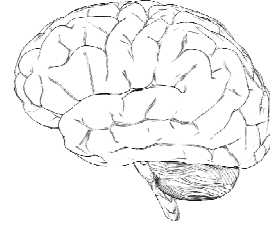


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Lecture 02a (09 May 2012) Conducting ethical research with humans



Conducting ethical research

Nazis and medical research (1940's)

Twins, transplantation, freezing, malaria

**No international legal code governing
research ethics at the time**



Image: <http://www.disinfo.com/tag/medical-experimentation/>

2

Protection of participants

The Nuremburg Code (1947)

Informed consent
Human research based on animal work
Benefits > risks
Qualified personnel to run studies
Physical and mental pain must be avoided
Injury or death must always be avoided

Declaration of Helsinki (1964)

Federal funding, ethics and violations

Belmont Report (1979)

Respect for persons
Beneficence
Justice



Image: http://nuremberg.law.harvard.edu/php/docs_swi.php?DI=1&text=overview

3

Institutional Review Boards (IRBs)

Established where research is conducted

Members and roles

Levels of risk and approval

Expedited and full review

Renewed annually, updates



Image: <http://minerva.stkate.edu/irb.nsf>

4

Why you have the protections you do

- Tuskegee Syphilis study (1932-72)
- Witchita Jury Case (1953)
- Milgram's obedience study (1963)
- Zimbardo's prison study (1973)
- Bronchoscopy study (1996)
- Restaurant letter study (2001)



Image: <http://allthingsd.com/20120318/the-failures-and-fallacies-of-mike-daiseys-apple-attack-and-the-media/shame-on-you/>

5

Tuskegee Syphilis Study (1932-72)

The New York Times

Syphilis Victims in U.S. Study Went Untreated for 40 Years

By JEAN HELLER
The Associated Press

WASHINGTON, July 25—For 40 years the United States Public Health Service has conducted a study in which human beings with syphilis, who were induced to serve as guinea pigs, have gone without medical treatment for the disease and a few have died of its late effects, even though an effective therapy was eventually discovered.

The study was conducted to determine from autopsies what the disease does to the human body.

Officials of the health service who initiated the experiment have long since retired. Current officials, who say they

have serious doubts about the morality of the study, also say that it is too late to treat the syphilis in any surviving participants.

Doctors in the service say they are now rendering whatever other medical services they can give to the survivors while the study of the disease's effects continues.

Dr. Merlin K. DuVal, Assistant Secretary of Health, Education and Welfare for Health and Scientific Affairs, expressed shock on learning of the study. He said that he was making an immediate investigation.

The experiment, called the Tuskegee Study, began in 1932 with about 600 black men,

Lack of informed consent, deception, withholding information and available treatment, putting people at risk, exploitation of a group that would not benefit from participation

6

Witchita Jury Case (1953)

Attorney's comments on jury deliberations

- Jurors unaware they were being taped
- Results shared at a law conference
- Fear of future taping
- Banned in 1956 (US federal law)



Compromising the integrity of a social institution, lack of informed consent, invasion of privacy

Image: http://www.visualphotos.com/image/2x3927468/jurors_in_the_jury_box

7

Milgram's Obedience Study (1963)

Obedience to authority

- Motivated by Nazi Germany's behavior
- Advertised as a learning experiment
- Higher shocks when learner makes errors
- How far would people go to obey authority?



Deception, unanticipated psychological harm

Image: http://wikis.lib.ncsu.edu/index.php/Ethical_Concerns_in_Experimental_Research

8

Zimbardo's Prison Study (1973)

Roles and attributions

- Students as prisoners or guards
- Getting into the role
- Progression of the study



Harm to subjects, lack of neutrality as a researcher

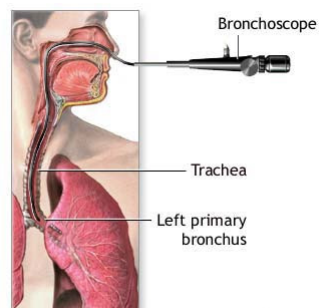
Image: <http://www.radioopensource.org/the-banality-of-evil-part-ii/>

