Diathesis and Stress

Lecture 40

Origins of Mental Illness

- Somatogenic
  - "Plagues and Tangles" in Alzheimer's Disease
  - Dopamine Hypothesis of Schizophrenia
  - Monoamine Hypothesis of Depression
    - Norepinephrine, Serotonin
- Psychogenic
  - Post-Traumatic Stress Disorder
  - Phobias as Acquired Fear
  - Compulsions as Avoidance Learning
  - Learned Helplessness in Depression

The Nature of Psychopathology

Psychological Deficits

- Schizophrenia
- Childhood Autism
- Depression
- Attention-Deficit Disorder

Maladaptive Social Learning

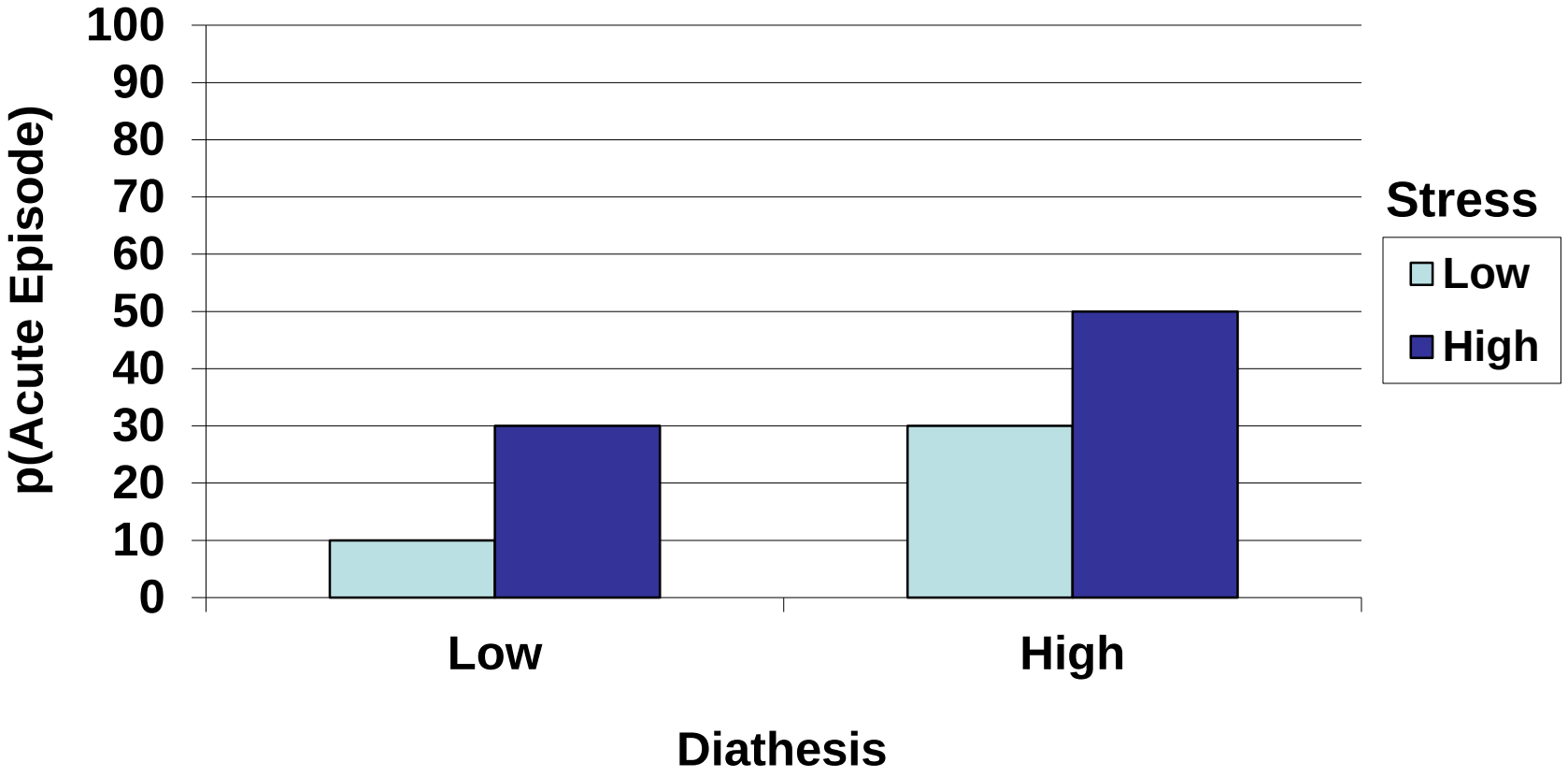
- Phobias
- Obsessive-Compulsive Disorder
- Depression
- Psychophysiological Disorders

