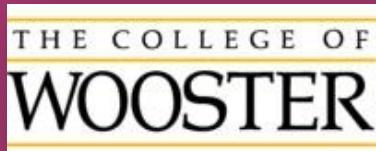


Chapter 5

Developing Through the Life Span

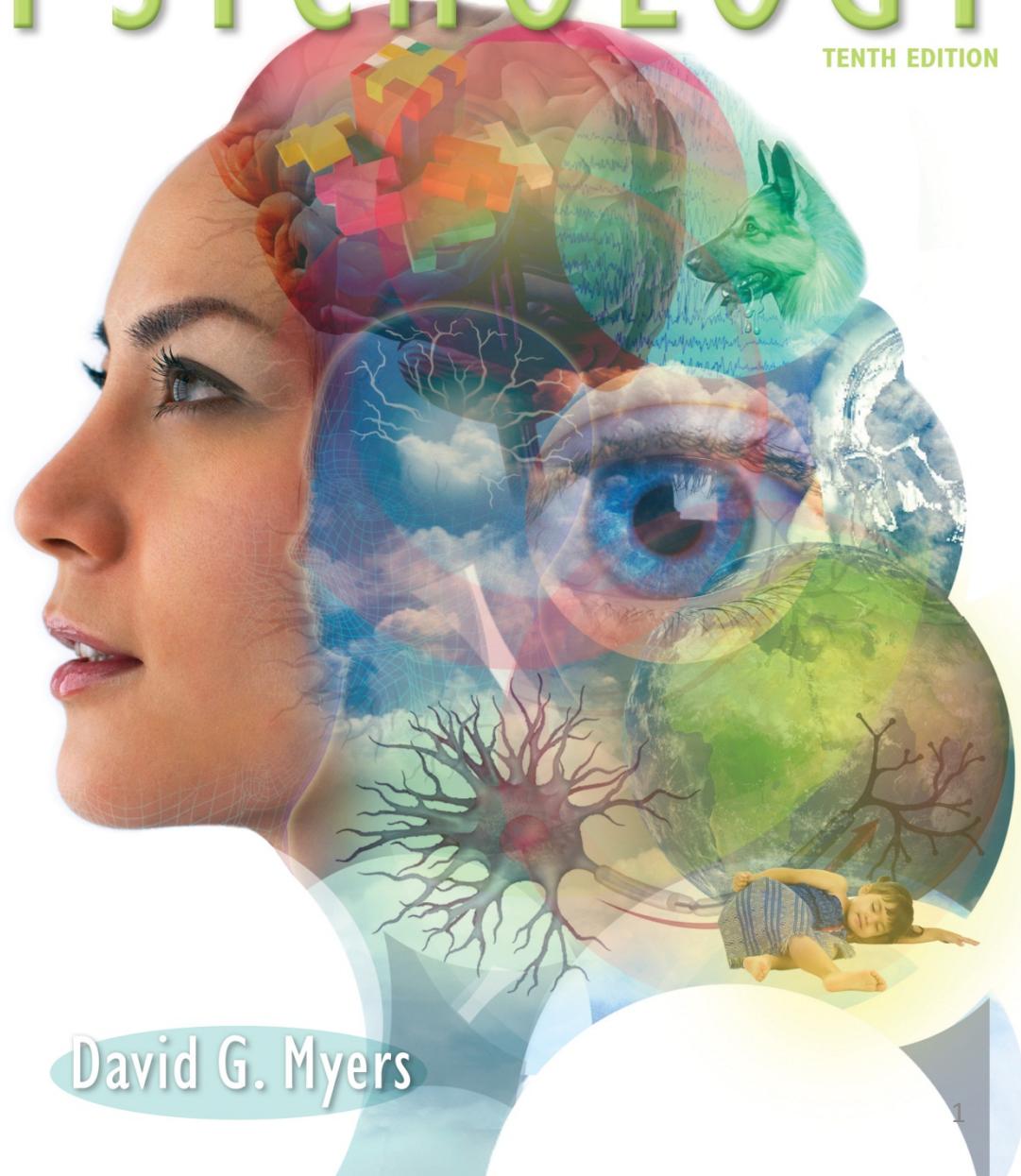
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PSYCHOLOGY

TENTH EDITION



David G. Myers

Topics in This Chapter

Issues to keep in mind:

- nature and nurture
- continuity and stages
- stability and change

Stages/ages covered:

- from conception to old age

Types of development:

- physical
- cognitive
- social/emotional



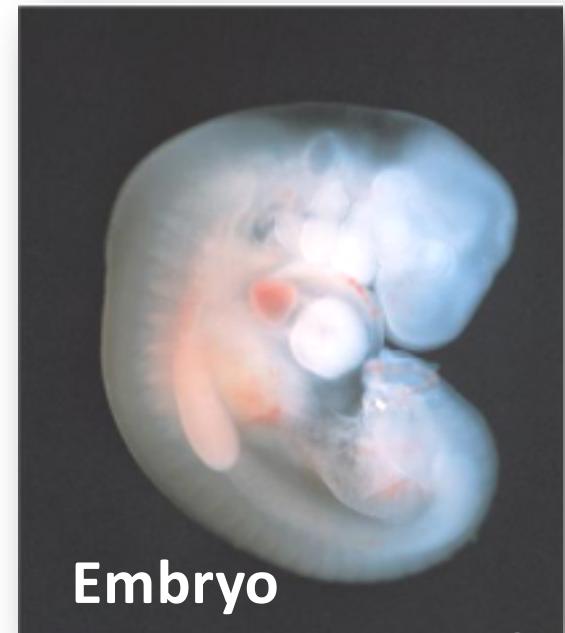
Prenatal Development

The Zygote Stage: First 10 to 14 Days

- After the nuclei of the egg and sperm fuse, the cell divides in 2, 4, 8, 16, 100, 1000...
- Milestone of the zygote stage: cells begin to **differentiate** into specialized locations and structures

Implantation: The Embryo, 2 to 8 weeks

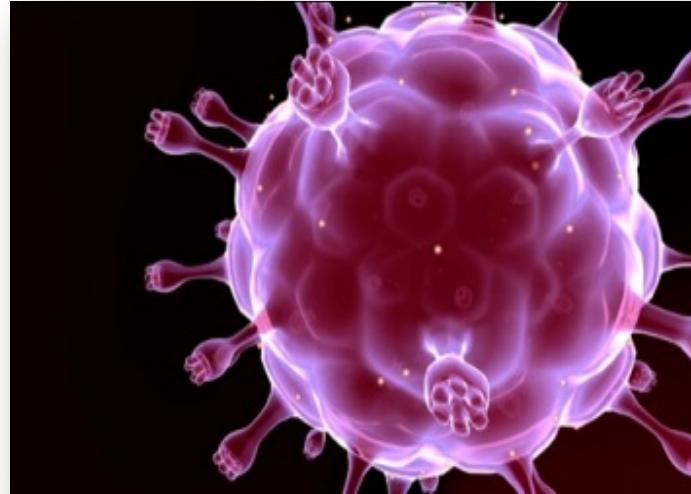
- This stage begins with the multicellular cluster that **implants** in the uterine wall.
- Milestone of the implantation stage: differentiated cells develop into organs and bones



Fetal Life: The Dangers

Dangers

- **Teratogens** (“monster makers”) are substances such as viruses and chemicals that can damage the developing embryo or fetus.
- **Fetal Alcohol Syndrome (FAS)** refers to cognitive, behavioral, and body/brain structure abnormalities caused by exposure to alcohol in the fetal stage.