9

Accidental death (1996)

Bronchoscopy (U Rochester - 1996)

- Participant consented to all procedures
- Excessive lidocaine used, resulted in death



*Exploiting a vulnerable population,
inadequate informed consent*

Image: <http://www.umm.edu/imagepages/9138.htm>

10

Restaurant letter study (2001)

Restaurant response to criticism

Just wanted to complain (not telling authorities)
Employees lost their job before it was exposed
Letter of apology and subsequent lawsuits



*Deception, lack of informed consent,
In infliction of emotional distress*

Image: <http://www.thefoodplace.co.uk/blog/page/4/>

11

Revisiting your rights as a participant

[Signed] informed consent
Right to participate
Compensation
Known risks and benefits
Confidentiality
Debriefing (deception or not)



Image: <http://www.blog-city.info/en/guinea-pigs-wonder.php>

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Interim lecture summary

There are several documents that detail what it means to conduct ethical research

Violations of these ethics are associated with harsh penalties, depending on the type and degree of the violation

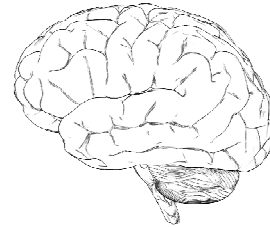
You have important rights as a participant in psychological research and your health and safety come before anything else



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Lecture 02b (09 May 2012)
Using statistics to examine our data



Gathering and analyzing psychological data

Study a subset of people (sample) to make statements about all similar individuals of interest (population)

Why only sample?

Types of populations?



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Image: <http://ir.unlv.edu/IAP/Reports/Content/At+UNLV+-+Diversity.aspx>

Employing statistics

Collection, organization and interpretation of data

Why use statistics?

Summarize and examine the data
(descriptive statistics)

Use data to make logical inferences about the population
(inferential statistics)



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Image: <http://www.theatresupply.com/AboutUs/News/cheeseday/Numbers/>

Descriptive statistics: central tendency

Mean	<i>Sample test scores for a Psych midterm</i>
Median	(a) 90 85 80 70 70
Mode	
Outliers	(b) 90 85 80 70 40

Mean of data set (a): 79%	Mean of data set (b): 73%
Median of data set (a): 80%	Median of data set (b): 80%
Mode of data set (a): 70%	Mode of data set (b): none

