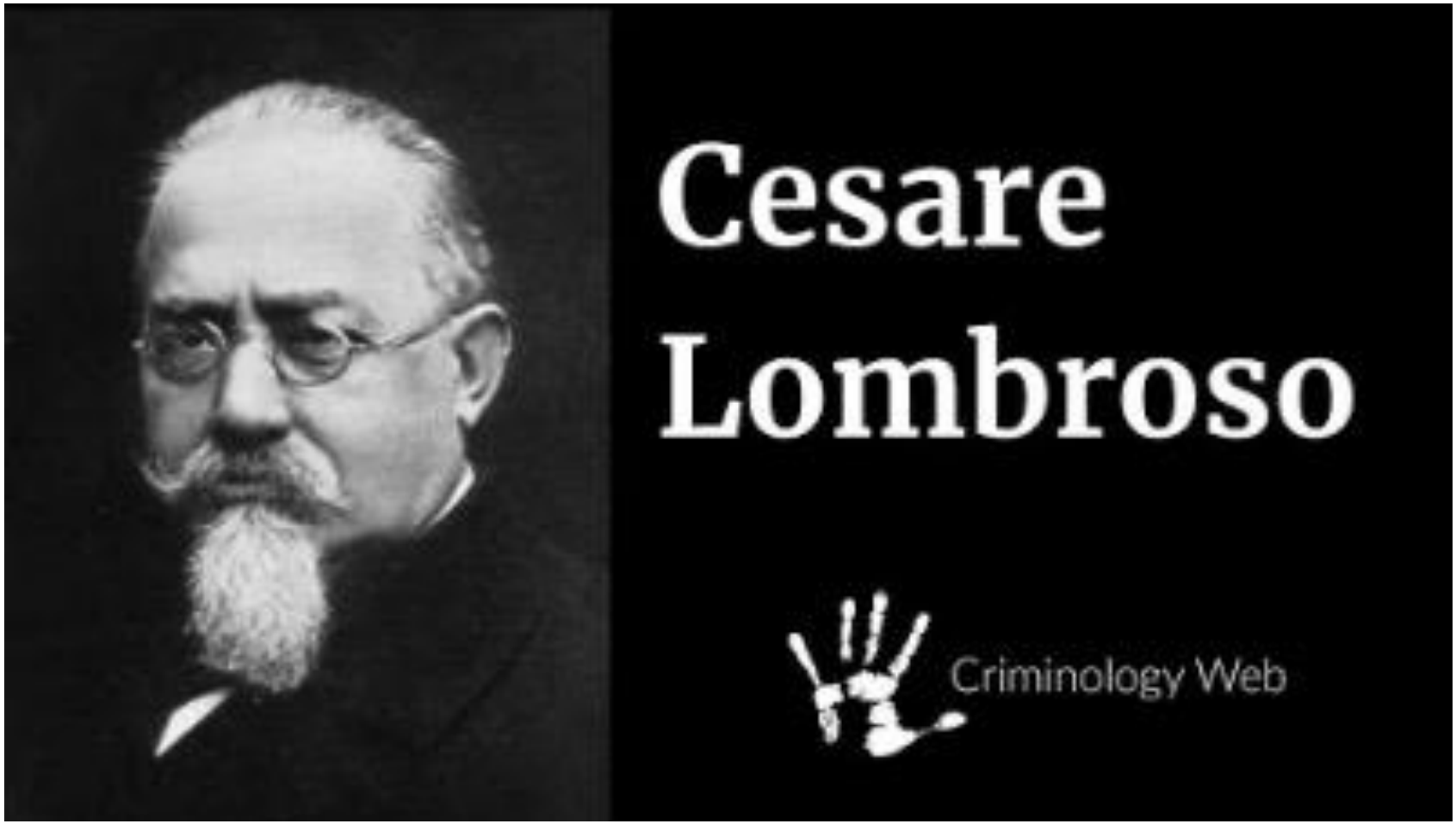
Chapter Objectives

- Summarize the current research on environmental neurotoxins that present the greatest risk for healthy neurodevelopment.

Chapter Objectives

- Summarize recent research on child and adolescent brain development, including fetal exposure to nicotine and drugs, effects of malnutrition, and traumatic brain injury, and their relationship to antisocial and criminal behavior.