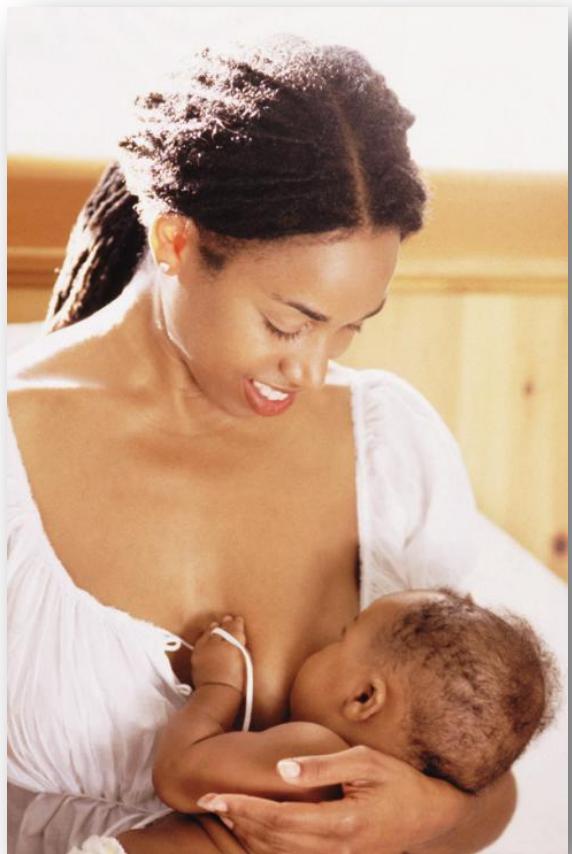


Fetal life: Responding to Sounds

- Fetuses in the womb can respond to sounds.
- Fetuses can learn to recognize and adapt to sounds that they previously heard only in the womb.
- Fetuses can habituate to annoying sounds, becoming less agitated with repeated exposure.



The Competent Newborn



Inborn Skills

Reflexes are *responses that are inborn and do not have to be learned.*

Newborns have reflexes to ensure that they will be fed.

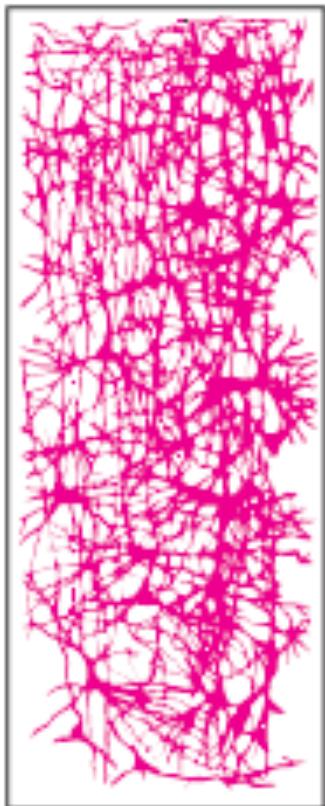
- **The rooting reflex--when something touches a newborn's cheek, the infant turns toward that side with an open mouth.**
- **The sucking reflex** can be triggered by a fingertip.
- **Crying when hungry** is the newborn talent of using just the right sounds to motivate parents to end the noise and feed the baby.

More Inborn Abilities

- Newborns (one hour old!) will look twice as long at the image on the left.
- What can we conclude from this behavior?



Brain Development: Building and Connecting Neurons



15 months

- In the **womb**, the *number* of neurons grows by about 750,000 new cells per minute in the middle trimester.
- Beginning at **birth**, the *connections* among neurons proliferate. As we learn, we form more branches and more neural networks.
- In **infancy**, the growth in neural connections takes place initially in the less complex parts of the brain (the brainstem and limbic system), as well as the *motor and sensory strips*.
 - This enables body functions and basic survival skills.
- In early **childhood**, neural connections proliferate in the *association areas*.
 - This enables advancements in controlling attention and behavior (frontal lobes) and also in thinking, memory, and language.

Motor Development

- Maturation takes place in the body and cerebellum enabling the sequence below.
- Physical training generally cannot change the timing.



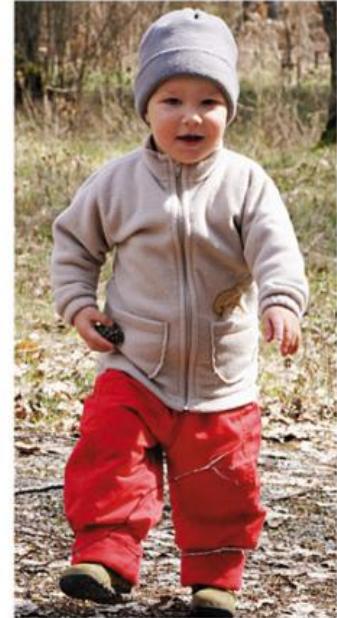
**Sitting
unsupported
6 months**



**Crawling
8-9 months**



**Begining
to walk
12 months**



**Walking
Independently
15 months⁹**

Baby Memory

Infantile Amnesia

- In infancy, the brain forms memories so differently from the episodic memory of adulthood that most people cannot really recall memories from the first three years of life.
- A birthday party when turning three might be a person's first memory.



Learning Skills

- Infants can learn skills (procedural memories).
- This three month old can learn, and recall a month later, that specific foot movements move specific mobiles.

Cognitive Development

Cognition refers to the mental activities that help us function, including:

- problem-solving.
- figuring out how the world works.
- developing models and concepts.
- storing and retrieving knowledge.
- understanding and using language.
- using self-talk and inner thoughts.

Cognitive Development: Jean Piaget (1896-1980)

- We don't start out being able to think like adults.
- Jean Piaget studied the errors in cognition made by children in order to understand in what ways they think differently than adults.

The error below is an inability to understand scale (relative size).