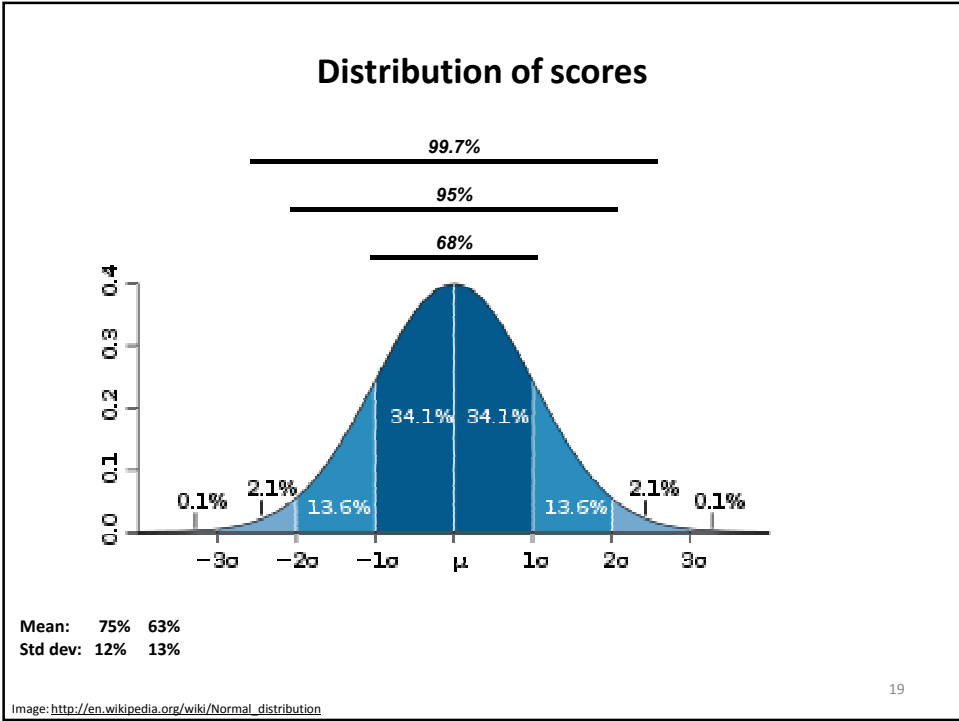
17

Descriptive statistics: variability or dispersion

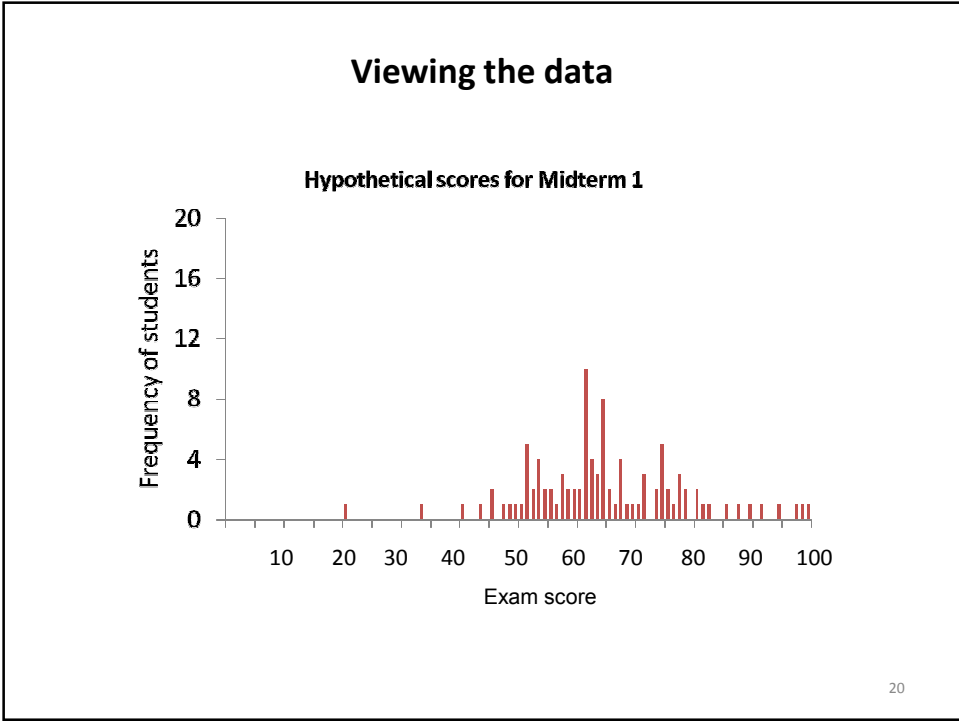
Range	<i>Sample test scores for a Psych midterm</i>
Standard deviation (std dev)	(a) 90 85 80 70 70
	(b) 90 85 80 70 40

Range of data set (a): 20%	Range of data set (b): 50%
Std dev of data set (a): 8.94%	Std dev of data set (b): 19.87%

