



# Using twin studies in Psychology



# Areas for research:

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Personality, temperament,  
intelligence and cognitive abilities

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Schizophrenia and  
Psychosis

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Bipolar disorder, depression  
and eating disorders



# The biological basis of twinning

- Two types of twins - monozygotic (MZ) and fraternal or dizygotic (DZ).
- Monozygotic twins result when a single fertilized egg divides (Vogel & Motulsky, 1979), between 1 and 14 days following conception (Bryan, 1983). They share all of their genes in common and are, with rare exception, always of the same sex.
- Given their genetic identity, behavioural and physical differences between MZ twins are associated with differences in their environments.
- Differential environmental effects may occur at the prenatal, perinatal, and/or postnatal levels. Some examples include fetal transfusion (prenatal), order of delivery (perinatal), and accident or injury to one twin (postnatal).
- Monozygotic twins represent approximately one-third of twins born, with the MZ twinning rate of 3–4 per 1,000 maternities, remaining fairly constant across ethnic groups and geographical locations.



# The biological basis of twinning

- Dizygotic twins result when two separate eggs are fertilized by two separate sperm. Dizygotic twins (and ordinary siblings) share 50% of their genes, on average, by descent.
- The theoretical range of shared genes for same sex-pairs is 0%–100%, but a more realistic range is 25%–75% (Pakstis, Scarr-Salapatek, Elston, & Siervogel, 1972).
- Dizygotic twinning represents approximately two-thirds of twins born; one-third of all twins are DZ same-sex pairs and one third of all twins are DZ opposite-sex pairs.
- The DZ twinning rate is lowest among Oriental populations (approximately 2 per 1,000 births), intermediate among Caucasian populations (8 per 1,000 births), and highest among Black populations (as high as 57 per 1,000 births in parts of Nigeria) (Bulmer, 1970).



# Factors responsible for twinning

- ▶ The biological bases of MZ twinning are not well understood, although it is believed to occur randomly. Recent evidence suggests that MZ twins resulting from delayed zygotic splitting represent hereditary transmission (Parisi, Gatti, Prinzi, & Caperna 1983).
- ▶ Delayed splitting of the zygote has been associated with “mirror-imaging” of selected physical traits among approximately 25% of MZ twin pairs (Springer & Deutsch, 1985). This may partly explain the increased incidence of left-handedness among twins, as compared with non twins (20% versus 12%).
- ▶ A variety of factors have been associated with DZ twinning, including advanced maternal age, increased maternal height and weight, use of fertility drugs and contraceptives, social class membership, birth order, conceptions occurring after periods of sexual abstinence, and nutritional supply (Elwood, 1985).
- ▶ Ethnic differences in the DZ twinning rate have been associated with differences in many of these characteristics. The tendency toward DZ twinning may be genetically mediated, although the precise mode of transmission has not been established.

# Twin Research Designs

- 10 methods have been used -
- 1. Classic Twin Study: MZ and DZ Twins Reared Together
- 2. Co-twin Control Studies
- 3. Singleton Twins
- 4. Dizygotic twin designs
- 5. Longitudinal twin studies
- 6. Twin-family designs
- 7. Twins as couples
- 8. Twins and non-twins
- 9. Partially reared apart twins
- 10. Twins reared apart





# Biases in twin studies

## ► Social biases

- Individuals respond to the physical identity of MZ twins by encouraging, or creating, identical environments. DZ twins, in contrast, would experience less similar environments as they are not identical in appearance (Farber 1981)

## ► Primary biases

- Primary biases refer to the “prenatal and natal environmental factors in twin studies. These factors (which mainly affect MZ twinpairs) include birth events and mutual circulation in utero.

## ► Recruitment biases

- In studies using adult same-sex twins, approximately two-thirds of volunteer twin pairs are female and two-thirds are MZ (Lykken, McGue, & Tellegen, 1987). An excess of MZ twin pairs has also been found in research using twin children, in which families were contacted primarily through twins clubs and personal referrals (Segal, 1985).
- Such recruitment bias suggests that available male and DZ twin pairs may show reduced within-pair differences on some characteristics.

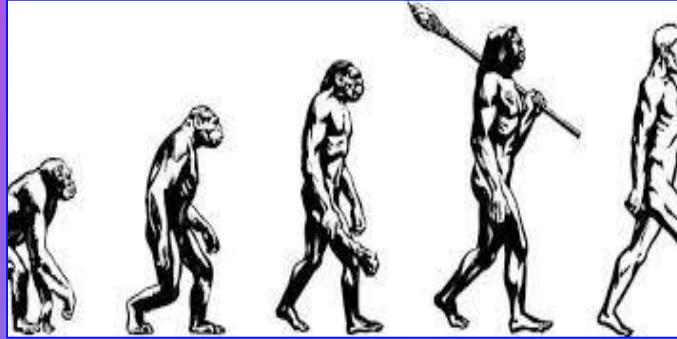
# Your task:

- Select a twin study from the folder
- Skim read the introductory section/literature review, the method section and the discussion/conclusion
- Present your findings to the rest of your class.



## RELATIONSHIPS

SEXUAL SELECTION &  
HUMAN REPRODUCTIVE  
BEHAVIOUR



# Evolutionary influences on behaviour

# Charles Darwin and Evolution

- What do you know about Evolution?
  - Have you come across it before?
  - Do you think human behaviour has evolved?
  - How would we know?
  - Evolution is the change of a species over time





# Natural Selection

- Darwin's theory of natural selection is based on three main assumptions:
  - 1. Only a small proportion of each generation survives to reproduce
  - 2. Offspring are not identical to their parents, and so each generation has a degree of variation, and that at least some of this variation is heritable and passed on through the genes
  - 3. Some characteristics give the animal an advantage over others in the ability to survive and reproduce
  - Characteristics which give the animal a greater chance of survival and reproduction are adaptive



## Some examples:

- ▶ Snakes and spiders are poisonous and can kill with one bite. People who are predisposed to avoid these animals are less likely to get bitten and die, they will therefore survive longer, and be more likely to reproduce, passing these genes on to their offspring. This is termed **biological preparedness**.
- ▶ How can Altruism be adaptive? **Genetic self-favouritism**. Hamilton (1963) proposed that altruism evolves when two people are close to one another and the costs to the donor are little whilst the benefits to the recipient are high
- ▶ In practically every culture in the world, men prefer young rather than old women, women with wide hips and narrow waists, and women with full lips and large eyes. What could be the evolutionary explanation for this?
- ▶ Full lips and large eyes are signs of youth. Younger women are more fertile. Men who have sex with young women are more likely to produce offspring. Narrow waists and wide hips are also signs of fertility and health. This is **Sexual Selection**

# Your task:

- Select an evolutionary study from the folder
- Skim read the introductory section/literature review, the method section and the discussion/conclusion
- Present your findings to the rest of your class.