Sliding a miniature slide

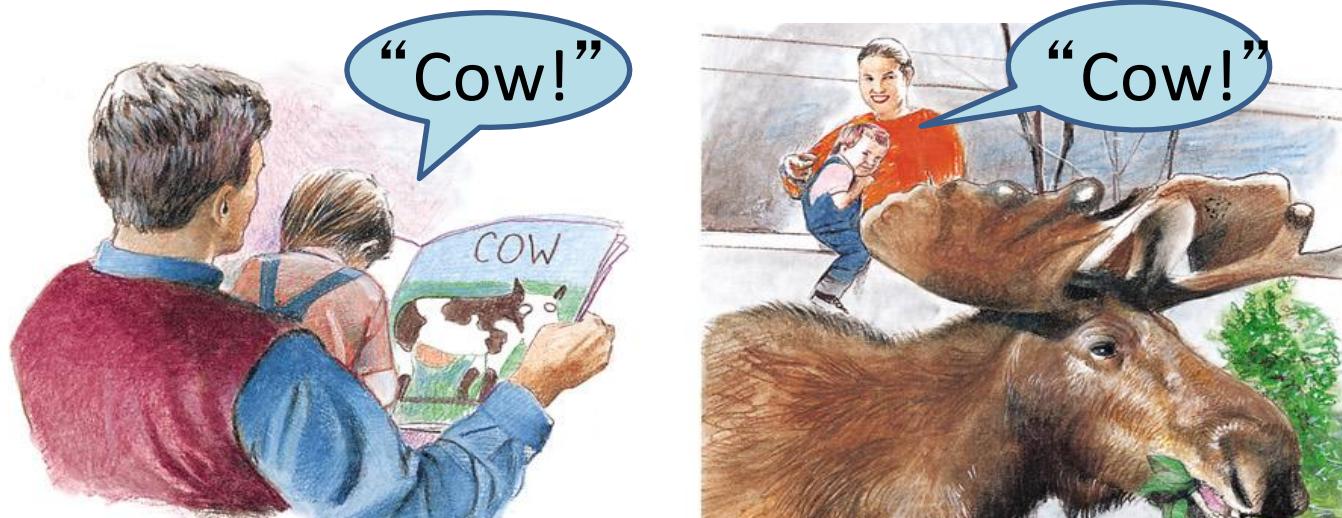


Trying to sit in a miniature car

Jean Piaget and Cognitive Development: Schemas

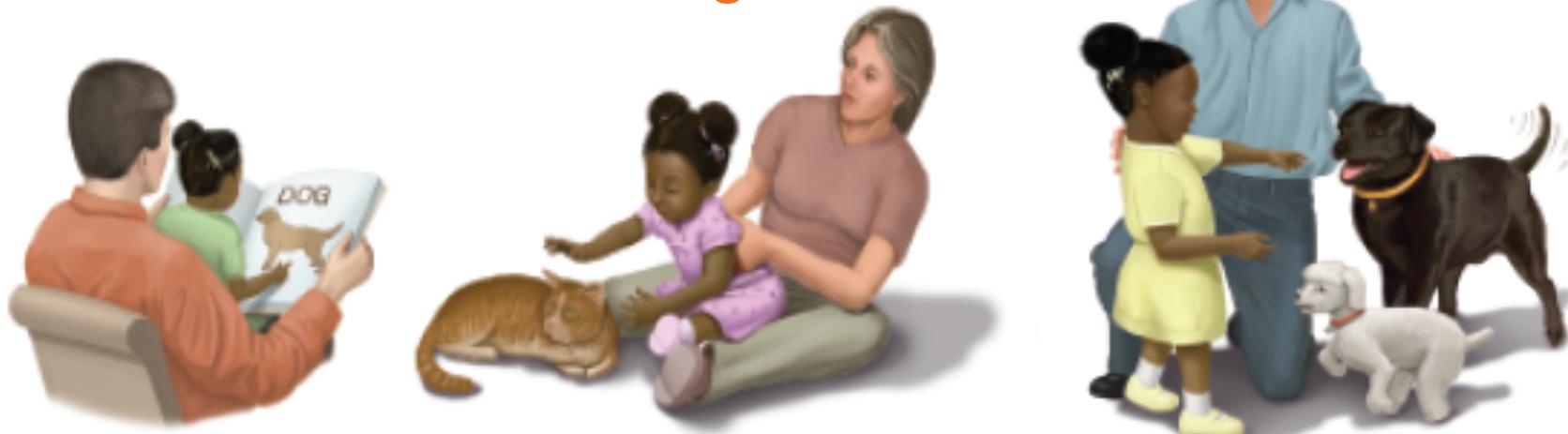
- An infant's mind works hard to make sense of our experiences in the world.
- An early tool to organize those experiences is a **schema**, a *mental container we build to hold our experiences*.
- Schemas can take the form of images, models, and/or concepts.

This child has formed a schema called “COW” which he uses to think about animals of a certain shape and size.



Jean Piaget and Cognitive Development: Assimilation and Accommodation

How can this girl use her “dog” schema when encountering a cat?



- She can **assimilate** the experience into her schema by referring to the cat as a “dog”
or
- she can **accommodate** her animal schema by separating the cat, and even different types of dogs, into separate schemas.

Jean Piaget's Stages of Cognitive Development

Typical Age Range	Description of Stage	Developmental Phenomena
Birth to nearly 2 years	<i>Sensorimotor</i> Experiencing the world through senses and actions (looking, hearing, touching, mouthing, and grasping)	<ul style="list-style-type: none">Object permanenceStranger anxiety
About 2 to about 6 or 7 years	<i>Preoperational</i> Representing things with words and images; using intuitive rather than logical reasoning	<ul style="list-style-type: none">Pretend playEgocentrism
About 7 to 11 years	<i>Concrete operational</i> Thinking logically about concrete events; grasping concrete analogies and performing arithmetical operations	<ul style="list-style-type: none">ConservationMathematical transformations
About 12 through adulthood	<i>Formal operational</i> Abstract reasoning	<ul style="list-style-type: none">Abstract logicPotential for mature moral reasoning

Sensorimotor Stage (From Birth to Age 2)

In the sensorimotor stage, children explore by looking, hearing, touching, mouthing, and grasping.

Cool cognitive trick learned at 6 to 8 months, coming up next:
object permanence.



There's a game
I've learned to
play all by myself:
peekaboo!

Object Permanence

Through games like “peekaboo,” kids learn **object permanence**--the idea that objects exist even when they can’t be seen.



Can Children Think Abstractly?



Jean Piaget felt that kids in the sensorimotor stage did not think abstractly.

Yet there is some evidence that kids in this stage can notice violations in physics (such as gravity).

Does that mean babies are doing physics?



Is This Math?

If so, kids in the “sensorimotor” stage do math.

Babies stare longer and with surprise
when numbers don’t make sense.

Is this math? Was Jean Piaget wrong?



What can kids do in the preoperational stage?

1. Represent their schema, and even some feelings, with words and images.
2. Use visual models to represent other places, and perform pretend play.
3. Picture other points of view, replacing egocentrism with theory of mind.
4. Use intuition, but not logic and abstraction yet.



Egocentrism: “I am the World.”

What mistake is the boy making?

Do you
have a
brother?

Does Jim
have a
brother?

Yes.
Jim.

No.



How does this relate to
our definition of
egocentrism?

Maturing beyond Egocentrism: Developing a “Theory of Mind”

Theory of mind refers to the ability to understand that others have their own thoughts and perspective.

With a theory of mind, you can picture that Sally will have the wrong idea about where the ball is.



Examples of Operations that Preoperational Children Cannot Do...Yet

Conservation refers to the ability to understand that a quantity is **conserved** (does not change) even when it is arranged in a different shape.



Which row has more mice?



The Concrete Operational Stage

- begins at ages 6-7 (first grade) to age 11
- children now grasp conservation and other concrete transformations
- they also understand simple mathematical transformations the reversibility of operations (reversing $3 + 7 = 10$ to figure out that $10 - 7 = 3$).

Formal Operational Stage (Age 11 +)

Concrete operations include analogies such as “My brain is like a computer.”

Includes arithmetic transformations:
if $4 + 8 = 12$, $12 - 4 = ?$

Formal operations includes allegorical thinking such as “People who live in glass houses shouldn’t throw stones” (understanding that this is a comment on hypocrisy).

Includes algebra:
if $x = 3y$ and $x - 2y = 4$, what is x ?

Reassessment of Jean Piaget's Theory

Using Models: Symbolic Thinking?

Three-year-olds can use a tiny model of a room as a map, helping them to picture the location of objects in a full-sized room.

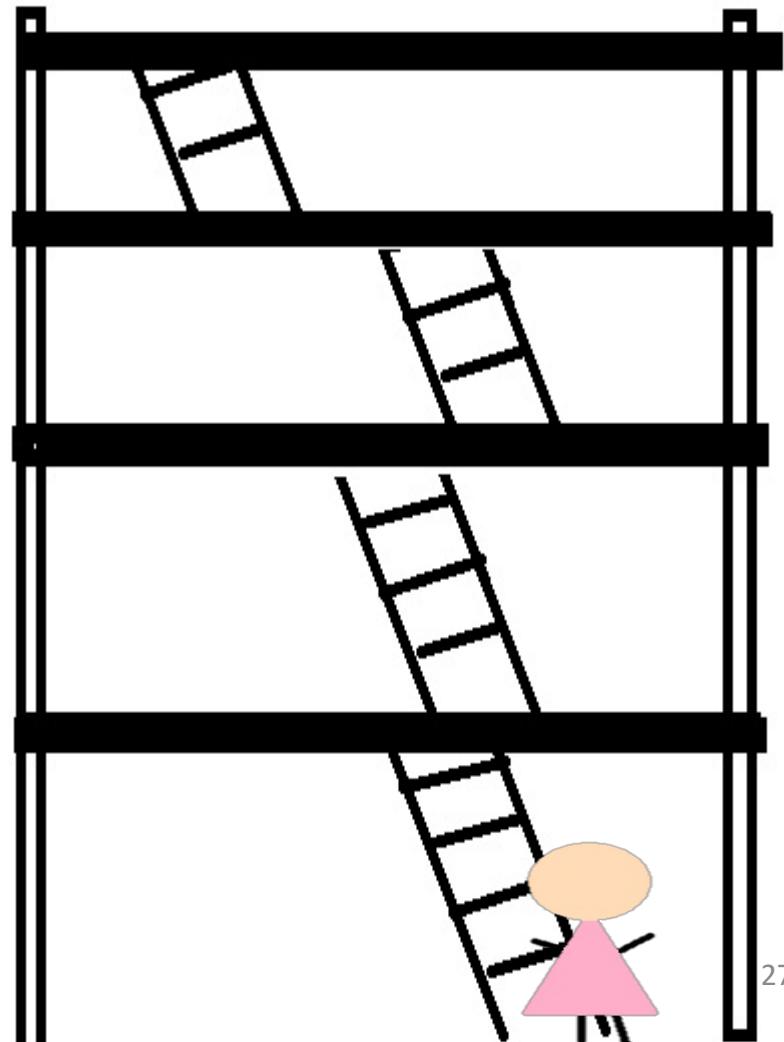
- Does this 3-year-old ability mean that Piaget was wrong? Do kids use symbolic thought much earlier than he suggested?