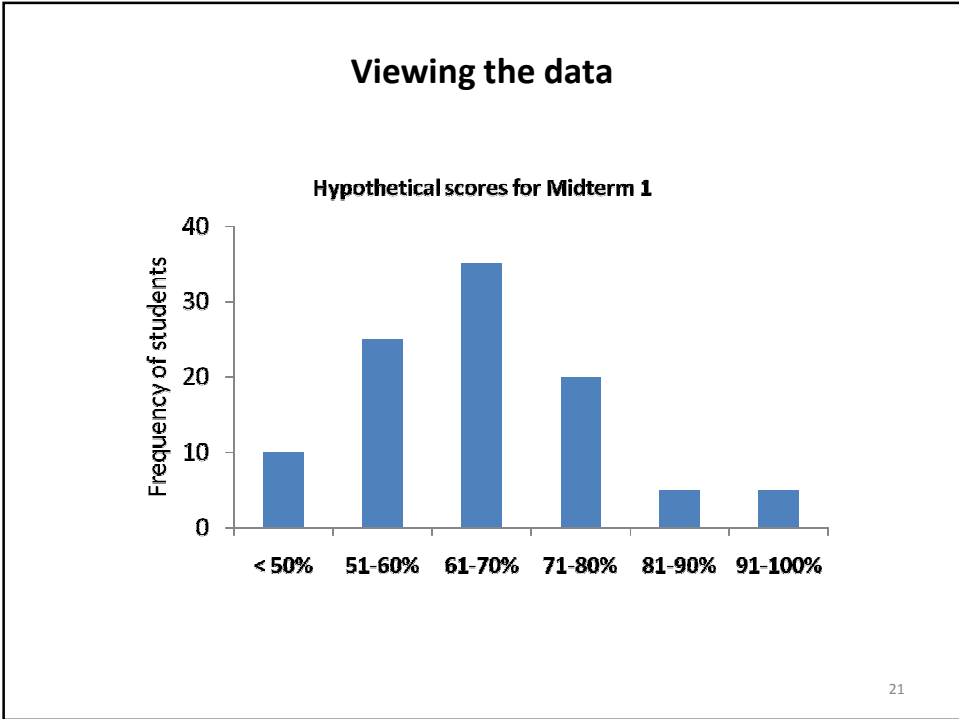
18



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20



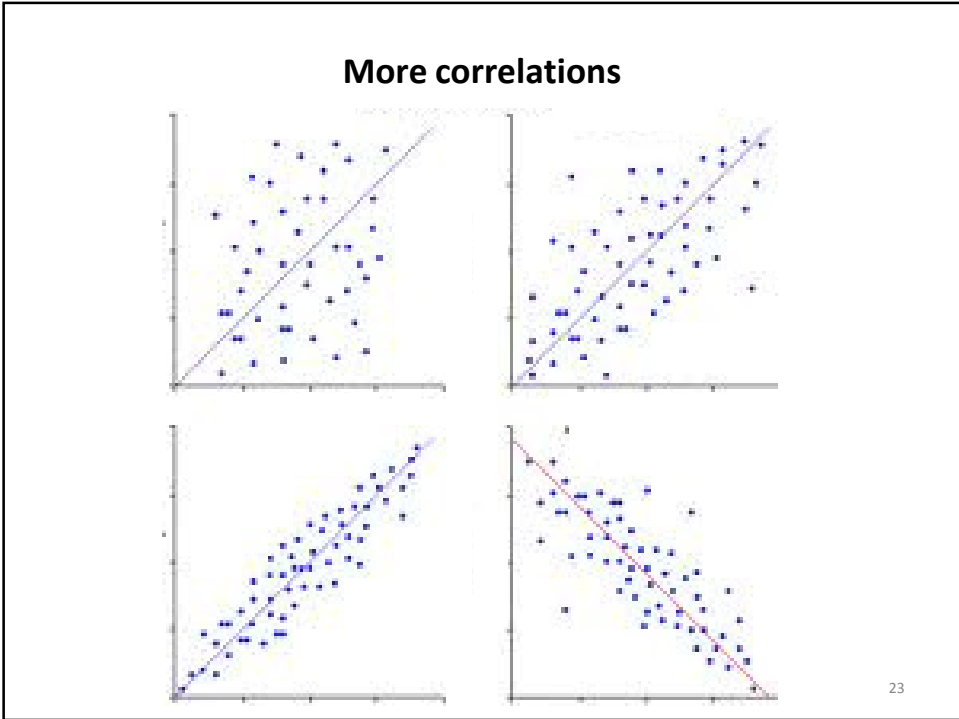
Relationship between variables of interest

Scatter plots
 Correlation coefficient (r)
 Positive, negative and none
 Range: -1.00 to +1.00 (magnitude)
 Causation

Examples of:
 Positive correlation?
 Negative correlation?
 No correlation?