Biological Bases of Behavior: Lombroso 1876 (Criminology Web 7:04)



Biological Bases of Behavior: Lombroso 1876

- People are born criminals due to their biological makeup

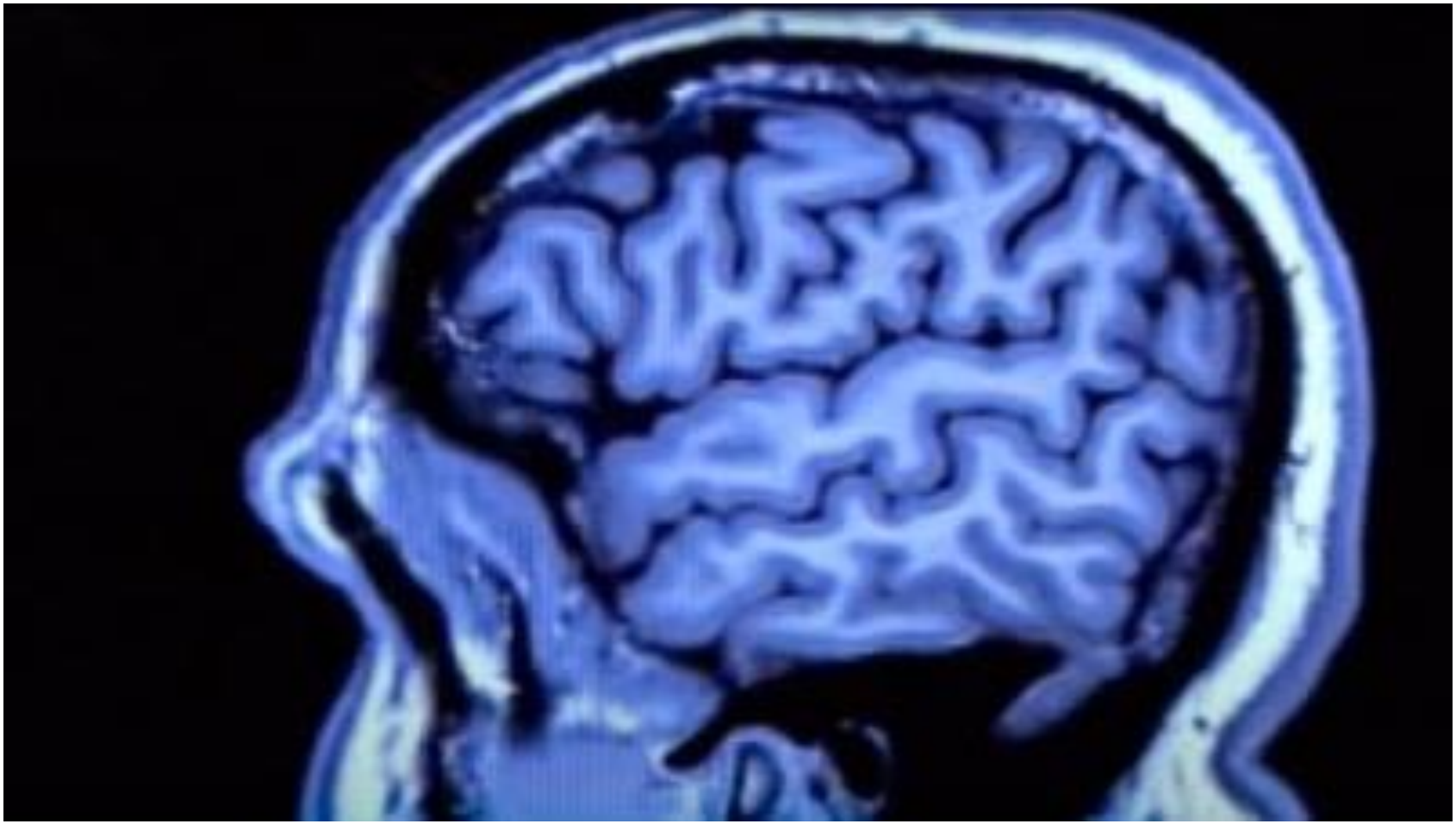
- "In *The Criminal Man* ("L'Uomo delinquente"), first published in 1876, he suggested that there was distinct biological class of people that were prone to criminality. These people exhibited 'atavistic' (i.e. primitive) features. Atavistic derives from the word "avatus", which means ancestor in Latin." (Brookes)

Biological Bases of Behavior: Lombroso 1876

- I.e. the more one looks like a caveman, the more likely they are to be a criminal.
- Lombroso's later work concluded that biological factors alone were not the explanation of all criminality
  - Alcoholism
  - Poverty
  - Individual psychological characteristics
- Lombroso's work no longer considered to have any validity, but offshoots are still popular by other criminologists

Genetics and Antisocial Behavior

(BBC Studios 3.03)



Genetics and Antisocial Behavior

- Behavior genetics
  - The role genes play in the formation and development of human and animal behavior
  - Genetic v. environmental influences in twin and adoption studies
  - In appropriate use of statistics and research designs can be made to suggest genetic links where none exist
    - US homicide rates
  - Research shows that any genetic link to crime that does exist, is usually easily mitigated by positive sociological factors.