Although Jean Piaget's observation and stage theory are useful, today's researchers believe:

1. development is a continuous process.
2. children show some mental abilities and operations at an earlier age than Piaget thought.
3. formal logic is a smaller part of cognition, even for adults, than Piaget believed.

Lev Vygotsky: Alternative to Jean Piaget

- Lev Vygotsky (1896-1934) studied kids too, but focused on how they learn *in the context of social communication.*
- Principle: children learn thinking skills by *internalizing language from others* and developing inner speech: “Put the big blocks on the bottom, not the top...”
- Vygotsky saw development as building on a **scaffold** of mentoring, language, and **cognitive support** from parents and others.



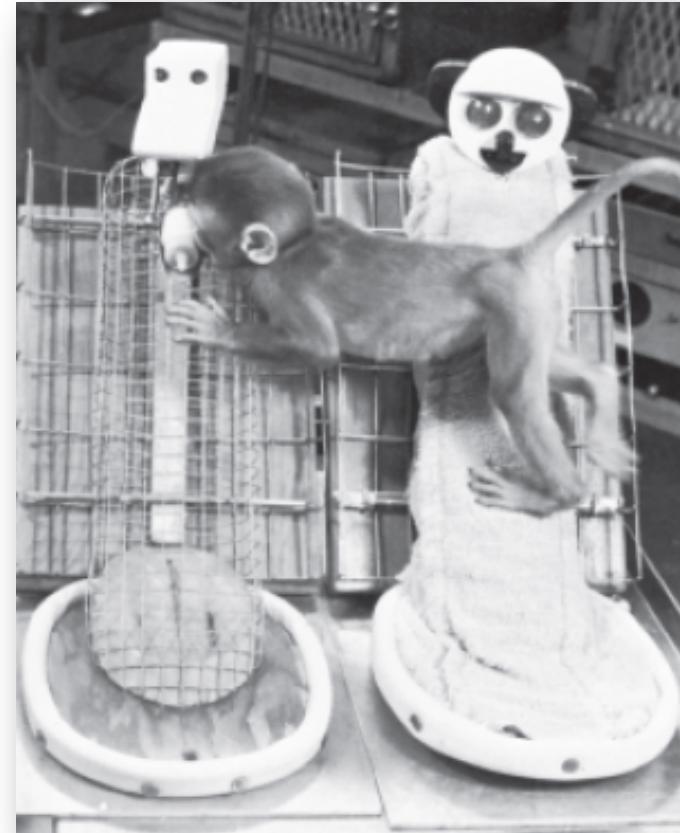
Social Development: Attachment

Attachment refers to an emotional tie to another person.

- In children, *attachment* can appear as a desire for physical closeness to a caregiver.

Origins of Attachment

Experiments with monkeys suggest that attachment is based on physical affection and comfortable **body contact**, and not based on being rewarded with food.



Attachment Variation: Styles of Dealing with Separation

The degree and style of parent-child attachment has been tested by Mary Ainsworth in the “**strange situations**” test. In this test, a child is observed as:

- 1.a mother and infant child are alone *in an unfamiliar (“strange”) room*; the child explores the room as the mother just sits.
- 2.a stranger enters the room, talks to the mother, and approaches the child; the *mother leaves the room*.
- 3.After a few moments, the *mother returns*.

Reactions to Separation and Reunion

- **Secure attachment**: most children (60 percent) feel distress when mother leaves, and seek contact with her when she returns
- **Insecure attachment** (anxious style): clinging to mother, less likely to explore environment, and may get loudly upset with mother’s departure and remain upset when she returns
- **Insecure attachment** (avoidant style): seeming indifferent to mother’s departure and return

What causes these different attachment styles: nature or nurture?

Is the “strange situations” behavior mainly a function of the child’s inborn **temperament**?

- **Temperament** refers to a person’s characteristic style and intensity of **emotional reactivity**.
- Some infants have an “easy” temperament; they are happy, relaxed, and calm, with predictable rhythms of needing to eat and sleep.
- Some infants seem to be “difficult”; they are irritable, with unpredictable needs and behavior, and intense reactions.

Is the behavior a reaction to the way the parents have interacted with the child previously? If so, is that caused by the **parenting behavior**?

- Mary Ainsworth believed that sensitive, responsive, calm parenting is correlated with the secure attachment style.
- Monkeys with unresponsive artificial mothers showed anxious insecure attachment.
- Training in sensitive responding for parents of temperamentally-difficult children led to doubled rates of secure attachment.

Fathers Count Too

- Many studies of the impact of parenting have focused on mothers.
- Correlational studies show a strong relationship between paternal (father) involvement in parenting and the child's academic success, health, and overall well-being.



Attachment Styles...

not just about bonding with parents

- Erik Erikson's concept of **basic trust** resembles the concept of attachment, but extends beyond the family into *our feeling of whether the world is predictable and trustworthy.*
- Attachment style may be relevant to our ability to manage and enjoy adult relationships. It may even be relevant to our motivations to achieve or to avoid risks.

Are basic trust and attachment styles determined in childhood?

- Erik Erikson believed that basic trust is established by relationships with early caregivers.
- Are trust and attachment styles:
 - set by genetics?
 - formed by early experiences with parents?
 - reshaped by new relationship experiences?

Deprivation of Attachment



- If children live without safe, nurturing, affectionate caretaking, they may still be **resilient**, that is bounce back, attach, and succeed.
- However, if the child experiences severe, prolonged deprivation or abuse, he or she **may**:
 - have difficulty forming attachments.
 - have increased anxiety and depression.
 - have lowered intelligence.
 - show increased aggression.

Childhood: Self-Concept

- A major task of infancy may be to form healthy attachments.
- A major task of childhood may be to form a healthy **self-concept**: a stable and positive *understanding of identity*.
- By age 8-10, a child moves from “that’s me in the mirror” to “I have skills, preferences, and goals”; this prepares the child for confident success.



Childhood: Hypothetical Parenting Styles

Style	Response to Child's Behavior
Authoritarian “Too Hard”	Parents impose rules “because I said so” and expect obedience.
Permissive “Too Soft”	Parents submit to kids’ desires, not enforcing limits or standards for child behavior.
Authoritative “Just Right”	Parents enforce rules, limits, and standards but also explain, discuss, listen, and express respect for child’s ideas and wishes.

Outcomes with Parenting Styles

- Authoritative parenting, more than the other two styles, seems to be associated with:
 - high self-reliance.
 - high social competence.
 - high self-esteem.
 - low aggression.
- But are these a result of parenting style, or are parents responding to a child's temperament? Or are both a function of culture ? Or genes?



