INTRODUCTION OF PSYCHOLOGY APPLICATION （PSY1102）

★ Chapter 4 ★

Class One

- **Nature: Genes & DNA & Heredity**
- **Nurture: Everything else**

***** Both of them contribute who we are (interaction)

- **Genes**

- Our biological blueprint (Chromosomes [carry genetic info.], 46 = 23 pairs)

- Component, segment of DNA

- Basic unit of heredity

- Direct the production of protein

(Through 2 major steps : Transcription & Translation known as gene expression)

- Two types (active, expressed & inactive, unexpressed)

- One single gene can also produce

- But most of time we need multiple genes (gene complexes)

- **Genes are made of Nucleotides (4 of them) ： The Alphabet of life**

- A —— T G —— C

- **Chromosomes = Books**
- **Genes = Words**
- **Nucleotides = Letters**

- **Human Genome**

- 20,000 + (around 24，000 genes)
- 99.99% similar to other human beings
- Repartition of the 0.01% difference
- 5% difference among ‘races ’
- 95% difference within a ‘race’

- **Nature Genetics : 2004 - Title: Study discounts link between DNA races**

- Only 1 race exist : human race
- ‘ Race is a biologically meaningless concept’
- ‘ Standard concepts of race ought to be abandoned ’

- **Similarity to Human**

- Chimpanzee 95-98%
- Mouse 90%
- Bananas 50%

- **Evolution Psychology - Internet Definition**

- The combination of two science: evolutionary biology & cognitive psychology
- It is focused on how evolution has shaped the mind and behavior.
- It postulates that the mind is shaped by pressure to **survive** and **reproduce**.
- It is a theoretical approach to psychology that attempts to explain useful mental and psychological traits, such as memory, perception, or language - as **adaptations**, I.e, as the functional products of **natural selection**.
- It seeks to explain through **universal mechanisms of behavior** why humans act the way they do.

- **Evolutionary Psychology - Class Notes**

- Theory of Darwin

- Main goal of organisms: Survival & Transit genes to future
- Natural Selection (Survival of the fittest)

- How to apply to universal common behavior
- Traits & Characteristics & ... Adaptation

- **Application - Sexuality**

- Man & Woman (relational sex)
- Same desire but different attitude
- Man and woman have same goal (Survive & Transmit) but different biological genes

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◆ **Critique of Evolutionary Psychology**

Class Two

- **Introduction of Individual Difference**

- Difference within a group
- Difference between individuals
- Intellectually & physically & emotionally...

- **Due to genetics or environment ?**
- **Heritablility (Individual difference due to genetics)**

- **How do they determine the difference (What studies did they do?)**

- **From the Internet**

Heredity Versus Environment: Twin, Adoption, and Family Studies

Twin Studies

- Identical twins, or monozygotic twins, are siblings whose genotypes are duplicates of each other. They are most likely the best indicator of whether biology affects traits and psychopathology in human beings.
- Fraternal twins, or dizygotic twins, share exactly half their genes with each other. Fraternal twins are similar to first-degree relatives, except they are sure to share the exact same age, as do identical twins.
- Twin studies usually rely on samples of identical and fraternal twins; if biology has a greater hand than environment, then identical twins should behave or possess psychopathology similar to each other more so than fraternal twins.

Adoption Studies

- Adoption studies are important because they include two sets of factors that may account for differences in behavior, personality, and psychopathology: biological parents and environmental parents.
- The first adoption study performed on schizophrenia showed that family environment contributes little to a child's risk for a disorder such as schizophrenia.
- Another adoption study showed that a high percentage of proband adoptees, or adoptees whose birth parents had schizophrenia, also suffered from chronic schizophrenia or displayed schizophrenic-like behaviors.

Family Studies

- Family studies are mostly used to identify the degree of risk of relatives developing mental disorders that other family members suffer from. Case-control family studies are employed, including estimates of relative risk and population relative risk of a mental illness.
- These kinds of studies are most often used to determine the risk of passing down mental disorders to offspring within families. It must also be taken into consideration that these types of studies do not tangibly express outside factors.

- **Twin Studies**

- Monozy vs Dizygotic

① M: Identical Twins (One egg, one sperm - 100% genetically similar)

② D: Fraternal Twins (Two eggs, two sperms - only 50%, either same or different)

- **Identical vs Fraternal**

- Alzheimer's I: 60% (not 100% ?) F: 30%

- Divorce 5.5 1.6

- Extraversion

- Neuroticism (more about identical twins)

- **Criticism (From the internet)**

- First, identical twins aren't literally genetically identical

- MZ and DZ twins don't always have "equal environments." ...

- **Solutions**

Identical twins who rear apart (adoption, raise in different families)are more similar than Fraternal Twins who live together.