Diathesis-Stress Model of the Etiology of Mental Illness

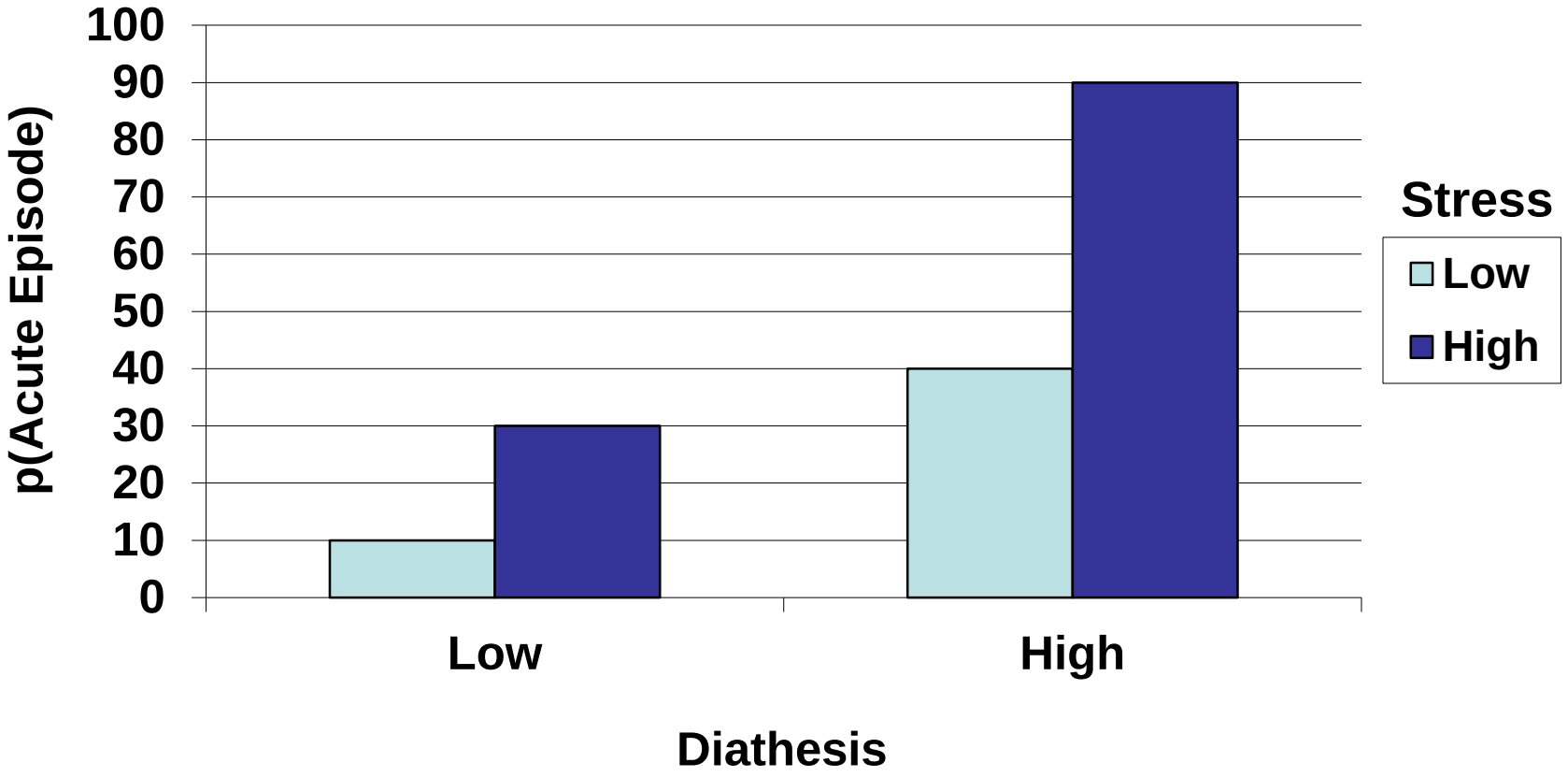
Meehl (1962); Rosenthal (1963)
Monroe & Simons (1991); Belsky & Pleuss (2009)