Physical Development

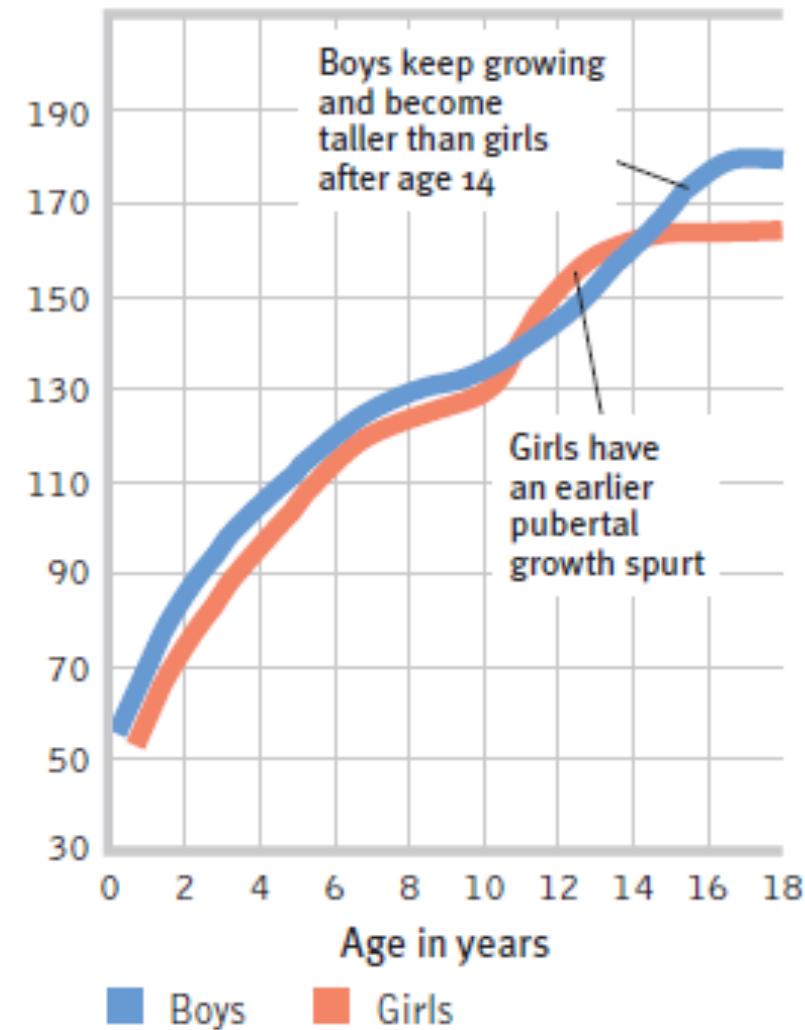
Puberty is the *time of sexual maturation* (becoming physically able to reproduce).

During puberty, increased sex hormones lead to:

- primary and secondary sex characteristics.
- some changes in mood and behavior.

Height changes are an early sign of puberty.

- Because girls begin puberty sooner than boys, girls briefly overtake boys in height.



Adolescent Brain Development

- During puberty, the brain stops automatically adding new connections, and becomes more efficient by “rewiring.”
 - “pruning” away the connections not being used
 - coating the well-used connections in myelin, in order to speed up nerve conduction
- This makes early adolescence a crucial time to learn as much as you can!

Frontal Lobes are Last to Rewire

The emotional limbic system gets wired for puberty *before* the frontal judgment centers of the brain get wired for adulthood.

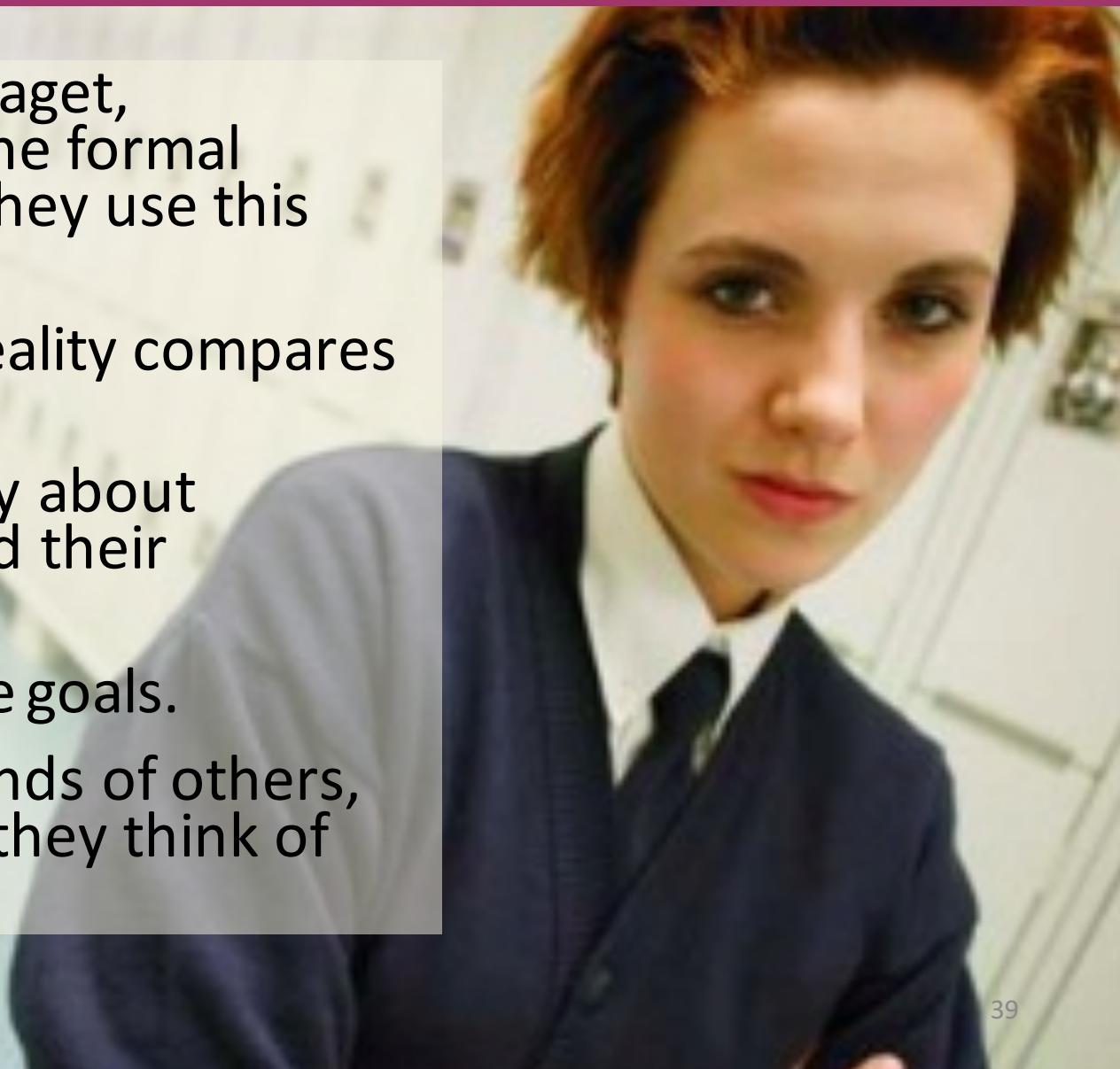
As a result, adolescents may understand risks and consequences, but give more weight to potential thrills and rewards.

Teens have developed a mental accelerator, but are not in the habit of using the brakes.

Adolescent Cognitive Development

According to Jean Piaget, adolescents are in the formal operational stage. They use this reasoning to:

- think about how reality compares to ideals.
- think hypothetically about different choices and their consequences.
- plan how to pursue goals.
- think about the minds of others, including “what do they think of me?”



Building Toward Moral Reasoning

- Adolescents see justice and fairness in terms of merit and equity instead of in terms of everyone getting equal treatment.
- Adolescents may strive to advocate for ideals and political causes.
- Adolescents think about god, meaning, and purpose in deeper terms than in childhood.

Lawrence Kohlberg's Levels of Moral Reasoning

Preconventional morality (up to age 9): “Follow the rules because if you don’t, you’ll get in trouble; if you do, you might get a treat.”

Conventional morality (early adolescence): “Follow the rules because we get along better if everyone does the right thing.”

Postconventional morality (later adolescence and adulthood): “Sometimes rules need to be set aside to pursue higher principles.”

Example: looting after a natural disaster

Which level of moral reasoning is involved?

- Looting is a problem; if everyone did it, there would be escalating chaos and greater damage to the economy.
- Looting is generally wrong, yet morally right when your family's survival seems to depend on it.
- Looting is wrong because you might get punished, but if no one is punished, that's a sign that it's okay.



