Exceptionally inhibited and fearful 2yos often are still relatively shy as 8yos; about half will become introverted adolescents.
The most emotionally intense preschoolers tend to be relatively intense young adults:
   - Emotionally reactive and impulsive 3yos developed into somewhat more impulsive, aggressive, and conflict-prone 21yos.

- The genetic effect appears in physiological differences:
  - Anxious, inhibited infants have high and variable heart rates and a reactive nervous system.
  - Our biologically rooted temperament helps form our enduring personality.

4.1.4 The New Frontier: Molecular Genetics
- **Molecular genetics** The subfield of biology that studies the molecular structure and function of genes.
  - Seeks to identify specific genes influencing behavior.
- Most human traits are influenced by teams of genes.
- A goal of *molecular behavior genetics* is to find some of the many genes that together orchestrate traits such as body weight, sexual orientation, and extraversion.
- Genetic tests can now reveal at-risk populations for many dozens of diseases:
  - Molecular geneticists find families that have had the disorder across several generations.
  - “The most powerful potential for DNA is to predict risk so that steps can be taken to prevent problems before they happen.”

4.1.5 Heritability
- **Heritability** The proportion of variation among individuals that we can attribute to genes. The heritability of a trait may vary, depending on the range of populations and environments studied.
- We can never say what percentage of an individual’s personality or intelligence is inherited:
  - It makes no sense to say that your personality is due x percent to your heredity and y percent to your environment.
  - Heritability refers to the extent to which differences among people are attributable to genes.
- Heritability can vary from study to study.
- As environments become more similar, heredity as a source of differences necessarily becomes more important:
  - If all schools were of uniform quality, all families equally loving, and all neighborhoods equally healthy, then heritability would *increase* (because differences due to environment would *decrease*).
  - If all people had similar heredities but were raised in drastically different environments, heritability would be much lower.
- Heritable individual differences need not imply heritable group differences:
  - B/c different environments.
The window on language learning closes gradually in early childhood

- Later-than-usual exposure to language (2yo or 3yo) unleashes the idle language capacity of a child’s brain, producing a rush of language
- By about 7yo, those who have not been exposed to either a spoken or a signed language gradually lose their ability to master any language

9.2.3 The Brain and Language

- **Aphasia** Impairment of language, usually caused by left-hemisphere damage either to Broca’s area (impairing speaking) or to Wernicke’s area (impairing understanding)
- Broca’s area processes language through a series of neural computations
- Language functions are distributed across other brain areas
- Different neural networks also enable one’s native language and a second language learned later in life
- Jokes that play on meaning are processed in a different brain area than jokes that play on words
- In processing language, as in other forms of information processing, the brain operates by dividing its mental functions—speaking, perceiving, thinking, remembering—into subfunctions.
  - “Your conscious experience of reading this page seems indivisible, but your brain is computing each word’s form, sound, and meaning using different neural networks.”

9.2.4 Do Other Species Have Language?

- Animals show impressive comprehension and communication
- Humans alone possess language (language meaning verbal or signed expression of complex grammar)
  - Apes a capable of language, is language is defined as an ability to communicate through a meaningful sequence of symbols
- Studies of animal language and thinking have moved psychologists toward a greater appreciation of other species, not only for the traits we share w/ them but also for their own remarkable abilities
  - Other species exhibit insight, show family loyalty, communicate w/ one another, care for one another, and transmit cultural patterns across generations

9.3 Thinking and Language

9.3.1 Language Influences Thinking

- Linguist Benjamin Whorf contended that language determines the way we think
  - “Language itself shapes a person’s basic ideas”
- **Linguistic determinism** Whorf’s hypothesis that language determines the way we think
  - Very extreme
- **Attachment** An emotional tie w/ another person; shown in young children by their seeking closeness to the caregiver and showing distress on separation
  - Powerful survival impulse

- **Body contact**
  - (Harlow) Bred monkeys for their learning studies
    - Separated them from their mothers, gave them cheesecloth blankets
    - When their blankets were taken to be laundered, the monkeys became distressed
    - This intense attachment to the blanket contradicted the idea that attachment derives from an association w/ nourishment
  - (Harlow) Raised monkeys with both a wire frame that had milk, and a wire frame covered in a comfy cloth
    - Like other infants clinging to their live mothers, the monkey babies would cling to their cloth mothers when anxious
    - Researchers soon learned that other qualities—rocking, warmth, and feeding—made the cloth mother even more appealing
  - Human infants become attached to parents who are soft, warm, who rock, feed, and pat
  - Much parent-infant emotional communication occurs via touch
    - Can be either soothing (snuggles) or arousing (tickles)
  - Human attachment also consists of one person providing another w/ a secure base from which to explore and a safe haven when distressed
  - As we mature, our secure base and safe haven shift