- Diathesis
  - Predisposition
  - Vulnerability (“At Risk”)
  - Adaptation
    - “Good” vs. “Poor” Premorbid Adjustment
- Stress
  - Challenge to Current Level of Adaptation
  - Precipitates Acute Episode
    - But Only in Vulnerable Individuals

Diathesis-Stress Independence (Additive Model)



Diathesis-Stress Interaction (Multiplicative Model)



Patterns of Diathesis and Stress

- Substantial Diathesis: “High Risk”
  - Little Stress Required for Acute Episode
  - Poor Premorbid Personality
- Catastrophic Stress
  - Acute Episode Even in “Low-Risk” Individuals
  - Good Premorbid Personality
- Diathesis Within Normal Limits
  - Episode a Function of Stress
- Stress Within Normal Limits
  - Episode a Function of Diathesis

Diathesis is a *Specific* Predisposition

Concordance Rates for Psychopathology

Diagnosis	MZ	DZ
Schizophrenia	38%	14%
Bipolar Affective Disorder	72%	28%
Unipolar Affective Disorder	40%	11%

Genetic Endowment = “At Risk”

But Not Decisive

The Genain Quadruplets

Rosenthal (1963)

- “Dire Birth”
  - Nora
  - Iris
  - Myra
  - Hester

Environmental Contributions to Schizophrenia

- Socioeconomic Status
  - *Social Drift*, not Sociogenesis
- Coping Failures
  - Loss, Frustration
- Family Maladjustment
  - Adoption of “At Risk” Probands

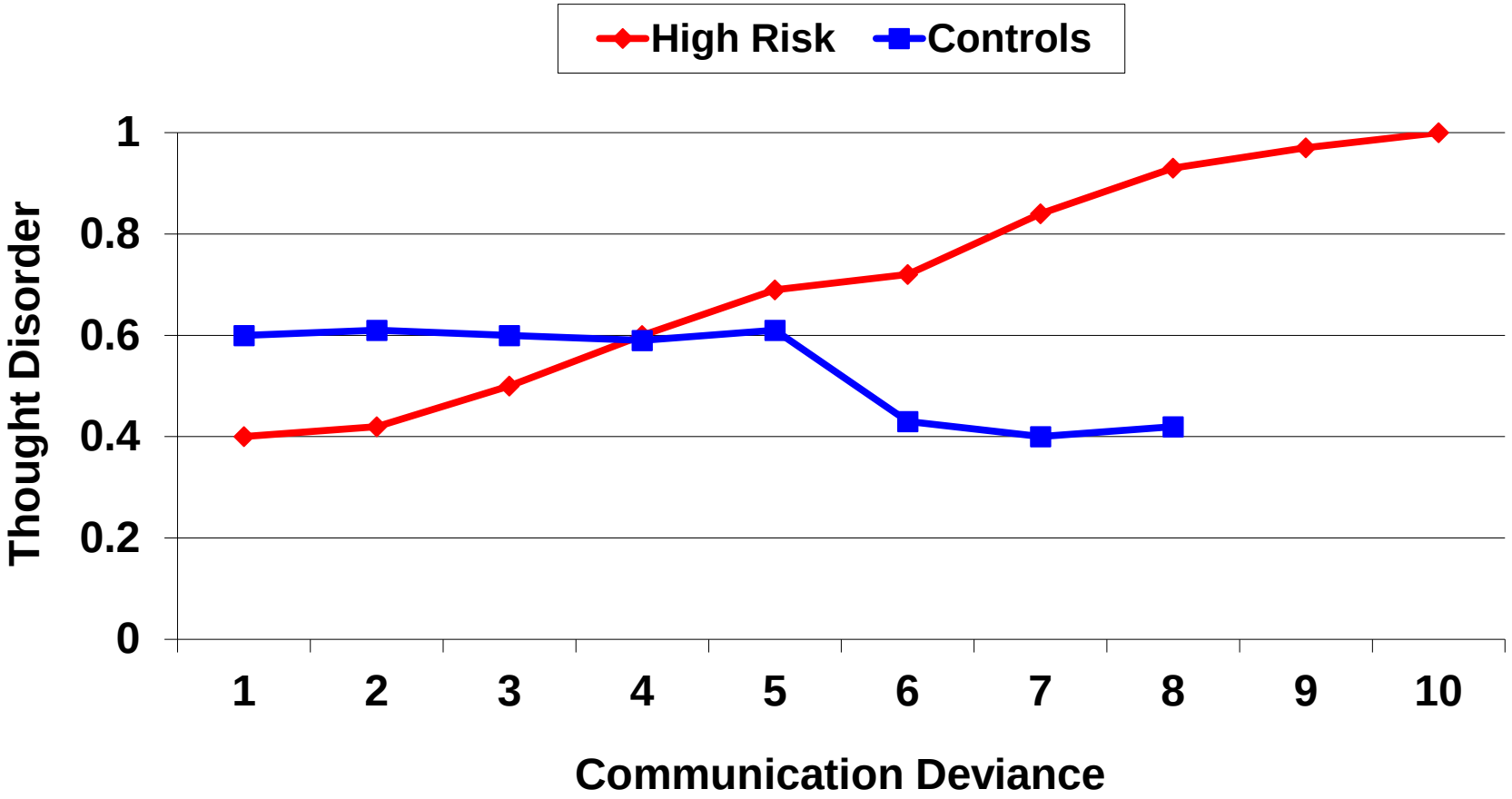
Finnish Adoptive Family Study of Schizophrenia