How would you describe these?
 $r = 0.87$ $r = 0.12$ $r = -0.66$

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From descriptive to inferential statistics

Descriptive statistics allow us to view our data but do not allow us to examine whether there are significant differences for comparisons of interest

To determine whether there are meaningful differences in our sample, we need to use **inferential statistics**

Is this a meaningful difference?

A bar chart with 'Performance' on the vertical axis. The horizontal axis has two categories: 'Group A' and 'Group B'. Group A has a white bar with a height of approximately 7 units. Group B has a grey bar with a height of approximately 5 units. A horizontal line with a bracket above it spans the two bars, with the text 'Is this a meaningful difference?' written above it.

24

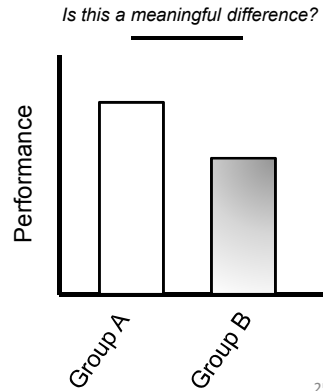
Is there a significant difference?

Key factors:

- # of people in the sample
- Variability *between* each group
- Variability *within* each group

Statistical significance

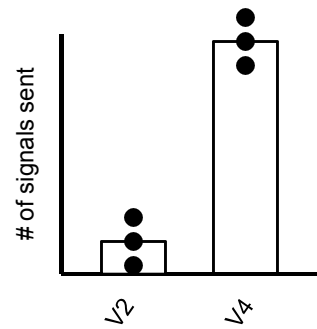
5% or less that this is just chance



Test case #1

Neuronal responsiveness to color

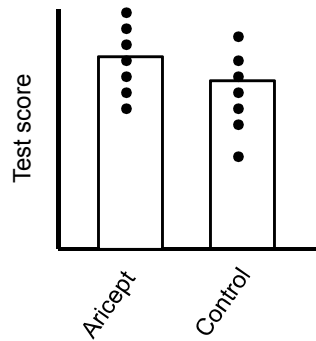
Measure the number of action potentials sent during the processing of color images in the **occipital lobe**



Test case #2

“Smart drug” and college students

Measure test scores between students taking “Aricept” and students on no drugs, controlling for everything else

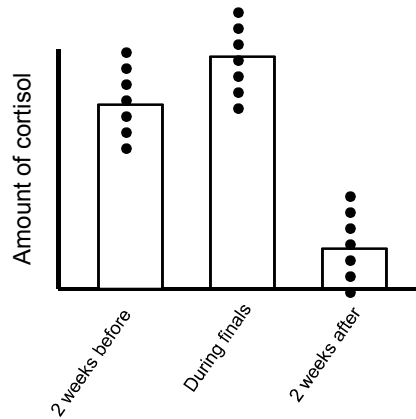


27

Test case #3

Cortisol and test performance

Measure cortisol 2 weeks before finals, during finals, and 2 weeks after finals to examine how this changes with stress



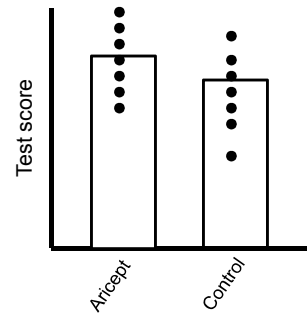
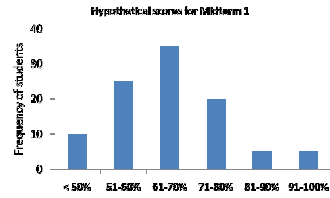
28

Interim lecture summary

Descriptive statistics help us describe how the data looks, and key instruments include measures of central tendency and dispersion

Histograms help us view our data and scatter plots and correlations help us view possible relationships between variables of interest

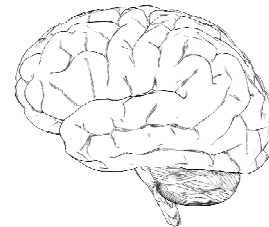
Inferential statistics help us determine whether differences between variables of interest are significant or not



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Lecture 02c (09 May 2012)
Exploring “nature” vs. “nurture”



Variability

What mechanisms contribute to variations in cognition and behaviour?