Genetics and Antisocial Behavior

- Certain brain and biochemical characteristics appear to *predispose* some children to exhibit higher levels of aggression than peers if these factors are not neutralized by socialization and competent parenting.

- Early onset of persistent antisocial behavior is often reflected in biological or neurological abnormalities. Late onset of juvenile offending appears to be more affected by social factors than biological ones.

- So, biology and genetics may play a role, but the social environment is the most important determinant of criminal behavior.

Genetics and Antisocial Behavior

- Molecular genetics
  - The structure and function of genes at the molecular level
  - How genes are transferred from generation to generation
  - DNA

Behavior Genetics

- Those studying the contribution of genetics to crime in siblings must evaluate:
  - Influences attributable to genetic effects
  - Influences of environment shared by siblings
  - Influences from unshared experiences

Behavior Genetics

- Studies of twins
  - Fraternal
    - Dizygotic
  - Identical
    - Monozygotic
  - Some support for the heritability of antisocial behavior
    - Twins separated early in life and raised apart (not a lot of these)

Behavior Genetics

- Studies of twins
  - Shared environments
  - Nonshared environments (adoption)
  - Concordance
    - The degree to which related pairs of subjects both show a particular behavior or condition

Behavior Genetics

- Studies of twins
  - The Twins' Early Development Study
    - Behavior and development in language, cognition, and academic abilities from early childhood through adolescence
    - Heritability seems to play a modest role.
      - Callous-unemotional trait
        - The psychopath trait
    - Interaction of biological factors and environmental influences

Behavior Genetics

- Studies of twins
  - The Twins' Early Development Study
    - Genetic factors played an important role in the early onset of aggressive behavior in children.
      - Less in male adolescent delinquent behavior

Molecular Genetics (LipTV 3:58)

Molecular Genetics

- The Monoamine Oxidase – A (MAOA) gene
  - MAOA-L gene = low activity
    - The warrior gene
- Seven genes have been associated with antisocial behavior in humans.
- Single gene abnormality may not be enough without other triggers

Psychophysiological Factors

- The dynamic interactions between behavior and the autonomic nervous system
  - Involuntary functions, such as heartbeat, blood pressure, breathing, and digestion
  - The amygdala
    - Regulation of emotional responses
      - Especially fear and anger
    - Psychopathy and callous-unemotional traits

Psychophysiological Factors

- Temperament
  - A "natural" mood disposition determined largely by genetics and biological influences
  - The quality of parent-infant relationships affects the infant temperament ***AND*** the infant temperament affects the parent-infant relationship
    - As indicated previously, positive nurturing is related to less criminal propensity in children
      - More difficult children may receive less nurturing

Temperament

Behavioral Characteristics	Easy Child	Difficult Child	Slow-to-Warm-Up Child
Rhythmicity	Regular	Irregular	Regular
Moods	Positive	Negative	Negative
Approach to others	High	Low	Low
Adaptability	Rapid	Slow	Slow
Intensity	Low	High	Low

Source: Adapted from Thomas & Chess (1977)

Psychophysiological Factors

- Temperament
  - A constitutional or biological basis
  - Appears in infancy and continues throughout life.
  - Influenced by the environment
    - Difficult child + parental rejection make a child high risk for antisocial behavior
  - Activity and emotionality
  - Temperament seems to also be linked to types of crimes persons commit

Environmental Risk Factors

- In utero experiences
  - Toxic or diseased environments
    - Fetal alcohol spectrum disorder
    - Just about every abused substance used during pregnancy has a negative effect on the infant (included tobacco)
  - Neurotoxins
    - Lead
    - Cadmium
    - Manganese
    - Mercury

Environmental Risk Factors

- Neurotoxins
  - Neurocognitive dysfunction which predisposes individuals to antisocial behavior and violence
    - Fetus and children under age two
    - May be difficult to separate neurotoxin exposure from other environment conditions such as poor nutrition, inadequate social environment, poverty when assessing neurotoxin exposure and criminality (lead exposure and developmental issues is well documented, but this in and of itself does not lead to criminality)