Moral Intuition

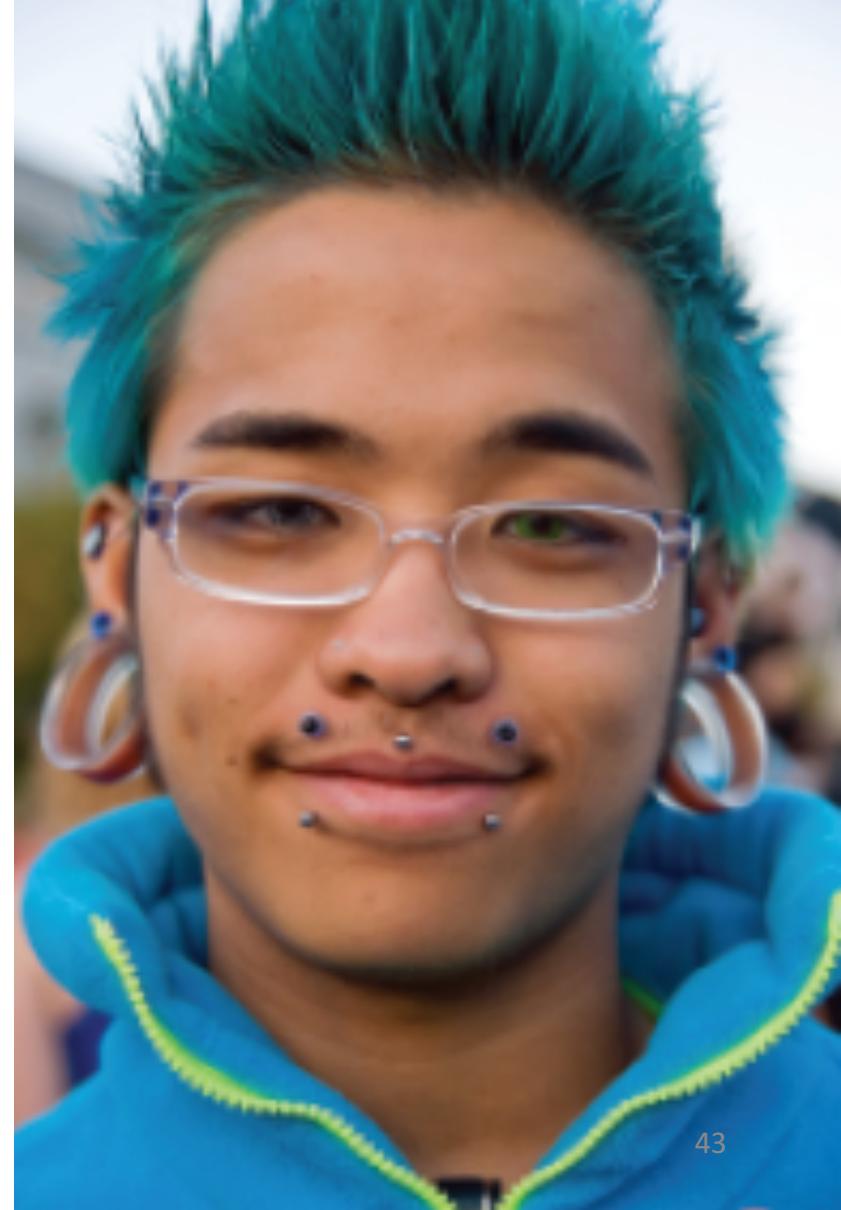
- Jonathan Haidt believed moral decisions are often driven by **moral intuition**, that is, *quick, gut-feeling decisions*.
- This intuition is not just based in moral reasoning but also in emotions such as:
 - **disgust.** We may turn away from choosing an action because it feels awful.
 - **elevated feelings.** We may get a rewarding delight from some moral behavior such as donating to charity.

An Example of Moral Intuition:

Given a hypothetical choice to save five people from an oncoming trolley by killing one person, many people's choice is determined not just by reasoning, but by **disgust**. Many people would *flip a switch* to make this choice, but not as many would *push a person on the tracks* to save five others.

Social Development: Erik Erikson (1902-1994)

- Erik Erikson's model of lifelong psychosocial development sees adolescence as a struggle to **form an identity**, *a sense of self*, out of the social roles adolescents are asked to play.
- Adolescents may try out different "selves" with peers, with parents, and with teachers.
- For Erikson, the challenge in adolescence was to test and integrate the roles in order to prevent **role confusion** (*which of those selves, or what combination, is really me?*).
- Some teens solve this problem simply by adopting one role, defined by parents or peers

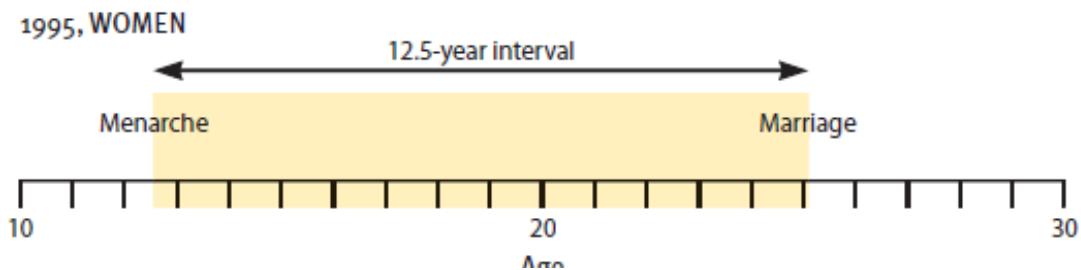
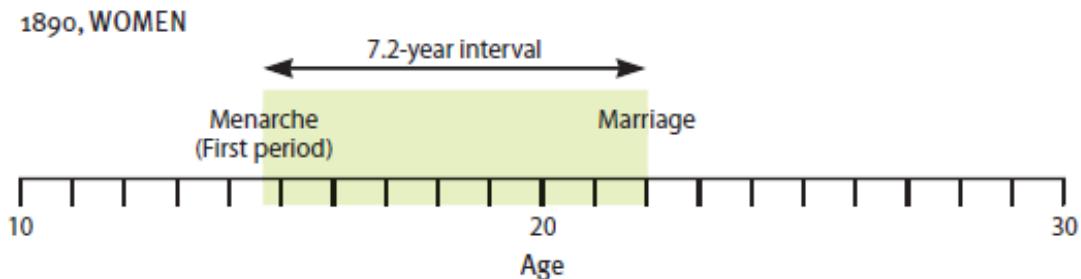


Erik Erikson: Stages of Psychosocial Development

Stage (approximate age)	Issue	Description of Task
Infancy (to 1 year)	Trust vs. mistrust	If needs are dependably met, infants develop a sense of basic trust.
Toddlerhood (1 to 3 years)	Autonomy vs. shame and doubt	Toddlers learn to exercise their will and do things for themselves, or they doubt their abilities.
Preschool (3 to 6 years)	Initiative vs. guilt	Preschoolers learn to initiate tasks and carry out plans, or they feel guilty about their efforts to be independent.
Elementary school (6 years to puberty)	Competence vs. inferiority	Children learn the pleasure of applying themselves to tasks, or they feel inferior.
Adolescence (teen years into 20s)	Identity vs. role confusion	Teenagers work at refining a sense of self by testing roles and then integrating them to form a single identity, or they become confused about who they are.
Young adulthood (20s to early 40s)	Intimacy vs. isolation	Young adults struggle to form close relationships and to gain the capacity for intimate love, or they feel socially isolated.
Middle adulthood (40s to 60s)	Generativity vs. stagnation	In middle age, people discover a sense of contributing to the world, usually through family and work, or they may feel a lack of purpose.
Late adulthood (late 60s and up)	Integrity vs. despair	Reflecting on his or her life, an older adult may feel a sense of satisfaction or failure.