Nature

Genetic influences

Nurture

Environmental influences



Image: <http://mirandakalish.hubpages.com/hub/NatureNurture>

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Down syndrome

Dr. John Down (1866)

Trisomy 21 (1959)

Physical characteristics

Mental retardation



Image: <http://geneticpeople.com/?tag=down-syndrome>

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Huntington's disease

Dr. George Huntington (1872)

DNA base repeat on Chromosome 4
 Progressive neurodegenerative disorder
 Onset around 40, time course 10-15 years

Abnormal movements

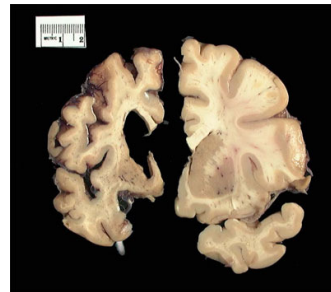
Chorea, athetosis

Behavioural changes

Depression, moody

Global cognitive impairment

Dementia



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Image: <http://neurokeptic.blogspot.com/2010/10/cannabinoids-in-huntingtons-disease.html>

Phenylketonuria (PKU)

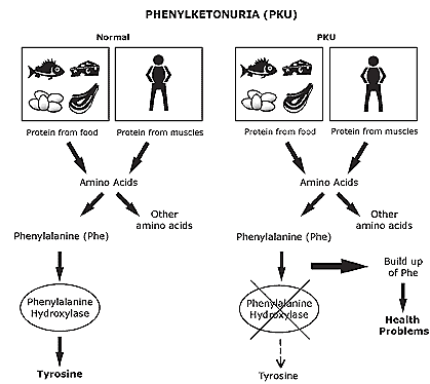
Autosomal recessive disorder

Inability to convert phenylalanine to tyrosine

Impaired brain development

Mental retardation

Seizures



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Image: <http://www.newbornscreening.info/Parents/aminoacidorders/PKU.html>

Genetic influence on behaviour: family

Intelligence Test Correlations between People with Different Relationships			
Relationship	Shared Home?	% Shared Genes	Correlation between Intelligence Test Scores (<i>r</i>)
Twins			
Identical twins (<i>n</i> = 4,672)	Yes	100%	.86
Identical twins (<i>n</i> = 93)	No	100%	.78
Fraternal twins (<i>n</i> = 5,533)	Yes	50%	.60
Parents and Children			
Parent-biological child (<i>n</i> = 8,433)	Yes	50%	.42
Parent-biological child (<i>n</i> = 720)	No	50%	.24
Nonbiological parent-adopted child (<i>n</i> = 1,491)	Yes	0%	.19
Siblings			
Biological siblings (2 parents in common) (<i>n</i> = 26,473)	Yes	50%	.47
Nonbiological siblings (no parents in common) (<i>n</i> = 714)	Yes	0%	.32
Biological siblings (2 parents in common) (<i>n</i> = 203)	No	50%	.24

Source: Plomin et al., 2001a, p. 168.

Picture: From Schacter's et al.'s *Psychology*, 1st ed

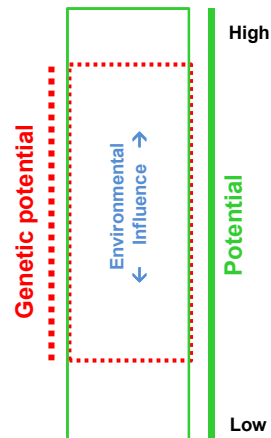
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We've seen what genes can do...