Environmental Risk Factors

- Micronutrients as protective factors
  - Trace elements
    - Iron
    - Zinc
    - Calcium
    - Selenium
  - Found in good nutrition
    - Can mitigate some toxin effects
      - Persons living in poverty often lack these in their diets
        - Neurotoxins may effect poorer children to a greater extent because of this

Environmental Risk Factors

- Prenatal and postnatal malnutrition
  - Increase prevalence of conduct problems and aggressive behaviors from malnutrition in the absence of any of the other factors discussed
    - Again, a correlate that is not necessary and sufficient on its own to produce aggression

Environmental Risk Factors

- Barbados Nutrition Study
  - High levels of antisocial behavior in adulthood
    - HOWEVER, what other environmental and social factors might have been involved?
      - Lack of nurturing due to poverty
      - Lack of supervision due to having to work multiple jobs
      - Family stress/violence due to lack of money
      - Alcohol and other substance abuse that is more prevalent in poorer homes?
      - Living in a poor high crime neighborhood?
      - Add your own

Environmental Risk Factors

- Alcohol
  - Fetal alcohol spectrum disorder
    - Can cause profound cognitive impairment
    - More likely to be aggressive and have conduct issues than non-affected peers
  - Difficulties with neurological functioning
- Nicotine
  - Slower brain development
  - Second-hand smoke
  - There may be a lot of social differences between smoking mothers and non-smoking ones
  - Link to criminal tendencies is not well established

Fetal Alcohol Spectrum and Criminal Behavior (WPLG Local 10 2:15)

Environmental Risk Factors

- Drug use
  - Polydrug users
    - The more you use, the worse you behave
    - The more addictions you have, the harder it is to cure them
    - The more a mother uses during pregnancy, the greater the effect and the wider the effect (greater neuronal impact)

Environmental Risk Factors

- Cocaine
  - Crack cocaine and powdered cocaine have the same chemical formula
    - Method of bodily absorption is different, and one is much faster than the other and the effect is different
    - In general, more violence is associated with the crack cocaine trade
    - Fetal exposure to cocaine is linked to attention deficits

Environmental Risk Factors

- Traumatic brain injury (remember Phineas Gage video)
  - Antisocial and serious criminal behavior
  - Pathological violence
  - 60% of incarcerated population
  - Frontal lobe (video slide 6)
  - War veterans
- Developing brain plasticity
  - Very young children may recover from a TBI that an adult could not recover from
- Behavioral and emotional effects are dependent on what part of the brain gets damaged

Environmental Risk Factors

- Brain development abnormalities
  - Limbic system
    - Amygdala
  - Brain plasticity
    - Developmental stages

Environmental Risk Factors

- Hormones and neurotransmitters
  - Serotonin
    - Low levels linked to aggression
    - Linked to suicidal depression
  - Dopamine
    - Linked to depression

Neuropsychological Factors

- Executive function
  - Nutrition
  - Risk-taking behavior
  - Impulsivity

Key Concepts

- Amygdala
- Behavior genetics
- Biopsychologists
- Concordance
- Executive function
- FASD
- Fraternal twins (dizygotic twins)
- Identical twins (monozygotic twins)

Key Concepts

- MAOA
- MAOA-L
- Molecular genetics
- Neurotransmitters
- Nonshared environments
- Plasticity
- Psychophysiology

Key Concepts

- Serotonin
- Shared environments
- Temperament
- Traumatic brain injury (TBI)
- Twins' Early Development Study (TEDS)

Additional Resources

Videos:

Criminology Web (2019) Cesare Lombroso: Theory of Crime, Criminal Man and Atavism https://www.youtube.com/watch?v=bjyDQdv6gSk

BBC Studios (2013) A Killer's Genes | Are You Good or Evil? https://www.youtube.com/watch?v=WAbUmF4Pujc

TheLipTV (2013) The "Warrior Gene" Goes Psycho https://www.youtube.com/watch?v=4osmQ7jWiow

WPLG Local 10 (2022) Expert witness: Parkland school shooter suffers from fetal alcohol spectrum disorder https://www.youtube.com/watch?v=MM7MvtthRmA

Online Sources:

Brookes, E (2021) Cesare Lombroso: Theory of Crime, Criminal Man, and Atavism. Simply Psychology. https://www.simplypsychology.org/lombroso-theory-of-crime-criminal-man-and-atavism.html