Wahlberg, Wynn, et al. (1997)

- 167 Women Hospitalized for Schizophrenia
  - 183 Probands Given Up for Adoption
- 202 Women Hospitalized for Other Illnesses
  - 204 Probands Given Up for Adoption
- Psychological Testing of Adoptive Families
  - “Communication Deviance”
- Psychological Testing of Adoptees
  - Index of Thought Disorder

Communication Disorder and Thought Disorder

Wahlberg, Wynne, et al. (1997)



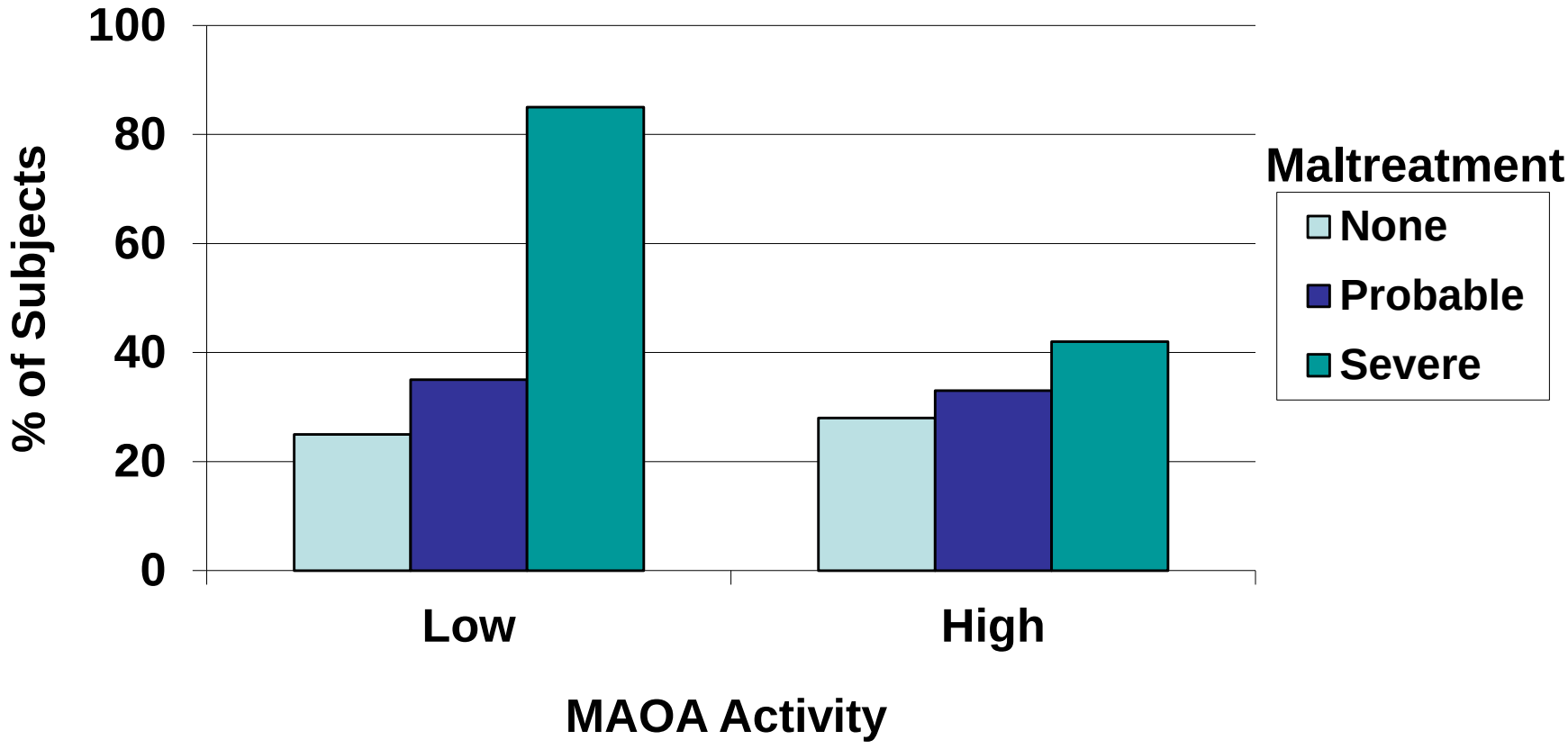
Diathesis and Stress in Adolescent Conduct Disorder

Dunedin Multidisciplinary Health and Development Study
Caspi et al. (2002)

- Adolescent Conduct Disorder in Boys
  - Aggression, Antisocial Behavior
- Diathesis: MAOA Gene
  - Promotes Monoamine Oxidase - A
    - Located on X Chromosome
    - Metabolizes Many Neurotransmitters
    - Linked to Aggression in Mice, Humans
- Stress: History of Maltreatment
  - Initiates “Cycle of Violence”

MAO-A, Maltreatment, and Adolescent Conduct Disorder

Caspi et al. (2002)