- **Final Conclusion**

- Identical twins who rears together are more similar to each other than identical twins who are apart.
- Identical twins who whether rear together or not are more similar than Fraternal twins who rear together or not.

- **Adoption Studies**

- Rationale:

Share Genes Share Environment

Biological Parents → → → **Adopted Child** → → → → → **Adopted Parents**

More Similar

Strong genetic component (Personality)

- **Family Studies (Family... Within...)**

- Regular siblings : 50%
- Parents to children : 50%
- Grandparents to grandchildren : 25%
- 1st Cousin : 25%

- **Temperament (Typical Emotional Way... Have genetic component...) Studies**

- Easy babies (40%): Cheerful, happy predictable (about when they sleep, eat...)
- Slow-to-warm babies (15%): Shy

- Difficult Babies (10%): Fussy, irritable, unpredictable

- Combination (35%): Sometimes easy, difficult and shy

* Identical Twins are more similar in temperament

- **Physiological Studies (heart machines, blood pressure machines)**

- Nurture dose play a role in temperament, we can reshape children through nurture.

- **Heritability**

? The percentage of variation within a given population that is due to heredity

- Heritability is the proportion of variance in a particular trait, in a particular population, that is due to genetic factors, as opposed to environmental influences.

- h^2 = heritability coefficient

- $h^2 = \text{Variation}_{\text{genes}} \div (\text{Variation}_{\text{genes}} + \text{Variance}_{\text{environment}})$

- h^2 varies between 0 and 1

- $h^2 = 0.0$ means no genetic influence

- $h^2 = 1.0$ means all variance due to genetic influence

- **ex.** $h^2 = o.4$ means 40% genes, 60% environment

* When environment is similar, h^2 will be higher.

* When environment is different, h^2 will be lower.

Not quite...

* Just because individual differences are heritable, it does not necessarily mean that differences between races, genders, generations are heritable.

* h^2 only applies difference within a group or between individuals, not with a group.

- **Nature & Nurture Interaction**

- Genes are self-regulating, they are not set in stone; they are flexible. Some genes

will behave differently in different (or same?) environment.

- Genome
- Epigenome (turn on/ off genes)
- Methyl groups (deactivate genes, genes do dormant)
- Acetyl groups (activate gene, express itself)

* Environment can affect M & A groups.

* Diet also affects (Ex. 2 mice, yellow big one represents M; brown small one is A)

- Epigenetics : all the factors affect gene expression without affecting DNA itself

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- **Molecular Genetics**

- Search for and identify the gene link to disease, characteristics...
- Linkage analysis

- **Relevance to psychology**

- If genes are involved, we want to know which one involves...

- **Promises and Danger (* The nurture components ?)**

- **Prenatal Development**

- Nurture long before conception happens; vulnerability of babies [birth effects]

- **Experience & Brain Development**

- Proper, essential & fundamental development; baby need loving care from parents
- Baby who raised with care has a normal, bigger brain than the one who is neglected

*** Changes:**

- we do will influence our brain, even an old brain can be stimulated and challenged to be a better one.

*** Experiment:**

- Old poor rats (deprived) & Old rich rats (enriched)
- Bigger, heavier, more neurons, more connections, better brain

- **How much blame do parents deserve? (Text book)**

- **Peer Influence**

- Infancy onward: how baby interacts with each other
- Growing interaction = Growing influence
- Peers & risk-taking behavior (Ex. Smoking, sex... Is it the selection effect?)

- **How parents influence the relationship with peers**

- Life style choices

(parents choose how children live, they decide the peers their children end up with)

- Through the advice
- Quality of parent-child influence quality of peer

* Bullies who bully other children on average are bullied by their parents at home.

* Both parents and peers effect us.

Their influence on us are both distinct & complimentary.

- **Culture (Earn a Point P148-153)**
- **The Nature and Nurture of Gender (Gender similarity & difference)**

- **The Sex Choromosomes**

- It genetically determine female or male
- x,y represents male & x, x represents female

* Even though someone is genetically female or male; however, their cells are not. To some extent, they are not match to their genders.

* Higher levels of testosterone = more masculine

- **The Role of Culture and Society**

- Gender Identity: have a strong sense (feeling of being a man or woman)

- Gender role: how we should behave, feel, understand as a male or female

- Gender typed: when we adopted the traditional role of our gender

- **Learning about Gender**

*** Social Learning Theory**

- Though modeling (observe role model & imitate them)

- Observation

(observe social world around us & pay attention what is avoided and punished)

- By ourselves (be directly punished or rewarded)

*** Gender Schema Theory**

- Children are actively organizing this (social) information into gene scheme

- Scheme: influence, belief, relief, attitude, behavior...

- Children learn about what it means to be male and female from the culture in which they live. According to this theory, children adjust their behavior to fit in with the gender norms and expectations of their culture.