Genes influence health and behaviour

Genes may give us upper and lower boundaries for different domains

Interaction with the environment is the second piece to the puzzle of human variability



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Fetal alcohol syndrome (FAS)

Alcohol during pregnancy (teratogen)

Facial birth defects

Neurological damage

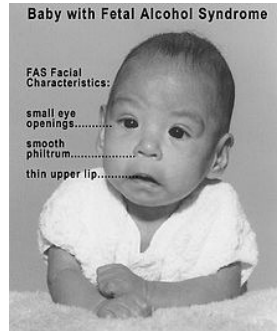


Image: <http://www.acbr.com/fas/fasmain.htm>
http://en.wikipedia.org/wiki/Fetal_alcohol_syndrome

37

The unfortunate case of Genie

Severely abused young girl
Confined until the age of 13

Poor language development
Telegraphic speech
Lack of language explosion
Right side of brain

Critical period



Picture: [http://en.wikipedia.org/wiki/Genie_\(feral_child\)](http://en.wikipedia.org/wiki/Genie_(feral_child))

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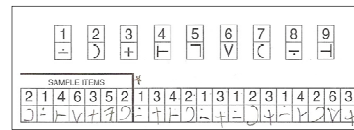
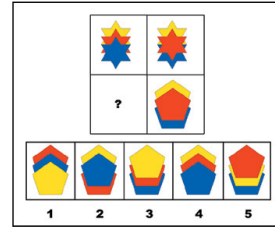
Malleability of intelligence in children with low SES

Participants

Reasoning Training ($n = 17$)
 Cognitive Speed Training ($n = 17$)
 Children attended a school with low test scores and a high proportion of students living in poverty.

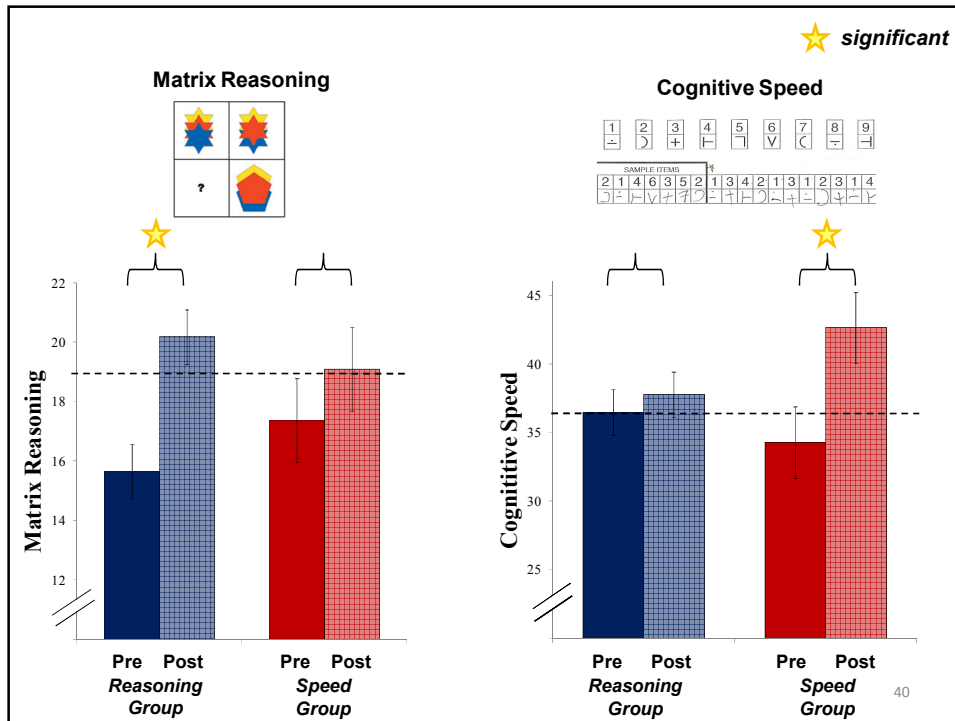
Training

Children played games for 75 minutes a day, 2 days a week for 8 weeks
 Games were off-the-shelf computer games, card games, and board games



Mackey, Hill, Stone & Bunge (2011), Dev Sci

39



Stress

Your response to stressors

- Body → physiological response
- Mind → psychological response

Characteristics of stressors

- Internal vs. external
- Positive vs. negative
- Internal vs. external locus of control



