

The knowledge acquisition problem

- How does knowledge get into our heads?
- *Nativism*: concepts are innate.
- *Empiricism*: knowledge is acquired through experience.
- The *nature-nurture debate* argues over the relative contribution of genetics and experience to any given trait.



Autism

- For a long time, it was considered environmental: Bettelheim: “frigidaire mom” hypothesis
 - Now: 100% genetic, with complex inheritance
 - Rate among identical twins: 0.8- 0.95
 - Rate among fraternal twins: 0.05- 0.1
 - Base rate: about 0.003 (1 in 300)
- > siblings of autistic children have 15-30 times higher risk of autism

New developments in genetics

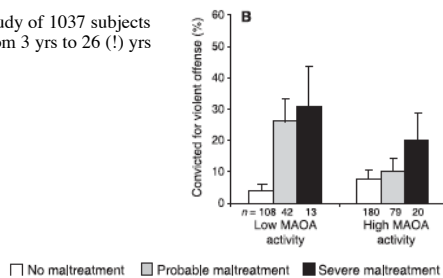
- Simple gene-behavior mappings
 - “Scientists have found the genetic bases of homosexuality”
 - “Alcoholism is based in genetics”
- Though very popular in the media, this view is largely considered to be **WRONG!**
- Most phenotypical traits are the result of **BOTH** genotype **AND** environment:
 - Fixed number and sequence of genes, BUT
 - Gene **EXPRESSION** can be modified by the environment

Example: antisocial behavior

- Caspi et al., 2002, *Science*
Effect of maltreatment in childhood depends on genetic factors
 - Low levels of promoter of the monoamine oxidase A (MAOA) gene **AND** maltreated -> more than average antisocial behavior
 - Low level of MAOA promoter **AND NOT** maltreated -> less than average antisocial behavior
- Gene-environment **INTERACTION**

Caspi et al., 2002

- Study of 1037 subjects from 3 yrs to 26 (!) yrs



Developmental science

- Psychology, neurobiology, genetics, computer modeling
- Lifespan development (instead of just birth - adolescence)

Classic view

- Infants' world is a "blooming, buzzing confusion" (William James, 1890)
- Piaget (1954): young infant's experiences of the world are fleeting:
 - infants do not have object permanence until the second year of life ("out of sight, out of mind")
 - infants do not have any criteria for deciding whether an object seen on one occasion is the same as or distinct from an object seen on a different occasion