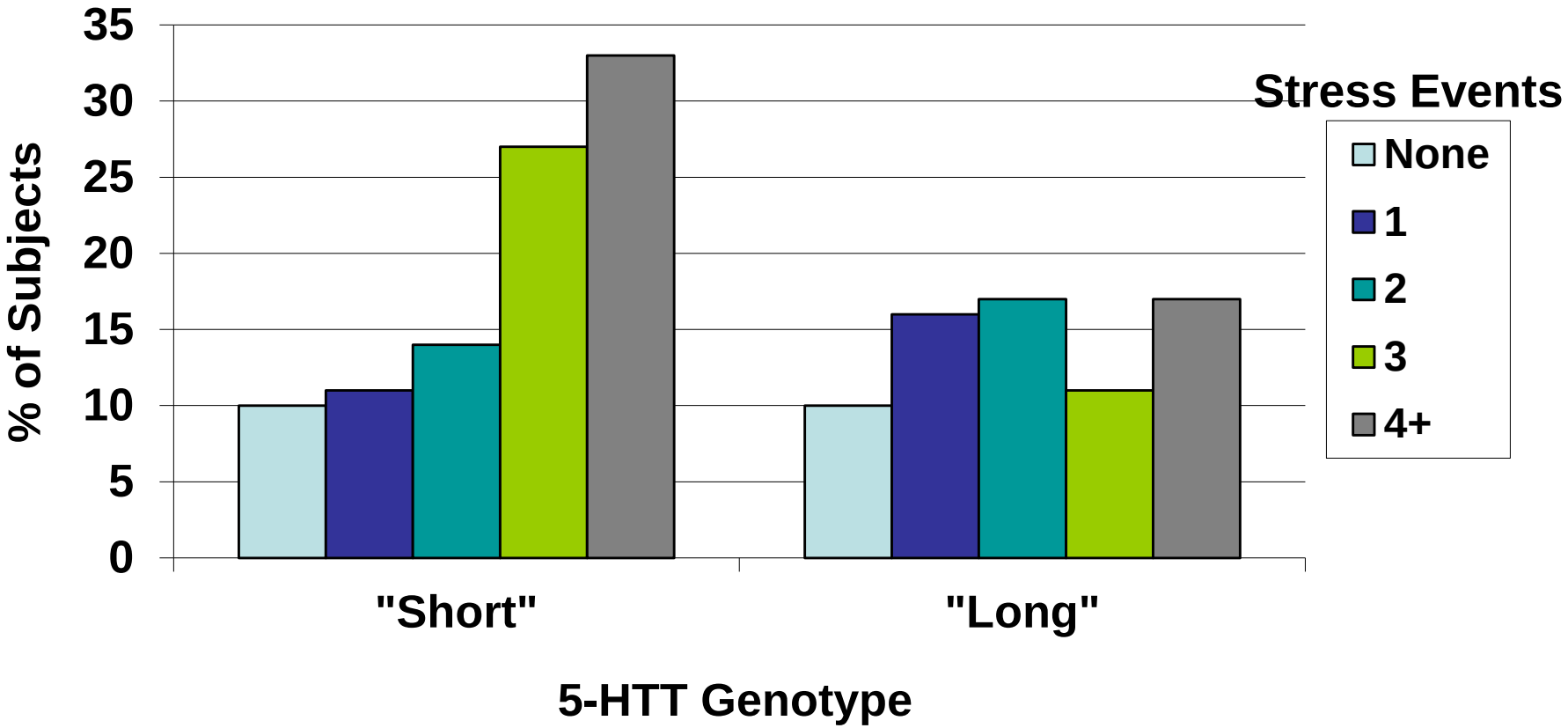
Diathesis and Stress in Depression

Dunedin Multidisciplinary Health and Development Study
Caspi et al. (2003)

- Major Depressive Illness
- Diathesis: 5-HTT Gene
  - Located on Chromosome 17
    - 2 Alleles, "Short" and "Long"
      - 4 Genotypes: SS, SL or LS, and LL
  - Serotonin Transporter
    - Serotonin Linked to Depression in Humans
    - Efficacy of SSRIs like Prozac, Zoloft
- Stress: Stressful Life Events
  - Occurring Between Age 21-26

5-HTT, Life Stress, and Depression

Caspi et al. (2003)