Adolescence, the sequel... Emerging Adulthood

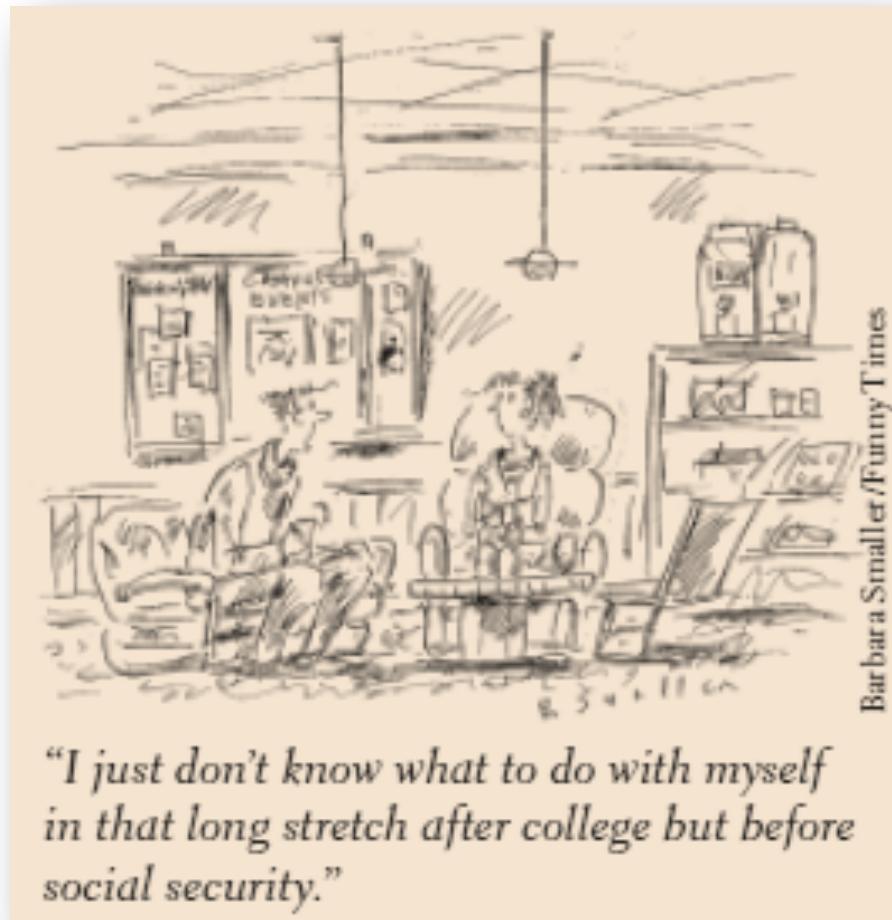
In some countries, added years of education and later marriage has delayed full adult independence beyond traditional adolescence. This seems to have created a new phase which can be called **emerging adulthood**, ages 18-25.



Adulthood

Is the rest of the developmental story just one long plateau of work and possibly raising kids?

- Physical Development
 - physical decline
 - lifespan and death
 - sensory changes
- Cognitive Development
 - memory
- Social Development
 - commitments



Adult Physical Development

- In our mid-20's, we reach a peak in the natural physical abilities which come with biological maturation:
 - muscular strength
 - cardiac output
 - reaction time
 - sensory sensitivity
- To what extent can training overcome the decline that follows?





Physical Changes: Middle Adulthood

Between ages 40 and 60, physical vitality (such as endurance and strength) may still be more of a function of lifestyle than of biological decline.

Some changes are still driven by genetic maturation, especially the end of our reproductive years.

The end the reproductive years

- There is a gradual decline in sexual activity in adulthood, although sexuality can continue throughout life.
- Around age 50, women enter menopause (the end of being able to get pregnant).
- According to evolutionary psychologists, why might it make sense for women's fertility to end?

The Aging Body

- Potential lifespan for the human body is estimated to be about 122 years.
- Life expectancy refers to the average expected life span.
- The worldwide average has increased from 49 in 1950 to 69 in 2010. In 2012:
 - South Africa—49
 - Cameroon—55
 - Pakistan—66
 - Thailand--74
 - United States--75
 - Ireland--80
 - Australia—82
 - Japan--84

More Aged Women

- The rise in life expectancy, combined with declining birth rates, means a higher percentage of the world's population is old.
- More elderly people are women because more men die than women at every age. By age 100, women outnumber men by a ratio of 5 to 1.



Why don't we live forever? Possible biological answers...

- **Nurture/Environment**

An accumulation of stress, damage, and disease wears us down until one of these factors kills us.

- **Genes**

Some people have genes that protect against some kinds of damage.

- Even with great genes and environment, **telomeres** (*the tips at the end of chromosomes*) wear down with every generation of cell duplication and we stop healing well.

Physical Changes with Age

The following abilities decline as we age:

- visual acuity, both sharpness and brightness
- hearing, especially sensing higher pitch
- reaction time and general motor abilities
- neural processing speed, especially for complex and novel tasks



Health/Immunity Changes with Age

The
bad
news



The immune system declines with age, and can have difficulty fighting off **major** illnesses.

The
good
news



The immune system has a lifetime's accumulation of antibodies, and does well fighting off **minor** illnesses.

Exercise Can Slow the Aging Process

Exercise can:

- build muscles and bones.
- stimulate neurogenesis (in the hippocampus) and new neural connections.
- maintain telomeres.
- improve cognition.
- reduce the risk of dementia.



Changes in the Brain with Age

- Myelin-enhanced neural processing speed peaks in the teen years, and declines thereafter.
- Regions of the brain related to memory begin to shrink with age, making it harder to form new memories.
- The frontal lobes atrophy, leading eventually to decreased inhibition and self-control.
- By age 80, a healthy brain is 5 percent lighter than a brain in middle adulthood.



Alzheimer's Disease and Other Dementias

Dementia, including the Alzheimer's type, is NOT a "normal" part of aging.

Dementia Symptoms

- decreased ability to recall recent events and the names of familiar objects and people
- emotional unpredictability; flat, then uninhibited, then angry
- confusion, disorientation, and eventual inability to think or communicate



Brain Changes of Alzheimer's Disease

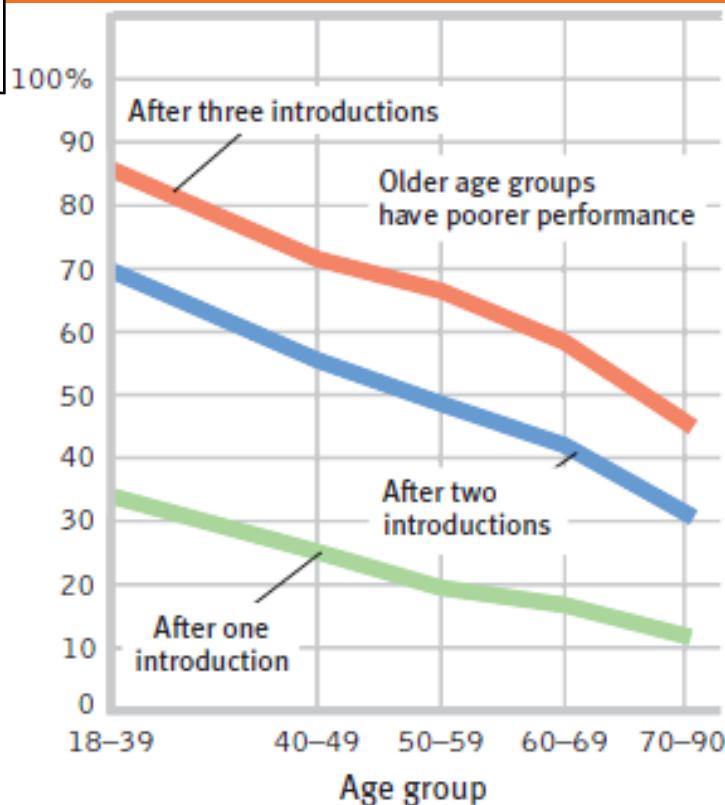
- loss of brain cells and neural network connections
- deterioration of neurons that produce acetylcholine, the memory neurotransmitter
- shriveled and broken protein filaments forming plaques at the tips of neurons
- dramatic shrinking of the brain

