Time-lapse MRI images of human-brain development between ages five and 20 show the growth and then gradual loss of gray matter, which consists of cells that process information. (Red areas contain more gray matter, blue areas less.) Paradoxically, the thinning of gray matter that starts around puberty corresponds to increasing cognitive abilities. This probably reflects improved neural organization, as the brain parets redundant connections and benefits from increases in the white matter that helps brain cells communicate.
Piagetian Perspective

- Fixed sequence of qualitatively different stages
- Fundamentally different than child thinking
- Utilized in variety of settings and situations
  - Incorporates new, more advanced, and more adaptive form of reasoning
  - Occurs when biological readiness and increasingly complex environmental demands create cognitive disequilibrium

Piagetian Stages Related to Youth Development

Concrete operations
- 6-11 years
- Mastery of logic
- Development of rational thinking

Formal operations
- 11+ years
- Development of abstract and hypothetical reasoning
- Development of propositional logic
Developmental of Formal Operations

- **Emergent**
  - Early adolescence
  - Variable usage depends on conditions surrounding assessment

- **Established**
  - Late adolescence
  - Consolidated and integrated into general approach to reasoning

Piaget…Pros and Cons

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>• Catalyst for much research</td>
<td>• Fails to prove</td>
</tr>
<tr>
<td>• Accounts for many changes observed during adolescence</td>
<td>- Stage-like fashion of cognition</td>
</tr>
<tr>
<td>• Helps explain</td>
<td>- FO is adolescent cognitive stage</td>
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<tr>
<td>- Developmental differences</td>
<td>• Fails to account for variability</td>
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<tr>
<td>- Multidimensionality</td>
<td>- Between children</td>
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<tr>
<td>- Metacognition</td>
<td>- Within child</td>
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<td>- Within specific situations</td>
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</tbody>
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Information Processing View

- Study of cognitive development in component processes
- Incorporates same techniques to understanding human reasoning that computer scientists employ in writing programs

Changes in Information Processing

- Gains during adolescence help to explain developmental differences in abstract, multidimensional, and hypothetical thinking
Changes

*Include five basic areas:*

- Attention
- Memory
- Information processing speed
- Organizational strategies
- Metacognition

Thinking about Thinking…

Metacognition improves during adolescence

- Thinks about own thoughts \(\rightarrow\) self-consciousness
- Monitors own learning processes more efficiently
- Paces own studying
Adolescent Egocentrism

- Imaginary audience
  - *Belief that one is center of everyone else’s concern and attention*

- Personal fables
  - *Egocentric belief that one’s experiences are unique*

- Assessment methodology
  - May be right about existence of adolescent egocentrism but wrong about underlying processes

School Performance
True or False?

Grades awarded to high school students have shifted upward in the last decade.

True

• The mean grade point average for college-bound seniors was 3.3 (out of a scale of 4), compared with 3.1 a decade ago. More than 40 percent of seniors reported average grades of A+, A, or A- (College Board, 2005).

• Independent measures of achievement, such as SAT scores, have not risen. Consequently, a more likely explanation for the higher grades is the phenomenon of grade inflation. According to this view, it is not that students have changed. Instead, instructors have become more lenient awarding higher grades for the same performance.

What consequences does this have (potentially) for college-bound students?
Socioeconomic Status and School Performance

*Individual Differences in Achievement*

- Children living in poverty lack many advantages
- Later school success builds heavily on basic skills presumably learned or not learned early in school

How do adolescents connect using technology?

- E-mails
- Instant messages (IMs)
- Web logs (blogs)
- Websites
- Chat rooms
- Cell phones
- Camcorders
Cyberspace: Adolescents Online

- E-mail
- Instant messaging
- Online games
- Schoolwork
- Chat rooms
- Product research
- Educational activities
- Youth portals
- Watching films and entertainment
- Research on college or jobs
- Shopping
- None of the above

The Downside of Click

- Objectionable material available
- Growing problem of Internet gambling
- Safety
- Digital divide
  - Poorer adolescents and members of minority groups have less access to computers than more affluent adolescents and members of socially-advantaged groups—a phenomenon known as the digital divide.