Picture: <http://www.methodsofhealing.com/statistics-on-college-student-stress/>

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Table 15.1 College Undergraduate Stress Scale

Event	Stress Rating	Event	Stress Rating
Being raped	100	Talking in front of class	72
Finding out that you are HIV positive	100	Lack of sleep	69
Being accused of rape	98	Change in housing situation (hassles, moves)	69
Death of a close friend	97	Competing or performing in public	69
Death of a close family member	96	Getting in a physical fight	66
Contracting a sexually transmitted disease (other than AIDS)	94	Difficulties with a roommate	66
Concerns about being pregnant	91	Job changes (applying, new job, work hassles)	65
Finals week	90	Declaring a major or concerns about future plans	65
Concerns about your partner being pregnant	90	A class you hate	62
Oversleeping for an exam	89	Drinking or use of drugs	61
Flunking a class	89	Confrontations with professors	60
Having a boyfriend or girlfriend cheat on you	85	Starting a new semester	58
Ending a steady dating relationship	85	Going on a first date	57
Serious illness in a close friend or family member	85	Registration	55
Financial difficulties	84	Maintaining a steady dating relationship	55
Writing a major term paper	83	Commuting to campus or work or both	54
Being caught cheating on a test	83	Peer pressures	53
Drunk driving	82	Being away from home for the first time	53
Sense of overload in school or work	82	Getting sick	52
Two exams in one day	80	Concerns about your appearance	52
Cheating on your boyfriend or girlfriend	77	Getting straight A's	51
Getting married	76	A difficult class that you love	48
Negative consequences of drinking or drug use	75	Making new friends; getting along with friends	47
Depression or crisis in your best friend	73	Fraternity or sorority rush	47
Difficulties with parents	73	Falling asleep in class	40
		Attending an athletic event	20

Source: Renner and Mackin (1998). Note: To compute your personal life change score, sum the stress ratings for all events that have happened to you in the last year.

Picture: From Schacter's et al.'s *Psychology*, 1st ed

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Physiological trigger of the stress response

HPA axis

H: Hypothalamus
P: Pituitary gland
A: Adrenal gland

Short-term vs. long-term

The diagram illustrates the HPA axis. It starts with the Hypothalamus in the brain, which releases a 'Releasing factor' to the Pituitary gland. The Pituitary gland then releases 'ACTH (through blood)' to the Adrenal gland. The Adrenal gland produces two hormones: 'Cortisol' and 'Catecholamines'.

Picture: From Schacter's et al.'s *Psychology*, 1st ed 43

Stress compromises our well-being: physical

Immune system

- Susceptibility to illness
- Slower healing

Cardiovascular health

- Hypertension
- Coronary Heart Disease
- Stroke

Fatigue

- Poor sleep
- Constantly feeling exhausted

The diagram compares two arteries. On the left is a 'Normal artery' with a wide lumen and 'Blood flow' indicated by a blue arrow. On the right is an 'Artery narrowed by atherosclerosis', where a 'Plaque' has built up on the inner wall, significantly narrowing the lumen and restricting blood flow.

© Healthwise, Incorporated

Picture: <https://myhealth.alberta.ca/health/pages/conditions.aspx?hwid=hw108781&> 44

Stress compromises our well-being: psychological

Diathesis stress model

- Schizophrenia
- Depression and bipolar disorder
- Post-traumatic stress disorder (PTSD)

Cognition

- Racing thoughts, worries
- Mind goes blank
- Overall performance

Emotions, mood

- Irritability



Picture: <http://psychscoop.wordpress.com/category/schizophrenia/>

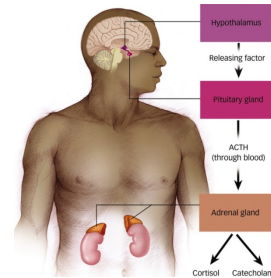
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Lecture summary

The environment plays an important role in shaping our development and poor input may result in poor output

Even intelligence is malleable and can be addressed in children with poor SES

Stress is a major environmental contributor to issues in health and well-being and solid coping strategies are key to managing stress successfully



Next lecture: Nervous system

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