Cognitive Development and Memory

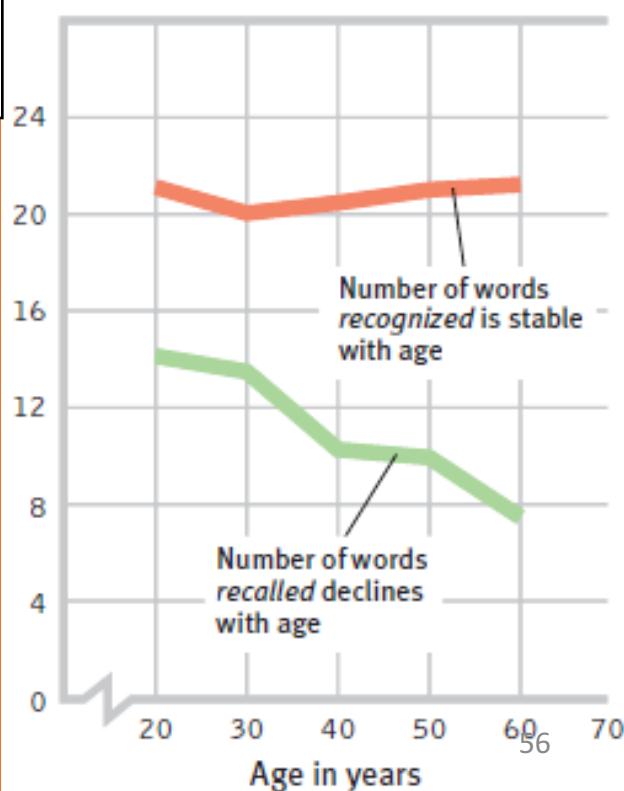
- Even without the brain changes of dementia, there are some changes in our ability to learn, process, and recall information.
- The ability to recognize information, and to use previous knowledge as expertise, does not decline with age.

Can you describe and explain the differences in performance changes in these charts?

Percentage of names recalled



Number of words remembered



More Learning and Memory Changes

- Rote memorization ability declines more than ability to learn **meaningful** information.
- **Prospective memory**, *planning to recall*, (“I must remember to do...) also declines.
- The ability to learn new **skills** declines less than the ability to learn new **information**.



Social Development in Adulthood

Is adult social development driven by biological maturation or by life experiences and roles?

- The “midlife crisis” --re-evaluating one’s life plan and success--does not seem to peak at any age.
- For the 25 percent of adults who do have this emotional crisis, the trigger seems to be the challenge of major illness, divorce, job loss, or parenting.



Psychosocial Development

- Although the “midlife crisis” may not be a function of age, people do feel pressured by a “**social clock**” of achievement expectation.
- Erik Erikson’s observations of age-related issues:

Young adulthood (20s to early 40s)	Intimacy vs. isolation	Young adults struggle to form close relationships and to gain the capacity for intimate love, or they feel socially isolated.
Middle adulthood (40s to 60s)	Generativity vs. stagnation	In middle age, people discover a sense of contributing to the world, usually through family and work, or they may feel a lack of purpose.
Late adulthood (late 60s and up)	Integrity vs. despair	Reflecting on his or her life, an older adult may feel a sense of satisfaction or failure.

Challenges of Healthy Adulthood



Arising first:
Erik Erikson's
intimacy issue
(a.k.a. affiliation,
attachment,
connectedness)

Sigmund Freud
used simpler
terms, saying that
the healthy adult
must find ways to
love and to **work**.



Arising later: Erik
Erikson's
generativity issue
(achievement,
productivity,
competence)



Commitment to Love

- The desire to commit to a loving relationship may have evolved to help vulnerable human children survive long enough to reproduce.
- Couples who go through marriage/union ceremonies tend to stay together more than couples who simply live together.
- Marriage, compared to being single, is associated with ‘happiness’ and with fewer social problems such as crime and child delinquency.

Commitment to Work



- Work roles can largely define adult identity, especially in individualistic capitalist societies.
- Tough economic times make it difficult to find work, much less follow a career path.
- Work satisfaction seems to be a function of having the work fit a person’s interests and providing a sense of competence and accomplishment.

Why do people claim to be happy even as their body declines?

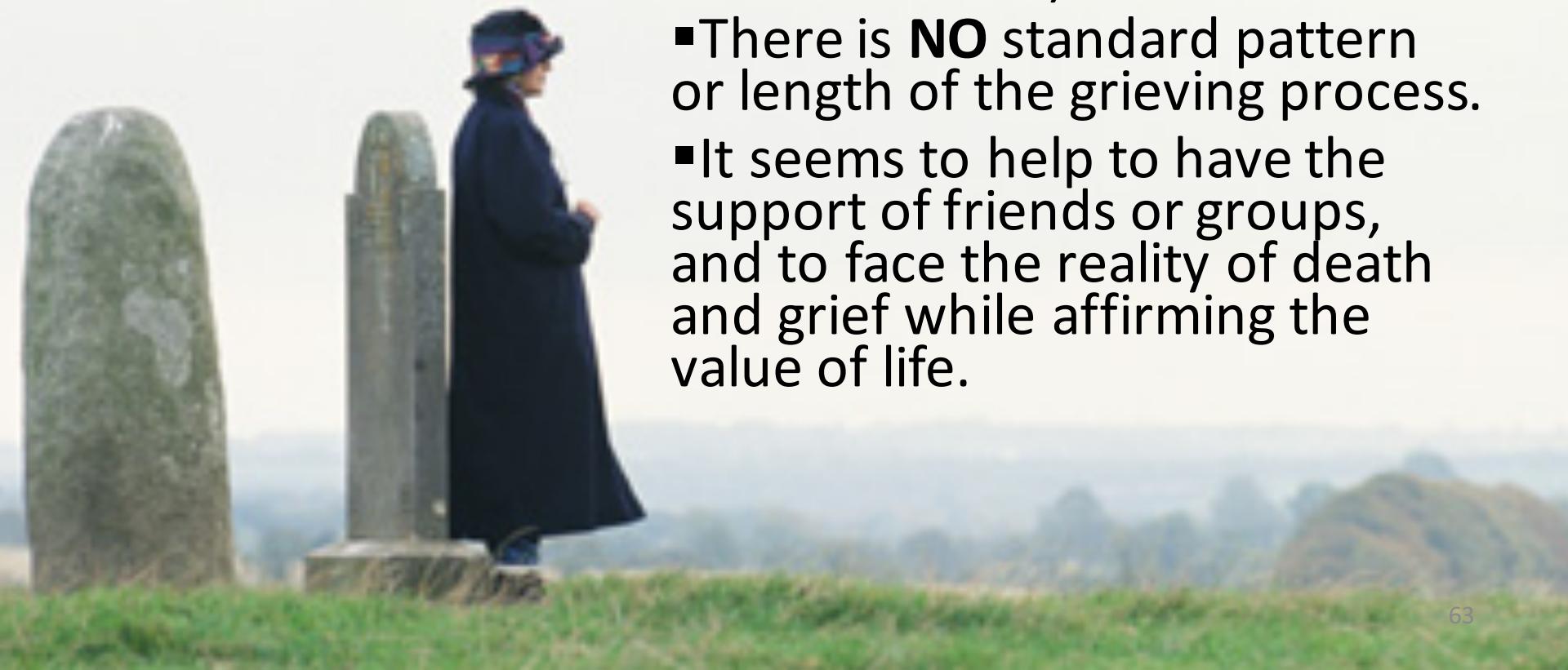
- Older people attend less to negative information and more to positive information.
- They are also more likely to have accumulated many mildly positive memories, which last longer than mildly negative memories.
- Older people feel an increased sense of competence and control, and have greater stability in mood.



Coping with Death and Dying

Individual responses to death may vary.

- Grief is more intense when death occurs unexpectedly (especially if also too early on the social clock).
- There is **NO** standard pattern or length of the grieving process.
- It seems to help to have the support of friends or groups, and to face the reality of death and grief while affirming the value of life.



The Final Issue in Development: Stability and Change

Are we essentially the same person over long periods?

- In general, temperament seems stable.
- Traits can vary, especially attitudes, coping strategies, work habits, and styles of socializing.
- Personality seems to stabilize with age.

Stability helps us form identity, while the potential for change gives us control over our lives.