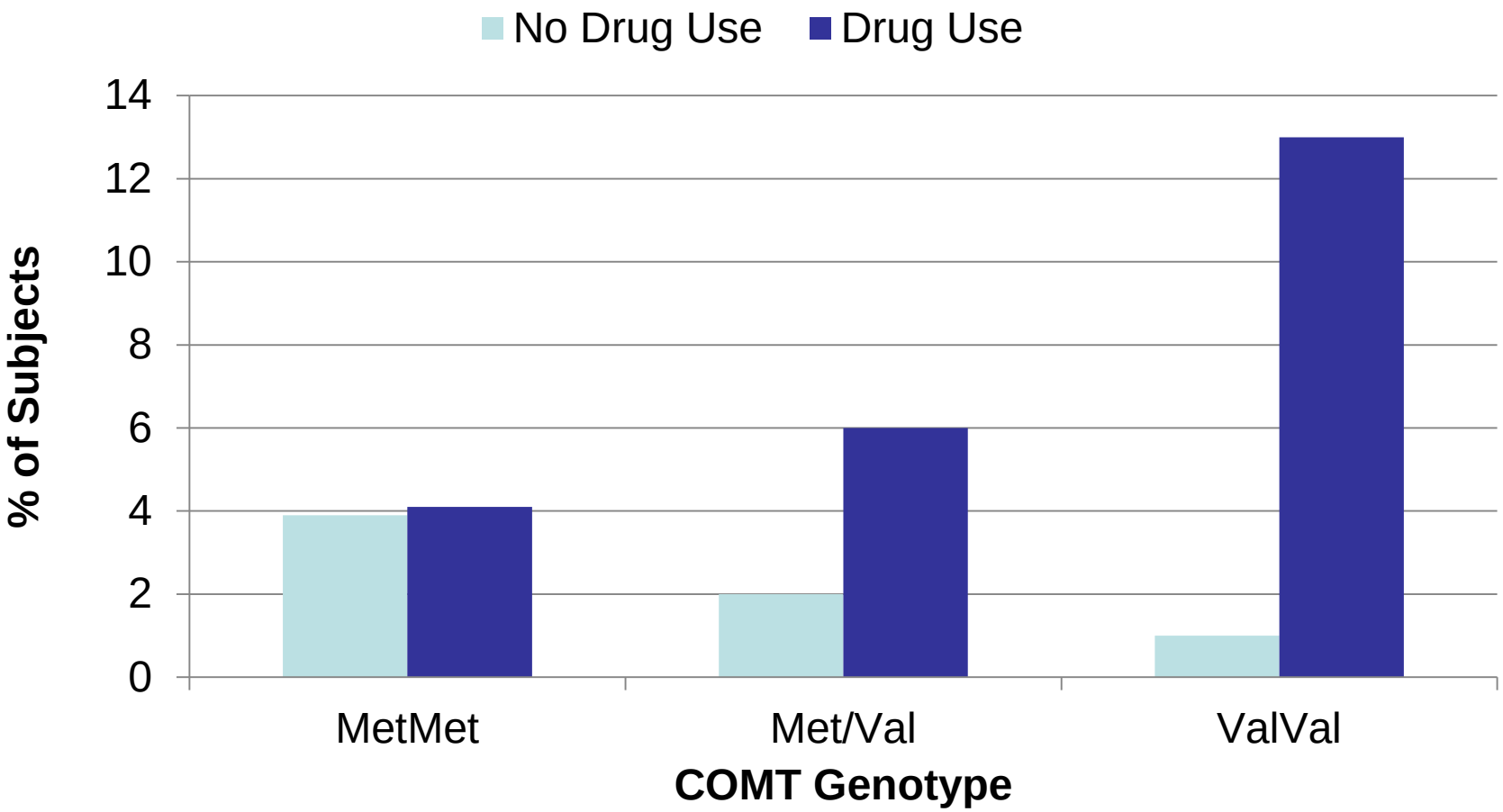
Diathesis and Stress in Psychosis

Dunedin Multidisciplinary Health and Development Study
Caspi et al. (2005)

- "Psychotic" Symptoms at Age 26
  - "Schizophreniform" Hallucinations/Delusions
- Diathesis: COMT Gene
  - Located on Chromosome 22
    - 2 Alleles, "MET" (Methionine) and "Val" (Valine)
      - 4 Genotypes: MetMet, MetVal or ValMet, ValVal
  - Involved in Metabolism of Dopamine
    - MetMet, Fastest Breakdown; ValVal, Slowest Breakdown
  - Linked to Schizophrenia
- Stress: Adolescent Marijuana Use
  - At Least Once Per Month Prior to Age 18

COMT, Marijuana Use, and Psychosis

Caspi et al. (2005)



5-HTT and Depression: Current Status

Caspi et al. (2010); Karg et al. (2011)

- Gene x Environment Interaction Controversial
  - Some Studies Failed to Replicate
  - Assessment of Stress
- 56 Published Studies (*N* = 40,749)
  - Overall Confirmation of Interaction (*p* = .00002)
    - Short Allele More Sensitive (42/56)
    - Long Allele More Sensitive (6/56)
    - No Difference (8/56)
  - Nature of Stress
    - Stressful Life Events
    - Childhood Maltreatment
    - Life-Threatening/Chronic Medical Conditions

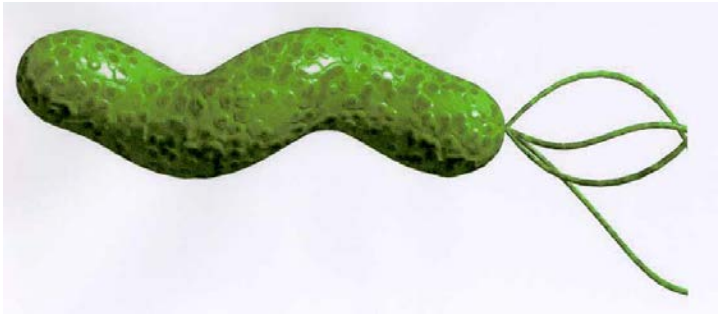
Examples of Diathesis and Stress

- Schizophrenia and Unipolar Affective Disorder
  - Genetic Component
  - Nonshared Environment – Communication Deviance
- Adolescent Conduct Disorder
  - MAOA Activity
  - History of Maltreatment
- Depression
  - 5-HTT Allele (Short)
  - Stressful Events
- Pathological Shyness
  - 5-HTT Allele (Short)
  - Social Support

Diathesis and Stress in Psychosomatic Ulcers

Overmier & Murison (2000)

contra Mashall & Warren (1982, 1983)



- Diathesis
  - Bacterial Infection
    - *helicobacter pylori*
- Stress
  - Prolonged Emotional Stress
    - Autonomic Nervous System activation
- Laboratory Model in Rats
  - *h. pylori* Infection
  - Unpredictable, Uncontrollable Shock

Diathesis and Stress in Phobias

Mineka & Zinbarg (2006)

- Stress
  - Fear Conditioning, But…
    - History Not Always Positive
    - Phobias are Not Arbitrary
- Laboratory Model in Monkeys
  - Observational Fear Conditioning
    - Exposure to Snakes but not to Flowers
- Preparedness Argument
  - Evolved Predisposition as Diathesis
    - Fear Dark, Heights, Open Spaces, Certain Animals

Diathesis often Biological, and Stress often Psychological, *but* Stress Can Be Biological

- Birth Complications in Schizophrenia
  - Prenatal
    - Exposure to Viruses
    - Malnutrition
    - Short Gestation, Low Birth Weight
  - Perinatal
    - Birth Complications

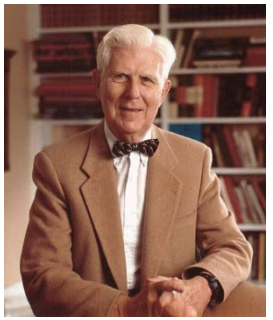
But These Factors Do Not Inevitably Give Rise to Mental Illness Nor Are They Specific to Schizophrenia

Diathesis often Biological, and Stress often Psychological, *but* Diathesis Can Be Psychological

Cognitive Theory of Depression

Beck (1967)

- Depressogenic Schemata
  - Negative View of Self
  - Negative View of the World
  - Negative View of the Future



"I'm no good, the world is hostile, and the future is bleak."

Diathesis often Biological, and Stress often Psychological, *but* Diathesis Can Be Psychological

Hopelessness Theory of Depression

Abramson & Alloy (1989)

- Learned Helplessness Theory of Depression
- Depressive Attributional Style
  - Stable vs. Variable
  - Internal vs. External
  - Global vs. Specific

"I'm always responsible for all the bad things that happen to me"

Diathesis and Stress in Depression

- Biological Stress
  - Sudden Changes in Hormonal Environment
    - e.g., Pregnancy, Parturition, Menopause
  - Behavioral Consequences
    - Altered Mood State
    - Reduction in Activity Levels
- Psychological Diathesis
  - Depressogenic Schemata, Attributional Style
    - Affect Interpretation of Changes in Mood, Activity

Hormonal Changes, Interpretation of Effects

Can Combine to Cause Episode of Depression

Diathesis and Stress as Person-Situation Interaction

- Diatheses are Internal, Personal Factors
  - Origins in Genetic Endowment
  - Origins in History of Social Learning
- Stressors are Features of the Environment
  - Biological in Nature
  - Psychosocial in Nature

Episodes of Mental Illness Emerge from the Interaction of the Person and the Environment